

Minimum wages and income inequality: The impact of minimum wages on income inequality in the USA since 1989

Zur Erlangung des akademischen Grades einer
DOKTORIN DER PHILOSOPHIE (Dr. phil.)

von der KIT-Fakultät für Geistes- und Sozialwissenschaften des
Karlsruher Instituts für Technologie (KIT)
angenommene

DISSERTATION

von

Barbara Binder

KIT-Dekan: Prof. Dr. Michael Mäs

1. Gutachter: Prof. Dr. Gerd Nollmann
2. Gutachter: Prof. Dr. Reinhard Pollak

Tag der mündlichen Prüfung: 31.10.2024

Zusammenfassung

Die Dissertation untersucht den Einfluss von Mindestlöhnen auf die Entwicklung der Einkommensungleichheit in den USA über 30 Jahre von 1989 bis 2018. In vielen (post-)industriellen Gesellschaften hat die Ungleichheit der verfügbaren Haushaltseinkommen in den vergangenen Jahrzehnten stark zugenommen. Da Einkünfte aus Erwerbstätigkeit in diesen Gesellschaften die wichtigste Einkommensquelle der Haushalte sind, kann die Entwicklung der Lohnstruktur erheblich die Verteilung der Haushaltseinkommen beeinflussen. Da das Haushaltseinkommen jedoch aus verschiedenen Quellen aller Haushaltsmitglieder besteht, ist der Zusammenhang zwischen individuellen Löhnen und dem Gesamteinkommen eines Haushalts komplex. Die Skepsis gegenüber Mindestlöhnen als sozialpolitische Maßnahme ist groß und wird in Wissenschaft und Politik intensiv debattiert.

Haushalte mit Mindestlohnbeschäftigten haben nicht zwangsläufig ein niedriges Einkommen, und Haushalte mit niedrigem Einkommen sind nicht notwendigerweise häufiger von Mindestlöhnen betroffen. Zudem erschweren Interaktionen zwischen verschiedenen Einkommensquellen die Übertragung steigender Löhne auf höhere Haushaltsnettoeinkommen. Eine besondere Rolle spielen dabei die Transferentzugsraten, also die Verringerung des Anspruchs auf staatliche Transferzahlungen (insbesondere der Sozialhilfeprogramme) aufgrund steigender Erwerbseinkommen, sowie die erhöhte Steuerbelastung durch steigende Erwerbseinkommen, die jedoch zu einem substantiellen Teil zurückerstattet wird. Die Forschungslage zum Einfluss von Mindestlöhnen auf Armut oder Einkommensungleichheit ist trotz zahlreicher Studien mit verschiedenen methodischen Ansätzen uneindeutig und berücksichtigt Steuergutschriften und Steuerrückerstattungen häufig nicht.

Im betrachteten Zeitraum haben sich sowohl die Höhe der gesetzlichen Mindestlöhne als auch die Sozialstruktur erheblich verändert, was tiefgreifende Auswirkungen auf den Arbeitsmarkt sowie die Komposition und Einkommenssituation der Haushalte mit Mindestlohnbeschäftigten hatte. Die zunehmende Heterogenität in der Höhe der gesetzlichen Mindestlöhne auf Ebene der Bundesstaaten führte zu einem Anstieg des Medians der Mindestlöhne auf Bundesebene. Parallel dazu hat die Ausweitung des Niedriglohnsektors die Bedeutung von Mindestlöhnen verstärkt, sodass immer mehr Erwerbstätige von immer höheren Mindestlöhnen betroffen sind. Langfristige Veränderungen in der Sozialstruktur, etwa durch Zuwanderung oder veränderte Familienkonstellationen, haben das typische Bild der Mindestlohnbeschäftigten diversifiziert: Heute sind es nicht mehr überproportional Jugendliche oder niedrig gebildete Erwachsene, sondern eine heterogenere Gruppe, die oft den Großteil zum Haushaltseinkommen beiträgt und damit den Wohlstand des Haushalts maßgeblich bestimmt.

Gleichzeitig hat sich der US-amerikanische Wohlfahrtsstaat gewandelt, indem wohlfahrtsstaatliche Leistungen zunehmend an Erwerbstätige und ihre Haushalte ausgerichtet wurden. Ungünstige Interaktionseffekte, bei denen der Anreiz für mehr Arbeit durch reduzierte Transferzahlungen gemindert wird, konnten verringert werden, da das Einkommensteuersystem zu einem der wichtigsten Systeme staatlicher Unterstützung geworden ist: Hohe Steuergutschriften können zu einer negativen Einkommensteuerlast und zu hohen Steuerrückerstattungen führen. Steuerrückerstattungen fungieren für Haushalte mit niedrigen bis moderaten Erwerbseinkommen als zusätzliche Einkommensquelle. Anders als bei traditionellen staatlichen Transferleistungen steigt die Summe der Steuergutschriften, auf die

Haushalte Anspruch haben, mit steigenden Erwerbseinkommen zunächst an. So verstärken sich steigende Erwerbseinkommen aus Mindestlohnbeschäftigung und staatliche Unterstützung über das Einkommensteuersystem gegenseitig.

Vor dem Hintergrund dieser langfristigen Entwicklungen ist die grundlegende Erwartung der vorliegenden Arbeit, dass sich der Zusammenhang zwischen Mindestlohnbeschäftigung und niedrigen Haushaltseinkommen verstärkt hat. Mindestlohnbeschäftigte tragen zunehmend zum Haushaltseinkommen bei, leben häufiger in Haushalten mit niedrigem Einkommen und ihr Einkommen aus Mindestlohnbeschäftigung schlägt sich stärker in einem Anstieg des gesamten Haushaltseinkommens nieder.

Auf Grundlage von Quantilsregressionen, die nicht die Armutsquote als einzigen Punkt, sondern die **gesamte Verteilung der Haushaltseinkommen** betrachten, untersuche ich den Einfluss von Haushalten mit Mindestlohnbeschäftigten auf die Entwicklung der Einkommensungleichheit **in der Gesamtbevölkerung** zwischen 1989 und 2018. Die Haupthypothese lautet, dass die verbesserte Einkommenssituation von Haushalten mit Mindestlohnbeschäftigten zu einer Erhöhung der Quantilwerte im unteren Haushaltseinkommensbereich beigetragen hat, was wiederum zu einer Verringerung der Ungleichheit der Haushaltsnettoeinkommen geführt hat.

Damit verbunden sind weitere Hypothesen: Erstens, dass die ungleichheitsreduzierende Wirkung **bei engeren Definitionen von Haushaltseinkommen, wie den Erwerbseinkommen, stärker ausgeprägt ist als bei weiteren Definitionen, wie den Haushaltsbruttoeinkommen oder verfügbaren Haushaltsnettoeinkommen**. Zweitens, dass **Einkommenskonzepte, die die von Haushalten erhaltenen Steuerrückerstattungen als zusätzliche Einkommensquelle berücksichtigen**, ebenfalls eine stärkere ungleichheitsreduzierende Wirkung zeigen. Es wird außerdem erwartet, dass der Beitrag im unteren Einkommensbereich im Kontext des **veränderten Steuersystems** stärker ausfällt und dass Haushalte, die von den großzügigen Steuerrückerstattungen im veränderten Steuersystem profitieren, stärker zu positiven Entwicklungen im unteren Einkommensbereich beitragen als Haushalte, die keine Steuerrückerstattungen erhalten.

Diese Hypothesen werden anhand von Daten des Annual Socio-Economic Supplement des Current Population Survey (CPS-ASEC) mittels Dekompositionen unbedingter Quantilregressionen überprüft. Diese Methode ist besonders geeignet, um den Beitrag bestimmter Haushaltstypen, wie Haushalte mit Mindestlohnbeschäftigten, zur Veränderung bestimmter Quantilwerte zu schätzen. Diese Schätzungen werden für die gesamte untere Hälfte der Einkommensverteilung durchgeführt. Dabei wird nicht nur die Entwicklung der Quantilwerte der Verteilung der verfügbaren Haushaltsnettoeinkommen (*nach* Abzug von Steuern und Sozialversicherungsbeiträgen) untersucht, sondern auch die der Haushaltsbruttoeinkommen (Haushaltseinkommen *vor* Abzug von Steuern und Sozialabgaben) und der Erwerbseinkommen der Haushalte. Im Falle der Haushaltsbruttoeinkommen wird außerdem zwischen der standardmäßigen Messung und einer Messung, die die teilweise substanziellen Steuerrückerstattungen an Haushalte berücksichtigt, unterschieden. So können Aussagen darüber getroffen werden, ob Haushalte mit Mindestlohnbeschäftigten unterschiedlich stark zur Entwicklung der Ungleichheit dieser verschiedenen Einkommensarten beigetragen haben. Dies könnte der Fall sein, wenn der Einfluss des Mindestlohns bei weiter

gefassten Einkommenskonzepten, die beispielsweise auch Einkommen aus öffentlichen Transfers oder die Steuerbelastung der Haushalte berücksichtigen, aufgrund ungünstiger Wechselwirkungen weniger ungleichheitsmindernd war als bei enger gefassten Einkommenskonzepten. Darüber hinaus werden die Schätzungen mit unterschiedlichen Modellspezifikationen durchgeführt, unter anderem auch mit Interaktionseffekten, die das Zusammenspiel von Mindestlöhnen mit dem stark ausgebauten System der Steuerrückerstattungen abbilden. Damit wird untersucht, ob insbesondere das Zusammenspiel dieser beiden Faktoren zu einer Verbesserung der Einkommenssituation von Haushalten mit niedrigem Einkommen geführt hat.

Die Ergebnisse zeigen, dass Haushalte mit Mindestlohnbeschäftigten durch ihre verbesserte Einkommenssituation signifikant zu einem leichten Anstieg von 1 bis 2 Prozent der verfügbaren Haushaltseinkommen zwischen dem dritten und achten Perzentil beigetragen haben. Eine Auswirkung auf die Ungleichheit der verfügbaren Haushaltsnettoeinkommen in der Gesamtbevölkerung ist jedoch begrenzt. Aus den Ergebnissen der Modelle auf Grundlage verschiedener Einkommenskonzepte und Modellspezifikationen lässt sich schlussfolgern, dass Veränderungen der Ungleichheit der Erwerbseinkommen von Haushalten stärker mit der verbesserten Einkommenssituation von Haushalten mit Mindestlohnbeschäftigten assoziiert sind als Veränderungen in der Ungleichheit der Haushaltbruttoeinkommen oder verfügbaren Haushaltsnettoeinkommen. Die Ergebnisse unterschiedlicher Modellspezifikationen zeigen, dass Haushalte mit Mindestlohnbeschäftigten, anders als erwartet, im Kontext des veränderten Steuersystems im unteren Einkommensbereich nicht zu positiven Entwicklungen im unteren Einkommensbereich der Gesamtbevölkerung beitragen. Einkommenssteigerungen sind jedoch im Bereich des 35. Perzentils zu beobachten. Die Modellspezifikationen mit Interaktionseffekten zeigen, dass Haushalte mit Mindestlohnbeschäftigten, die auch Steuerrückerstattungen erhalten, stärker zu Einkommenssteigerungen im unteren Bereich der Einkommensverteilung beitragen als solche ohne Steuerrückerstattungen.

Der Einkommensbereich, in dem Haushalte mit Mindestlohnbeschäftigten zu einer positiven Entwicklung beitragen, liegt unterhalb der relativen und absoluten Armutsquote. In Studien zum Einfluss des Mindestlohns auf die Entwicklung der Armutsquote wird dieser positive Einfluss am unteren Rand der Verteilung somit übersehen. Die vorliegende Arbeit erweitert den Forschungsstand und zeigt, dass Mindestlohnpolitik zu Einkommenswachstum im unteren Einkommensbereich beitragen kann. Eine wichtige Rolle spielt dabei das Zusammenspiel mit der Steuerpolitik, die die Erwerbstätigkeit von Haushalten mit niedrigem Einkommen zunehmend unterstützt. Die Auswirkungen auf die Einkommensungleichheit in der Gesamtbevölkerung sind über verschiedene Einkommenskonzepte und Modellspezifikationen hinweg begrenzt. Stärker ist der ungleichheitsmindernde Effekt in der Gruppe der Haushalte, die in den Arbeitsmarkt integriert sind. In der Gesamtbevölkerung ist der Beitrag von Haushalten, die vor dem Hintergrund der Änderungen des Einkommensteuersystems von großzügigen Steuergutschriften und -erstattungen profitieren, für die Entwicklung der Ungleichheit der verfügbaren Haushaltseinkommen wesentlich bedeutsamer: Unabhängig davon, ob diese Haushalte vom Mindestlohn betroffen sind oder nicht, ist ihr Beitrag zur Entwicklung der Einkommensungleichheit deutlich stärker. Da sich die Höhe der Steuergutschrift am jährlichen Erwerbseinkommen orientiert, ist der durch den Mindestlohn definierte Stundenlohn für die ungleichheitsmindernde Wirkung von untergeordneter

Bedeutung. Allerdings trägt der Mindestlohn dazu bei, dass die Subventionierung niedriger Erwerbseinkommen nicht zu sinkenden Stundenlöhnen führt. Zusammen mit der Ausweitung der steuerlichen Förderung von Haushalten mit niedrigem Einkommen hat dies wesentlich dazu beigetragen, dass Haushalte mit niedrigem Einkommen in den USA - anders als in vielen anderen (post-)industrialisierten Ländern - nicht von der positiven Einkommensentwicklung der Haushalte in der Mitte der Bevölkerung abgekoppelt wurden.

Table of contents

1.	Introduction	1
1.1.	What this dissertation is about	7
1.2.	What this dissertation is not about	9
1.3.	Outline of this dissertation	10
2.	Minimum wages as social policy	11
2.1.	Minimum wage laws at the federal level and across states.....	15
2.2.	The increasing use of minimum wages as social policy on across the United States 16	
2.2.1.	History of the minimum wage before and after the enactment of the FLSA ...	17
2.2.2.	Recent trends in federal and state minimum wages	18
2.3.	Different trajectories in minimum wage policy, poverty, and income inequality....	23
2.4.	Skepticism about the effectiveness of minimum wages as a social policy tool	33
2.5.	The impact of minimum wages on household disposable income.....	38
2.5.1.	Who benefits from the minimum wage? The composition of the minimum wage workforce	39
2.5.2.	Who benefits most? The distribution of benefits from minimum wage increases across households.....	42
2.5.3.	A framework for the translation of minimum wage hikes into increases in total household income.....	45
2.6.	Summary and conclusion	52
3.	Minimum wages and income inequality: Changing labor markets, social policies, and demographic contexts.....	57
3.1.	Minimum wages in changing labor market contexts	59
3.1.1.	The impact of the minimum wage on wages.....	60
3.1.2.	Minimum wages and the prevailing wage structure.....	62
3.1.3.	Minimum wages and the distribution of work: Working hours and employment 69	
3.2.	Minimum wages and changing policies to support low-income households.....	86
3.2.1.	Minimum wages and changes in public income support. The increasing dependence of the working-age population on earned income	88
3.2.2.	Minimum wages and tax policies to support households in low-paid work	95
3.3.	Minimum wages in the context of demographic change and changes in household constellations	104

4. Minimum wage research and evidence on the impact of minimum wages on income inequality in the U.S.....	114
4.1. Minimum wage research: Difficulties, different research strategies, and different results	115
4.2. Evidence on effects of the minimum wage on the inequality of incomes.....	117
5. Research gaps and contributions of this dissertation.....	127
5.1. A novel approach: Identifying households affected by minimum wage policy.....	132
5.2. Minimum wage households' contribution to population-level income distribution changes: A distributional and decomposition analysis approach.....	134
5.3. A broad perspective: Studying the population-level influence of the minimum wage on income inequality in the long-term	135
5.4. The outcome variable of interest – Disposable incomes after transfers and taxes.	137
6. Analysis strategy and hypotheses.....	140
7. Data and methods	144
7.1. The CPS ASEC data.....	144
7.1.1. CPS ASEC: Comparability over time	145
7.1.2. Advantages and limitations of the CPS ASEC.....	147
7.2. Augmenting the survey data with aggregate data and tax simulations	151
7.2.1. Identification of tax units and augmentation of their information in the simulation program	152
7.2.2. Social security contributions	152
7.2.3. Income tax liability of households	153
7.3. Time frame	153
7.4. Analytic sample.....	154
7.5. Variables: Description of income measures, covariates, and control variables	156
7.5.1. Household income.....	156
7.5.2. Individuals and households affected by minimum wages.....	160
7.5.3. Additional covariates and control variables	162
7.6. Method: Decompositions of unconditional quantile regressions	168
7.6.1. Estimation procedure for contributions to unconditional quantile value changes	172
7.6.2. Model specification and interpretation of changes in quantile values	174
8. Minimum wages and the affected population: An empirical overview	178
8.1. Trends in minimum wages and their bite	178
8.2. The share of households with minimum wage earners as one subgroup of the total population.....	195

8.3.	Income trends and compositional changes among households with minimum wage earners	204
9.	Descriptive results	218
10.	Multivariate results	234
10.1.	The contribution of households with minimum wage earners to changes in inequality of disposable household income	234
10.2.	The impact of changes in minimum wage policy on the inequality of household incomes – different income concepts	243
10.3.	The interplay of changes in minimum wage policy and the systems of public transfers and taxes over time	253
10.4.	Do households with minimum wage earners benefit from tax policy supporting low-income households?	270
11.	Discussion and conclusion	285
11.1.	Central findings of this dissertation	287
11.2.	Limitations and avenues for further research	291
11.3.	Discussion	296
12.	References	302

1. Introduction

Minimum wages have featured prominently in policy debates in recent years and are increasingly used as a social policy tool to tackle income inequality by raising the incomes of low-income individuals and families.

In recent decades, many affluent democracies have experienced an increase in income dispersion. Countries differ, however, in their overall pattern of inequality trends. The U.S. has experienced a sharp rise in income inequality over the past three decades and is a clear outlier in terms of its exceptionally high current level of inequality (Grusky and Hill 2018; Atkinson 2015; Gornick and Milanović 2015; Alderson and Doran 2013; McCall and Percheski 2010; Gottschalk and Smeeding 1997; Morelli, Smeeding, and Thompson 2015). This long-term trend has been driven mainly by strong income and wealth growth at the top end, while the middle and the bottom of the income distribution have experienced only slow income growth in favorable economic environments. In some countries, the incomes of households in lower parts of the distribution have failed to keep pace with those in the middle, whereas in others the relation between middle- and low-income households has remained stable. The USA is one such case. Over the long term, inequality in the lower half of the household income distribution has remained relatively stable (Donovan, Labonte, and Dalaker 2016; Smeeding 2005; Kenworthy 2024). Claims regarding the stability of inequality in the lower half of the income distribution are based on the ratio between the median and the 10th percentile of the distribution (Smeeding 2005:963). It is possible that other developments may be observed below this point. Nevertheless, the stability in the income range above it means that the relative poverty rate, for example, has also been fairly stable since the 1990s.

Today's high level of inequality in the USA, particularly in the lower half of the income distribution, is the result of a period of strong inequality growth during the 1980s. The current distribution of income and the associated trends are particularly influenced by the employment income of household members (Salverda, Nolan, and Smeeding 2011b). It therefore seems reasonable to assume that one of the most significant labor market institutions, namely the regulation of minimum wages, can affect the extent of income inequality. Although the impact of minimum wages on the growth of income inequality has hardly been investigated, scholars argue that the rise in income inequality can be attributed, at least in part, to the declining real value of the minimum wage. This decline is the result of political processes that increasingly favor pro-inequality forces (Morris and Western 2008; Grusky and Ku 2008). Historically, workers have been able to capture rents through institutions. However, these have weakened in the past 40 years. This is particularly true of the decline in the real value of the minimum wage during the 1980s and the decline in the proportion of the labor force that is unionized (Weeden and Grusky 2014). This destruction in rent has been concentrated at the bottom of the income distribution, contributing to an increase in income inequality in general and within the lower half of the income distribution (Morgan and Cha 2007; Weeden and Grusky 2014; Grusky and MacLean 2016). This assumption is also supported by evidence that today's level of income inequality is a consequence of the sharp increase in wage inequality in the lower half of the wage distribution that occurred during the 1980s (Blackburn and Bloom 1991). This increase in wage inequality was also largely due to the declining real value of the minimum wage in the

same period. While scholars continue to debate how much of the increase in inequality was caused by minimum wages, they agree that it was one of the crucial drivers (Autor, Manning, and Smith 2016; DiNardo, Fortin, and Lemieux 1996; Fortin and Lemieux 1997; Western and Rosenfeld 2011). Following the same line of reasoning, I argue that rising real levels of statutory minimum wages across states could potentially combat income inequality. While not all low-wage workers live in low-income families, there is a clear relationship between the two — a relationship that has strengthened in recent decades. Together with the growing "bite" of the minimum wage, which refers to the combination of an increasing value of the minimum wage and a growing share of the labor force that is affected by it, this should have had an inequality-reducing effect.

Policymakers concerned about economic inequality regularly advocate for legislation to raise the minimum wage. The issue has been hotly debated in the USA for decades, with Democratic presidential hopefuls regularly calling for an increase in the federal minimum wage. Advocates of a higher minimum wage argue that it is not only a worker protection measure that ensures minimum wage floors, but also an antipoverty tool. This is consistent with its long-standing rationale of improving conditions for low-income families and alleviating poverty.

Nevertheless, calls to raise the minimum wage are met with opposition as well as support. Rising minimum wages benefit the lowest paid in the labor market. These may or may not belong to low-income households. For the minimum wage to have an impact on poverty or income inequality, the extent to which increases in minimum wages go to households in need is important (Belman, Wolfson, and Nawakitphaitoon 2015:607). This "targeting problem" makes the relationship between minimum wage policy and the reduction of poverty or income inequality more complex than the relationship between the minimum wage and the dispersion of wages. The problem of targeting is also a major counterargument put forward by those who are skeptical about raising the minimum wage. Another issue is the unfavorable interaction between the increase in earnings brought about by minimum wages and income support. High marginal tax rates due to transfer withdrawal rates or increasing tax liability of households reduce their gains from higher wages. Ultimately, this leaves households' net income unchanged.

For decades, policymakers and researchers have debated how effectively minimum wages protect employees. This debate has focused on two areas: the provision of adequate minimum wage floors and the reduction of income poverty. At the time of writing, the federal minimum wage has not been raised for more than a decade. Although Democrats regularly call for increases in the federal minimum wage, minimum wage policy is currently determined by state and local governments. The increasing relevance of minimum wages at the state, county, and city levels has also broadened the debate over the efficacy of minimum wage policy as a redistributive tool. As policy diversity emerges, diverging practices create quasi-experimental settings (Neumark and Wascher 2008). In 2024, 30 states and the District of Columbia have a higher minimum wage than the federal minimum. In D.C. and 19 of these 30 states, the minimum wage is indexed for inflation and automatically adjusted each year in line with the rising cost of living. Five states have never introduced a state minimum wage law, and two states have minimum wages below the federal minimum. However, since the statutory minimum wage is always the higher of the federal minimum and the state minimum, employees

in these states also benefit from the federal minimum wage. Fourteen states have a minimum wage set at the federal level of \$7.25 (Economic Policy Institute 2020, 2024b).

This paper uses a long-term timeframe between 1989 and 2018 that covers the period in which the minimum wage became increasingly important as a social policy measure. This coincides with a period in which the U.S. welfare state underwent significant changes in the provision of income support that were accompanied by widespread changes in the labor market, including a growing supply of low-wage labor that was also associated with a large influx of immigrants. I examine the impact of the minimum wage on the evolution of income inequality since 1989 and therefore focus on the long-term effects of minimum wages in a changing landscape in terms of the labor market, redistribution, and demographics.

This analysis period is preceded by a long period in the 1980s in which the federal minimum wage did not increase. This led to an extraordinary decline in its real value of around 30% by 1989 (Neumark and Wascher 2008). From this point on in the history of the minimum wage, more and more states began to utilize the option of enacting minimum wages at the state level in order to adjust the wage floor to the rising cost of living in many areas of the USA. Since 1989, there has therefore been a notable divergence in minimum wage levels across the 50 states and the District of Columbia. This had led to a surge in debate and research on the impact of these policies.

The federal minimum wage was raised on three occasions between 1989 and 2009. Since 2009, it has remained unchanged. In the absence of action at the national level, many states and localities have raised their own minimum wages. The constant flux of minimum wage laws at the state level underpins its relevance as a (social) policy tool. Notable changes in state and local minimum wages have resulted in a pronounced divergence in wage floors across the USA, particularly in recent years. A total of 28 states and D.C. have changed their minimum-wage laws since 2014, and the effective minimum wage has increased in 30 states and D.C. since 2014. However, 20 states still have a statutory minimum wage at the federal level of \$7.25, suggesting that attitudes towards this subject differ across the USA (Economic Policy Institute 2024b).

Most studies that investigate the impact of minimum wages on the living standards of the families of minimum wage earners estimate aggregate-level changes in poverty rates after hikes in minimum wages. The objective of this dissertation is to examine whether increases in the minimum wage were associated with a decline in income inequality between 1989 and 2018. Looking at the evolution in income inequality goes beyond the study of trends in poverty rates, as it considers trends in income across the whole distribution. From a sociological or sociopolitical point of view, what matters is not only whether a subsistence level, such as the one defined by the official poverty measure, is guaranteed, but also how the households affected by a social policy compare with others in society. In addition to ensuring a minimum subsistence level, social policy can also be designed to facilitate social participation, improve well-being, promote satisfaction, and foster social peace and cohesion. Perceptions of changes in inequality have a stronger influence on the attitudes and satisfaction of populations than the absolute magnitude of these changes. Therefore, changes in the absolute level of living standards may influence people's satisfaction to a lesser extent than the way in which their living standards compare with those of other people in society or their peers.

Inequality can be reduced at different levels. One approach is to implement measures that limit the extent to which inequality is generated by markets. Another is to implement measures that reduce the extent of inequality in market incomes through government redistribution, which can be achieved through tax systems or public transfers. Both types of measures are discussed in the literature on ways to tackle high inequality. There is also a consensus that reducing income inequality arising from labor market processes would be a helpful first step (e.g., Atkinson 2015). From a bottom-up perspective, the minimum wage appears to be the most important policy instrument for tackling inequality in labor markets. Although a tight labor market is undoubtedly contributing to the upward pressure on wages, it is important to recognize the role of institutional factors such as a statutory minimum wage.

In the literature on types of welfare states and types of market economies, the USA has long served as a model country and prime example of a liberal, Anglo-Saxon welfare state and a liberal market economy with limited state intervention in market processes and outcomes. The market is the primary actor in welfare production and its underlying logic largely determines the welfare and social security of the individual. State intervention in the form of social benefits is low and often involves means-testing. A minimum wage ensures a lower limit to the wages that have to be paid in the labor market, which is the primary source of welfare (Esping-Andersen 1990; Kalleberg 2018). The USA has been repeatedly described as a country with a very "pure" form of liberal market economy, with little labor market regulation. This includes a low level of employment protection and collective bargaining. The low level of employment protection is indicative of the ease with which employers can terminate employment contracts, while the limited scope of collective bargaining illustrates the limited role played by union-led wage bargaining. Furthermore, the liberal market economy of the USA is characterized by shorter average job tenure and less vocational training, as well as more general training in education systems (Hall and Soskice 2001).

Income inequality is primarily shaped by the earnings of individuals from work and the manner in which these earners cluster together in households. However, total household income is the sum of more than this single component. The amount of income from different income sources in households is not independent of each other, but correlates strongly. Furthermore, the impact of various income sources and different types of taxes varies between income strata. There is a widespread belief that employment is the best route out of poverty and therefore also helps to decrease inequality. At the same time, however, this belief is challenged, particularly in the U.S., by persistently high rates of in-work poverty: A significant proportion of people are poor even though they are employed. Many factors may drive in-work poverty, such as a low volume of work, a high number of dependents in the household with whom income must be shared, or low wages. As with the problem of in-work poverty, the question of the effectiveness of the minimum wage in combating income inequality arises on at least two levels. Firstly, there is the issue of individuals who work for the minimum wage. Secondly, there is the issue of the households in which they live and whose total income determines their standard of living. Minimum wages and the additional income from an increase in the minimum wage floor initially flow to low-wage individuals, and not to low-income households. For the minimum wage to work as a social policy that improves the lives of the least well-off and reduces the income inequality that increasingly divides U.S. society, minimum wages should primarily target low-income families and households.

I examine the extent to which minimum wages can affect income inequality, taking into account the relationship between people who work for minimum wages, the family constellations in which they live and the role that income from minimum wage employment plays in these constellations. Other sources of income and their interactions with increases due to the minimum wage play a special role here, for example the reduction in public transfers or the increasing tax burden on households resulting from rising earned income. It is an open question whether certain steps in the translation process between an individual's hourly wage and the total disposable income of households prevent the minimum wage from having an impact on income inequality. I will discuss the role of these factors and use appropriate methods to assess whether the minimum wage has had a reducing effect on income inequality over the last 30 years, independent of these interactions. It is possible that changes in social policy, tax policy, or demographics and family constellations have led to a change in the impact of the minimum wage on the distribution of household incomes. Higher minimum wages directly increase the hourly wages of affected individuals, but it remains unclear whether this translates into higher annual incomes for individuals, higher labor incomes for households, or higher total incomes for households, before and after accounting for their tax burden.

It also remains unclear whether minimum wage earners are distributed across households in such a way that income inequality can potentially be reduced if their incomes rise. If minimum wage earners and the benefits resulting from minimum wage increases are evenly distributed across the entire income distribution, wage increases will not affect inequality. These two interrelated and so far largely unanswered questions will be addressed in this thesis.

As previously stated, the long-term timeframe of the study enables a holistic view of the potential of the minimum wage to combat inequality. Since 1989, the minimum wage has become an increasingly important social policy instrument. This coincided with a period of significant change in the U.S. welfare state, including the provision of income support. These changes were accompanied by a number of other changes in the labor market, including a growing supply of low-wage labor, which was also associated with a large influx of immigrants. I examine the impact of the minimum wage on the evolution of income inequality since 1989 and therefore focus on the long-term effects of minimum wages in a changing landscape in terms of the labor market, redistribution, and demographics.

The rising real value of the minimum wage has been paralleled by trends that have altered the group to which it is targeted. This has increased the impact of the minimum wage on the wages of a significant portion of the workforce and on the incomes of a significant portion of low-income households.

The effectivity of minimum wage policy depends strongly on the labor market context in which it is set. The prevailing wage structure is particularly crucial for the minimum wage to have a significant impact. If only a very small share of the labor force is paid the minimum wage, then minimum wage policy is unlikely to have a significant impact on overall wage inequality, the distribution of earnings, and the distribution of household incomes. The growth of the low-wage sector has increased the proportion of potentially affected workers in the labor force over time. As the size of the affected workforce increases, minimum wages will affect the wage structure and wage inequality by raising wages at the bottom of the wage distribution for a substantial portion of the workforce. The impact of the minimum wage on *household income*

inequality largely depends on how households with low incomes are integrated in the labor market. Targeting would be 'inefficient' if the benefits of a hike in the minimum wage accrued unevenly to those in higher income brackets. Most of the benefits of a higher minimum wage would then flow to higher-income households. On the other hand, increased labor market activity in the lower income brackets over time, for example in the context of a strong shift to workfare and in-work benefits that incentivize work, could imply that the benefits of a minimum wage increasingly flow to households with low incomes.

The importance of labor market policy, and thus of the minimum wage, for the income distribution of the population as a whole is profoundly affected by demographic shifts and sociostructural changes. Ageing and the influx of immigrants with varying degrees of labor market participation determine the size and structure of the working population and have a strong influence on the labor supply in the growing low-wage sectors. Furthermore, the image of the "typical" minimum wage earner and the "typical" family, whose income is heavily dependent on the minimum wage, is changing. Patterns of household composition ultimately determine whether minimum-wage employees are increasingly the primary earners in the household or whether minimum-wage income plays a subordinate role in overall household income.

The interrelationship between minimum wages and policies to support low-income households is changing over time. Changes in redistribution through the welfare state and taxation shape the potential impact of minimum wage policy on income inequality over time. One of the central arguments of opponents of minimum wage increases is the potential loss of public income support that would consequently result from high marginal "taxes" on increased earnings and labor income. Additionally, rising income and social security tax liabilities could further diminish the benefits of a higher wage floor. However, public transfer and tax systems have changed considerably in recent decades, and an increasing proportion of family income support is compatible with, or even reinforced by, higher labor income. In this case, higher wage floors could be particularly beneficial for low-income families in employment. The move from welfare to workfare reduced traditional forms of public transfers. Low-income households became more reliant on earnings. Public transfers are increasingly linked to simultaneous labor market activity. Greater labor market integration is therefore no longer a barrier to but rather a prerequisite for the receipt of transfers and in this way also promotes greater labor market activity. This also improves the fit between minimum wage receipt and public income support, suggesting that minimum wages may not be as ineffective in reducing poverty as opponents of minimum wage increases have for years claimed. Working and receiving public income support are no longer as incompatible as they once were. The greatly increased dependence of the working-age population on work underlines the fact that an appropriate level of minimum wage is an even more important political instrument that must accompany the transition from a welfare to a workfare state in order to promote sufficiently high earned incomes.

Given the greater relevance of employment in providing welfare for households, tax policy and how it interacts with minimum wage receipt should have a growing impact on income inequality. Tax systems, including tax policies such as tax credits and tax breaks, determine the net gains from (increased) earned income. I expect that they have a growing impact on the income situation of low-income households in employment and of individuals entering the labor

market, which underlines the relevance of the interplay between minimum wage policy and tax policy.

The starting point is therefore stagnating inequality, despite increases in the minimum wage and related debates, and controversies at both federal and state levels.

1.1. What this dissertation is about

The question addressed in this thesis is whether the minimum wage contributed to a decline in income inequality between 1989 and 2018.

Building on this, I will also investigate at what point the positive effect of the minimum wage dissipates between the increase in individuals' hourly wages and their total disposable household income.¹ To this end, I estimate the contribution of minimum wage households to the distribution of household disposable income as well as other outcome variables that are based on narrower definitions of household income, such as total labor income or gross income. This enables the strongest implementation path and possible intermediate confounding factors to be identified.

A second objective is therefore to contribute to the discussion on potentially unfavorable interactions between rising labor income due to minimum wage increases and the two central redistribution systems, i.e. the public transfer system and the income and payroll tax system. It is still uncertain whether such interactions pose significant challenges to redistribution efforts. While potential transfer or tax withdrawal rates are one of the main counterarguments of opponents of minimum wage increases, I argue that they can be seen as a methodological problem. They blur the impact of the minimum wage on total (net) household income and necessitate an isolated examination of the impact of the minimum wage on income inequality. The analysis in this paper will advance understanding of the interaction between income from minimum wage work, income from public income support, and the household tax burden.

My analytical strategy will help to understand whether minimum wage adjustments contribute to changes in income inequality in society as a whole or primarily address inequalities within the working population. The distinction between the population-level influence and an influence on inequality among households connected to the labor market is relevant for the evaluation of the minimum wage as a social policy instrument.

This dissertation contributes to the literature and empirical evidence based on alternative approaches to conceptual and methodological issues. I use unconditional quantile regressions for the whole lower half of the income distribution on an analysis sample representing the whole population. I combine this with a new approach to the specification of the affectedness by minimum wage policy. Rather than focusing on the state level, I consider the household level. This thesis applies various income concepts to investigate the point in the "pipeline" from an individual's hourly wage to the total net income of a household at which a positive wage effect is not or only insufficiently translated further. The main focus is on the development of the distribution of households' net incomes, which also takes into account their tax liability. The thesis also delves into different empirical challenges such as the use of simulated amounts for

¹ I will use the terms "disposable household income" and "net household income" interchangeably.

households' tax liability and received tax refunds and the estimation of interaction effects between minimum wage policy and tax policy.

Therefore, some questions remain unanswered and there is a need for alternative approaches to both conceptual and methodological issues. The current state of research does not permit a comprehensive understanding of the relationship between minimum wage policy, the income situation of low-income households with minimum wage earners, and income inequality.

I aim to assess the impact of households with minimum wage workers on changes in the lower half of the income distribution, addressing the broader question of whether shifts in minimum wage policies have influenced income inequality at a population level. By analyzing whether households with minimum wage earners contribute to income increases and percentile shifts predominantly in the lower income range, this study aims to help understand their role in reducing income inequality between lower and higher income strata.

The contributions of households with minimum wage earners to changes in income dispersion at the population level may be the result of several factors. For example, changes in minimum wage policy could lead to higher earnings for households with minimum wage earners, possibly due to higher weekly working hours compared to previous years. In addition, shifts in income support for other types of households, such as the unemployed, could lead to significant income losses. Household incomes reduced in this way could also have an impact on certain quantiles of the income distribution and thus influence inequality.

A comprehensive research design is essential to accurately assess the contribution of minimum wage households and account for possible confounding factors. Multivariate methods that control for various intervening factors are necessary to isolate the impact of households with minimum wage earners on the dynamics of income distribution.

I use a repeated cross-sectional design and estimate the contribution of households with minimum wage earners to changes in all quantile values in the lower half of the income distribution. The goal is therefore to analyze how a particular population group leads to shifts in the overall income distribution of the population. This builds on an approach to the analysis of socio-structural change that takes into account both compositional changes and changes in the income situation of different population groups.

My claim is that the within-group income distribution of households with minimum wage earners changed in the long term in a way that led to rising incomes in the lower area of the income distribution. I further assume that these increases were more pronounced in lower income strata than in higher ones. This results in a reduction in the income gap between low-income households and those at the median, thereby ultimately reducing income inequality in the lower half of the income distribution.

I expect that the income situation among households with minimum wage earners has improved, not only due to rising hourly wages of the household members working for the minimum wage, but also due to the composition of the group of households with minimum wage earners. The composition of this group has changed over time and increasingly consists of households in which minimum wage workers are the main earners in their households and thus contribute the majority of the total income in these households.

An individual's hourly wage is more strongly tied to narrow income definitions of households, such as their total earnings, than to broader income concepts, such as their gross or even net household income. I therefore infer that the contribution of minimum wage policy is stronger in these narrower concepts. The narrower definition of households' labor or market income disregards households' transfer receipts, so that unfavorable interaction effects with the transfer system do not diminish the positive impact of rising minimum wages. Among the broader definitions of gross and net household income I assume that the effect is more pronounced for the income concepts that include tax refunds as an income component. Due to the changes in the income tax system, which is increasingly used as a form of public income support, I expect that the relationship between higher labor income through minimum wages and households' tax liability is more favorable in 2018 than in 1989.

I further assume that the interplay of minimum wages and progressive tax policy is particularly beneficial for low-income households. Just as households with minimum wage earners may belong to more or less favorable income tax categories, the beneficiaries of the changes in the tax system may or may not belong to the group of households affected by the minimum wage. Using interaction effects, I will investigate whether the combination of minimum wage and favorable income tax brackets has contributed to a reduction in income inequality. I will also discuss whether the observed interaction effect is predominantly due to the contribution of households with minimum wage earners or rather due to the contribution of households in favorable income tax brackets.

1.2. What this dissertation is not about

While this dissertation focuses on examining the impact of minimum wage policy on income inequality, it is important to delineate certain aspects that are beyond the scope of this research. Firstly, I do not aim to elaborate on the variety of alternative explanations for changing income inequality. This dissertation does not address the many factors other than minimum wage policy that are contributing to the rise in income inequality. While acknowledging the multifaceted nature of inequality, including factors such as technological advancements, globalization, and educational disparities, this research remains focused on evaluating the specific role of minimum wage adjustments.

Furthermore, I do not aim to discuss or evaluate whether there may be other "better", i.e. more effective or efficient policies for combatting income inequality. This dissertation assesses the effectivity of minimum wage policies; it does not make direct comparisons with alternative policies. While such comparisons are undoubtedly valuable, they are beyond the scope of this study, which concentrates on understanding the dynamics of income distribution in relation to minimum wage adjustments.

This dissertation employs a decomposition analysis based on the results of unconditional quantile regression using repeated cross-sectional data for a long timeframe. This is the rationale for studying the impact of a specific population group, namely households directly affected by minimum wage policy, on the long-run population-level change in income inequality. The dissertation does not aim to provide an analysis of short-run effects of the minimum wage or causal analyses based on difference-in-difference analyses using a panel

design. While acknowledging the importance of such analyses, this research focuses on assessing the broader, long-term implications of minimum wage policies on income inequality.

The long-term trend of a strong increase in income inequality over the last three decades in the USA was driven mainly by a steep rise in income and wealth at the top end. The middle and the bottom of the income distribution, in contrast, has experienced only slow income growth in favorable economic environments. However, this dissertation concentrates on evaluating the impact of minimum wage policies on the lower half of the income distribution and does not explore dynamics within the upper half of the income distribution. Debates about the effectiveness of the minimum wage focus on its impact on poverty. I argue that by taking a broader look at the lower half of the income distribution, it is easier to avoid using a crude measure such as the poverty line to evaluate whether minimum wages support low-income households. For example, minimum wages may primarily help households below that point in the distribution, which would not affect the poverty rate at all. From a theoretical point of view, I do not expect the minimum wage to have policy impacts on income strata above the median. The incomes beyond the median are so high that they bear no comparison with the contribution that minimum wage workers can make to a household's income. While recognizing the importance of diverse outcome variables beyond income, such as reliance on public income support, well-being or happiness, this dissertation focuses on analyzing the distributional effects of minimum wage policies on income inequality. Incomes are a central dimension of social inequalities. They play a decisive role in determining the extent to which individuals, families, or households are economically free or constrained to manage their daily lives and to pursue and achieve major goals in their lives. The distribution of income gives a relatively accurate picture of how equal or unequal a society is. However, I will argue in the concluding remarks that even if minimum wage increases do not lead to rising net household incomes, this should not necessarily be used as a counterargument against minimum wage policy. People who are no longer dependent on public income support could gain greater autonomy, while households that reduce the number of hours they work as a result of rising wages could benefit from more free time.

While these points are beyond the scope of this dissertation, I will discuss some of them as possible avenues for further research in the concluding remarks.

1.3. Outline of this dissertation

The dissertation is structured as follows. First, in Chapter 2, I discuss how the minimum wage functions as a social policy measure. I commence with an overview of the historical development and legislative framework of the minimum wage, before proceeding to examine its increasing utilization as a social policy instrument. I then systematize the vagueness of the minimum wage as a social policy measure using a theoretical framework that explains the relationship between a change in individual hourly wages due to the minimum wage and a change in net household income. The third chapter looks at the role of the labor market structure and the social policy landscape in which the minimum wage is embedded. The labor market context, including the prevailing wage structure and the way hours worked are distributed across households in different income brackets, is particularly crucial for the minimum wage to have a significant impact on household income in a way that ultimately affects income

inequality. Changes in redistribution through the welfare state and taxation shape the potential impact of minimum wage policy on income inequality over time.

Chapter 4 is devoted to previous minimum wage research and the empirical evidence for the impact of minimum wages on income inequality in the USA.

On this basis, I then go on in chapter 5 to outline research gaps and the contributions made by this dissertation. This is followed in Chapter 6 by the introduction of my analytical strategy and hypotheses. In Chapter 7, I present the data, variables and methods used. To this end, I explain the choice of data, how they were augmented with simulated household tax liability figures, the chosen time frame and the analysis sample. In the methods section, I explain the concept and the idea behind the decomposition method of unconditional quantile regressions as well as the model specifications used and the corresponding interpretation of the changes in the quantile values to answer my research questions.

Chapter 8 presents the landscape surrounding the implementation of minimum wage policy, including an overview of the trends in minimum wages and their bite, trends in the share of households with minimum wage workers, as well as the income trends and compositional changes among households with minimum wage earners. Chapter 9 presents changes in the income distribution in the USA over time as well as descriptive results on households' labor market integration, the role of income from labor and minimum wage work in total household income, and households' tax liability. Chapter 10 presents and discusses the multivariate results on the contribution of households with minimum wage earners to changes in inequality. The main results on the impact of household net income on inequality are followed by results using different income concepts as outcome variables. I then present the results that address the interplay of changes in minimum wage policy and the systems of public transfers and taxes over time. The final set of multivariate results sheds light on the question of whether households with minimum wage earners benefit from tax policy that particularly supports low-income households. _That is to say, it examines whether the interaction of minimum wage and tax policy plays a particular role in combating income inequality.

Chapter 11 concludes with a summary of the central findings of this dissertation and their discussion, as well as the limitations and avenues for further research.

2. Minimum wages as social policy

Minimum wage policies have featured prominently in policy debates of recent years in the USA and in many other rich democracies. In the U.S. context, numerous presidential candidates of the Democrats have advocated for increases in the federal minimum wage. In July 2019, the House of Representatives passed the Raise the Wage Act, which would gradually increase the minimum wage to \$15 by 2025, automatically update it every year after that, and phase out the subminimum wage for tipped workers (Congressional Research Service 2019b, 2019a). In 2017, when the Raise the Wage Act was first introduced in the 115th Congress, it died in committee. The current status of the Raise the Wage Act of 2021 is that it has been referred to committees of jurisdiction. Policymakers who are concerned with economic inequality tend in particular to push for laws to raise the minimum wage. They argue that the minimum wage is not just a measure of employee protection that ensures a minimum wage floor, but also an

antipoverty tool that can reduce the current high levels of income inequality in the USA. However, the extent to which minimum wages can actually reduce poverty or income inequality remains an open question. Minimum wage policy is by no means a standard approach to addressing poverty and inequality. Welfare, social assistance, and social security are usually the tools deployed to support low-income families and households. These measures reshape the distribution of incomes produced in the ‘market’. When people are unemployed, disabled, disabled, unable to work due to care responsibilities, or in low-paid work, their market income is unlikely to cover their living expenses. However, redistributing incomes produced on the market through public transfers is not the only way to fight poverty and income inequality. Much of this inequality is rooted in market processes and measures that directly address inequality on the labor market, like the distribution of wages, are adequate tools as well. The long-standing rationale of the minimum wage was to improve the conditions of low-income families and alleviate poverty. Advocates have promoted minimum wage laws to protect workers and their families from poverty for more than a century. The preamble to the Fair Labor Standards Act (FLSA) states the law’s purpose to secure labor conditions that maintain a “minimum standard of living necessary for health, efficiency, and general well-being of workers” (U.S. Department of Labor Wage and Hour Division 2011; House of Representatives 1938). Shortly after President Johnson declared an “unconditional war on poverty” in 1964, he stated that as part of the war on the sources of poverty, the coverage of those protected by the minimum wage should be expanded (Johnson 2016). Subsequently, the 1966 Amendments to the Fair Labor Standards Acts, which increased the minimum wage and substantially extended its coverage, was one of the War on Poverty’s major legislation and events (Bailey and Danziger 2013). The rationale of the minimum wage in fighting poverty has been further espoused by President Clinton, Senator Kennedy and President Obama (Neumark and Wascher 2008:141; Sobel 1999; Barack Obama 2014; Peters and Woolley 2014)².

Thus, calls for minimum wage increases as a form of social policy to combat growing income dispersion of incomes are not a new phenomenon. However, minimum wage policy has historically been controversial, and with the federal minimum wage stagnant at \$7.25 for more than 10 years, it continues to be hotly debated. As a result of federal inaction, more and more states have exercised their power to set minimum wages at the state level to keep the minimum wage floor in line with the rising cost of living in many areas of the USA. By 2020, only five states had never enacted a minimum wage law. In January 2020, 29 states and the District of Columbia had minimum wages higher than the federal minimum. This means that more than half the population lives in states that have wage floors higher than the current federal minimum of \$7.25 per hour. The federal minimum wage is therefore binding on less than 40% of the U.S. labor force today (Romich and Hill 2018; Economic Policy Institute 2019, 2020; Congressional Research Service 2020). Further minimum wage laws at the local level make the current landscape of minimum wage floors a patchwork, with workers being affected by widely varying minimum wage levels.

Contrary to the view of opponents who see the minimum wage as a tool that affects only a small minority of the labor market, jobs that pay (close to) the minimum wage make up a significant

² For an outline of the history and political support for minimum wages as an antipoverty device in the US, see Burkhauser et al. (1996), Burkhauser and Finegan (1989), Card and Krueger (1995a) or Sabia and Burkhauser (2008).

share of the U.S. labor market. Research suggests that changes in the minimum wage affect between 20 and 30% of the labor force (Belman and Wolfson 2014:4).³ The share of employees earning exactly the minimum wage is modest, but research suggests that minimum wage hikes affect not only those working for exactly the minimum wage, but the low-pay sector more generally. Workers earning hourly wages somewhat above the minimum wage may be indirectly affected by minimum wage hikes as employers adjust their pay schemes to maintain a certain level of wage differentials. Workers earning close to the minimum wage make up a substantial proportion of the labor force, which means that increases in the minimum wage can affect a considerable share of the employed labor force.

However, the effectiveness of minimum wage policy to reduce poverty and income inequality depends on the link between minimum wage work and the economic needs of the families and households minimum wage workers live in. The (lack of) strength of this link is the main argument of opponents of minimum wage increases, who argue that the minimum wage is too inefficient to justify possible job losses. They argue that many poor families are poor because they are not in employment, and that higher hourly wages will not help them escape poverty. However, more than half of all income-poor households headed by a working-age adult include at least one employed person. Thus, mandated minimum wages have the potential to improve the income situation of the poor. The counterargument by opponents that poverty and employment are only weakly related is further challenged by the widespread existence of in-work poverty in the USA, where a large fraction of the population is employed and poor. Compared to other modern industrialized nations, the poverty risk of individuals in employment is high in the USA, and they have been for three decades now (Kenworthy and Marx 2018; Brady, Fullerton, and Moren Cross 2010; Seikel and Spannagel 2018). Notably, the USA stands out with very high rates of poverty among the employed, even higher than for the population as a whole (Kenworthy and Marx 2018). The working poor are a larger population than the unemployed poor. Nonetheless, attention is drawn to the "problem" of joblessness, which has led to the impression that unemployment is the central problem of poverty. The notion that most of the poor do not work thus seems wrong – the problem is that employment is not a sufficient solution to poverty (Brady, Baker, and Finnigan 2013).

The USA further has a comparably large low-pay sector as well and employment has grown disproportionately in low-wage jobs (Antonczyk, DeLeire, and Fitzenberger 2018). Thus, employment in the USA is strikingly often linked with poverty, and to a much higher degree than in other rich democracies. Further, employment growth in the low-pay sector implies that a growing share of the labor force is affected by low wages. This clearly speaks in favor of minimum wage policy as an especially useful tool to combat poverty and income inequality in the USA.

Further, antipoverty policy in the USA is today much more work-centered than it was 30 years ago. According to a widely shared view in industrialized countries, employment should allow

³ According to the U.S. Bureau of Labor Statistics, the percentage of hourly paid workers being paid the federal minimum wage was between 7 and 8% in the early 1990s, but had declined to 2.1% by 2018. This decline is rooted in the increasing relevance of state minimum wages that exceed the federal minimum wage level, which cover more than half of the labor force being paid by the hour. Therefore, the percentage of hourly paid workers being paid the federal minimum wage approaches zero in states with higher statutory minimum wages and is higher in states without state minimum wages Bureau of Labor Statistics (2019b).

individuals to avoid poverty. Poverty should therefore “become a residual phenomenon restricted to persons out-of-work, supported, under some conditions, by social assistance” (Gautié and Ponthieux 2016:486). The USA in particular has been committed to the notion that employment is the key to poverty reduction more than any other rich democratic nation (Kenworthy and Marx 2018; Seikel and Spannagel 2018). This is reflected in today’s antipoverty policy, too. Eligibility for social assistance is subject to strict time limits, and states are required to ensure that most recipients of assistance payments are in employment or in a work training program. The statutory minimum wage was raised in the mid-1990s and was supplemented by work subsidies supporting households with low earnings (Kenworthy and Marx 2018). This work-centered antipoverty policy manifests in high poverty rates of individuals who are not in work, while poverty rates for those in work are substantially lower (Brady, Finnigan, and Hübgen 2017). This suggests an increasingly strong link between minimum wages and poverty, as well as the growing importance of minimum wage policy to ensure that employment can in fact mitigate poverty risks.

Compared to other social policy instruments such as means-tested transfers or means-tested tax credits, the minimum wage is more controversial in terms of its impact on poverty and income inequality. Minimum wages and the additional incomes from an increase in the minimum wage floor initially flow to low-wage individuals, and not to low-income households. In order for the minimum wage to function as a social policy that improves the living conditions of those worst-off and reduces the income disparities that increasingly divide U.S. society, minimum wages should target low-income families and households in particular. I examine the extent to which minimum wages can affect income inequality, taking into account the relationship between people who work for minimum wages and the family constellations in which they live and the role that income from minimum wage employment plays in these constellations. Other sources of income and their interactions with increases due to the minimum wage play a special role here, for example the reduction in public transfers or an increasing tax burden on households resulting from rising earned income. It is an open question whether certain steps in the translation process between an individual's hourly wage and the total household disposable income prevent the minimum wage from having an impact on income inequality. I will discuss the role of these factors and use appropriate methods to assess whether the minimum wage has had a reducing effect on income inequality over the last 30 years, independent of these interactions. It is possible that changes in social policy, tax policy, or demographics and family constellations have led to a change in the impact of the minimum wage on the distribution of household incomes. Higher minimum wages directly increase the hourly wages of affected individuals, but it remains unclear whether this translates into higher annual incomes for individuals, higher labor incomes for households, or higher total incomes for households, before and after accounting for their tax burden.

It also remains unclear whether minimum wage earners are distributed across households in such a way that income inequality can potentially be reduced if their incomes rise. If minimum wage earners and the benefits resulting from minimum wage increases are evenly distributed across the entire income distribution, wage increases cannot affect inequality and poverty. These two interrelated and so far largely unanswered questions will be answered in this thesis. In this chapter, I will explain how the minimum wage works as a social policy. First, I will provide a brief introduction to the process of minimum wage legislation that has shaped the

way minimum wages have been implemented and increased at the federal level and in individual states over the long term. I will demonstrate the increasing use of minimum wages in social policy by looking at the history and recent trends in minimum wages at the federal and state levels. I will illustrate different trajectories of minimum wage policy and poverty and income inequality and discuss the arguments of proponents and opponents of minimum wage increases. I will systematize the core of the criticism of minimum wages as a social policy, namely the *blurriness* or imprecision of the measure, by demonstrating how minimum wages affect the *income situation of households*. This framework will then be used in the following chapters to investigate the impact of the minimum wage on the *inequality of household incomes*.

2.1. Minimum wage laws at the federal level and across states

Today's landscape of minimum wages in the USA is characterized by a mixture of federal, state, and local minimum wage laws and amendments to these laws that put minimum wages into effect. In general, minimum wages can be realized through different channels. The ease with which minimum wages can be introduced and adjusted, and the obstacles that must be overcome, are likely to influence the success of minimum wage policy in curbing the growth of income inequality. Minimum wage hikes can be realized through ordinances, through automatic adjustments, such as when minimum wages are indexed to inflation, or through the political process when minimum wages are under the control of Congress, as is the case with the federally mandated minimum wage in the USA (Seltzer 1995; Sobel 1999).

This thesis examines the potential of minimum wages mandated by federal and state law to reduce income inequality. These statutory minimum wages are binding, broad-based minimal pay standards set by legal statute. This stands in sharp contrast to minimum wages and pay standards set by collective bargaining or voluntary agreements in certain industries or employers. While collective bargaining and voluntary agreements affect only distinct subgroups of the labor force, minimum wages set by legal statute affect the labor force as a whole, with very few exemptions. I refer to these statutory minimum wages at the federal and state levels, which are legislated directly by governments, and which shape the rules of labor markets in the form of law-induced institutions.

The Fair Labor Standards Act (FLSA) of 1938 set the stage for today's government-mandated minimum wage landscape. This legislation was probably the most significant intervention of its kind and is still in force (Neumark and Wascher 2008). The FLSA was designed to achieve certain public policy goals through a federally mandated minimum wage. The original bill was designed to give a separate Wages and Hours Board control over the minimum wage rate. However, the bill was amended to give Congress this control, even though this meant that the pursuit of the desired policy goals would be subject to the political pressure facing Congress (Seltzer 1995; Sobel 1999; House of Representatives 1938). One of these goals, repeated and often cited in political speeches and academic research, was to lift a typical minimum-wage worker's family out of poverty.

These political barriers at the federal level have resulted in slow-moving or stagnant minimum wages. The federal minimum wage currently stands at \$7.25 per hour and has not been raised since 2009. Not only are changes in the level of the federal minimum wage subject to political decision-making, but its indexation is also subject to pressures in the political process. The

decision to index the federal minimum wage to inflation would ensure that adjustments from year to year are automated and do not necessitate further decision-making except when larger increments are desired. To date, the federal minimum wage has not yet been indexed to inflation, and criticism of the lack of amendments to federal minimum wage law is growing: the federally mandated wage floor has not been able to keep pace with the cost of living or the median wage in the labor market (Cooper, Gould, and Zipperer 2019; Cooper 2014). This means that workers earning the federal minimum wage can purchase fewer and fewer goods and services for an hour of labor over time. The last increase at the federal level was in 2010 (House of Representatives 2007), and thus, the current period is the longest without any progress in the federally mandated minimum wage floor.

This standstill has led to an increasing number of states mandating their own minimum wages at the state level. President Obama first called on Congress to raise the minimum wage in his 2013 State of the Union address. However, since Republicans regained control of Congress in 2014, they have not scheduled one hearing to consider the issue. As the Minimum Wage Fairness Act, that would have amended the FLSA to raise the federal minimum wage to \$10.10 per hour, was unlikely to pass, President Obama signed an executive order in February 2014 to raise the minimum wage for federal contract workers to \$10.10 an hour starting in 2015 and encouraged employers nationwide to raise wages for their workers. The standstill in the federally mandated minimum wage floor led President Obama to call for increases at the state and local levels: “To every mayor, governor, and state legislator in America, I say, you don’t have to wait for Congress to act.” (2014 State of the Union). State and local governments have responded to the President’s call, passing bills to increase wages. The fact that minimum wage legislation is under the control of Congress and political decision-making has resulted in an extraordinary variance in minimum wages – and possibly in economic well-being of the population – across the United States. Prior to the passage of the Fair Minimum Wage Act of 2007 (FMWA), 37 states had enacted state minimum wages that exceeded the federal level, which had stagnated due to years of federal inaction.

In each state, the statutory minimum wage is always the higher of the federal minimum wage and the state minimum wage: it applies to all employees in a state covered by the respective minimum wage laws. At the time of writing, the federal minimum wage has not been raised for more than a decade. Even though Democrats regularly call for increases in the federal level of the minimum wage, minimum wage policy is currently determined by state and local government officials. The growing importance of minimum wages at the state, county and city levels has also broadened the debate about the efficacy of using minimum wage policy as a redistributive tool, as the increasing variance provides quasi-experimental settings (Neumark and Wascher 2008). In 2024, 30 states and the District of Columbia have a minimum wage higher than the federal minimum wage. Of these 30 states, the minimum wage is indexed for inflation in 19 states and D.C., meaning that it is automatically adjusted each year for increases in prices. Five states have never introduced a state minimum wage law, and two states have minimum wages below the federal minimum wage. In all these states, the federal minimum wage applies. Fourteen states have a minimum wage set at the federal level of \$7.25 (Economic Policy Institute 2020, 2024b).

2.2. The increasing use of minimum wages as social policy on across the United States

Despite the skepticism about the potential of the minimum wage as a tool to combat poverty and income inequality, minimum wage laws are in constant flux, and minimum wages are frequently debated and used as a policy tool in many states. This has been especially true in recent years. A total of 28 states and D.C. have amended their minimum wage legislation since 2014. In addition, the effective minimum wage has increased in 30 states and D.C. since 2014. However, 20 states still have a statutory minimum wage at the federal level of \$7.25, indicating that attitudes towards this subject vary across the USA. In what follows, I will first give a brief overview of the history of the minimum wage, followed by an examination of its evolution since 1989, which is the period of interest for this thesis. In this period, the variation in minimum wage levels across the 50 states and the District of Columbia has grown remarkably and has fueled the debates and research on its effects.

2.2.1. History of the minimum wage before and after the enactment of the FLSA

Prior to the enactment of the FLSA in 1938, states began introducing minimum wage laws in response to growing concerns about sweatshops in the wake of rapid urbanization, immigration, and industrialization in the early 1900s. There was particular concern about the working conditions of the growing number of women and children who were joining the labor force in factories, agriculture, and in service industries, whose workplaces were commonly referred to as sweatshops: working conditions characterized by very low wage rates, excessive working hours, and unsanitary workplaces (Neumark and Wascher 2008).⁴ Already in the early 20th century, Progressives believed that the strong bargaining power of employers would lead to wages being set below the productivity of workers, and that employees should be entitled to a "living wage" that would ensure a certain standard of living (Prasch 1999). Politicians were reluctant to enact federal minimum wages, however, which many lawmakers believed would violate employers' constitutional right to contract freely. Several states enacted legislation in the early 1910s that followed different models, either with flat-rate minimum wage levels, or with varying minimum wages by industry, or with different approaches with regard to the bindingness of minimum wages. In many cases, the states' minimum wages were successfully challenged and their relevance quickly diminished. In the 1930s, the economic problems of the Great Depression stimulated interest in minimum wage legislation at the federal level. After numerous failed legislative efforts and rounds of drafting and redrafting, the bill for the FLSA was approved by Congress and signed by Roosevelt in 1938. The Fair Labor Standards Laws enacted fair employment practices laws, overtime premia, and the first federal minimum wage laws just three years after the passage of the National Labor Relations Act in 1935, leading to a strong decline in the unionization rate (Neumark and Wascher 2008). However, only firms engaged in interstate commerce were subject to the act, and many industries, like retailing and agriculture, were exempted from FLSA laws (House of Representatives 1938). At the time, it was estimated that about half of all workers in the private sector were covered by the Act (Brown 1999). There was no provision in the original FLSA to raise the minimum wage above 40 cents until October 1945, and without amendments, the minimum wage declined over the years. Proponents began advocating for both a higher level and an expansion of covered

⁴ Examples of jobs performed in so-called sweatshops include chain-making, lace-finishing, paper and cardboard box-making, tailoring, food preserving, shirt-making, hollowware and linen and cotton embroidery Neumark and Wascher (2008).

workers, and in the ensuing decades there have been several amendments that would slightly increase the minimum wage level and/or expand its coverage. These changes followed a pattern in the 1950s and 1960s in which nominal minimum wages remained unchanged for several years, causing their real value to decline due to inflation, before new legislation passed by Congress amended the law to increase the minimum wage. Extensions of its coverage were less frequent than changes in its nominal value (Brown 1999; Neumark and Wascher 2008). In the 1960s, however, the FLSA's coverage was greatly expanded, primarily in agriculture, retail trade, restaurants, nursing homes, and other previously uncovered services. These expansions reached low-wage sectors in particular, where the law was binding for a large fraction of workers and where nearly a third of black workers were employed at the time (Derenoncourt and Montialoux 2020). Estimates suggest that coverage increased to around 77% of all workers in the private sector, and 40% in the public sector (Brown 1999). At the same time, the real value of the minimum wage peaked (to date) in 1968 at \$11.81 per hour (nominal value of \$1.60 in 2019 dollars). Taken together, these developments significantly increased the so-called "bite" of the minimum wage: A growing share of the labor force was covered by the minimum wage law, and the value of the minimum wage rose substantially. In the 1970s, the nominal value of the minimum wage rose more steadily, which kept its real value relatively stable (\$8.58 per hour in 1979) and by the late 1970s coverage was nearly complete, with only the smallest employers exempted (Fishback and Seltzer 2020). By the early 1980s, the minimum wage had reached \$3.35 per hour and many of the exemptions had been eliminated to cover more than 90% of all workers (Neumark and Wascher 2008).

2.2.2. Recent trends in federal and state minimum wages

The 1980s marked a long period without hikes in minimum wages at the federal level. This led to an extraordinary decline in its real value of around 30% by 1989 (Neumark and Wascher 2008). From this point on in the history of the minimum wage, more and more states began to exercise their power to set minimum wages at the state level in order to adjust the wage floor to the rising cost of living in many areas of the USA. By 1990, 16 states and the District of Columbia had minimum wages above the federal minimum wage level. Coverage was estimated at 87% of private sector workers and 100% of all public sector workers (Brown 1999). Coverage increased further with the 1989 amendments, as they increased the volume of sales coverage test for both retail and non-retail businesses to \$500,000 and eliminated the minimum wage and overtime pay exemption for small retail firms (U.S. Department of Labor 2022). After this long period of stagnation, the federal minimum wage increased again in several steps up to \$5.15 in 1996 where it remained until the most recent amendment, the Fair Minimum Wage Act (FMWA) of 2007 (House of Representatives 2007). Again, the decade of inaction prior to the FMWA of 2007 caused the real value of the federal minimum wage to hit a low of \$6.62 per hour in 2006 (in 2018 dollars). As in previous periods of stagnation, state legislatures once again raised minimum wages at the state level, especially after 2000 when prospects for further increases at the federal level faded. When the federal minimum wage was scheduled to be raised in 2007, 37 states had state minimum wages above the federal level.

During this period of increasing state variation in minimum wages since the late 1980s, the federal minimum wage was raised three times: 1989 to 1991, 1996 to 1998, and 2007 to 2010.⁵ Figure 1 illustrates these stepwise increases by means of the year-by-year evolution of the nominal value of the federal minimum wage between 1987 and 2019.⁶ After increasing between 2007 and 2010, the nominal federal minimum wage stagnated at \$7.25. The graph in Figure 1 also shows the evolution of the real value of the minimum wage. It reveals a cyclical pattern, with periods of increase coinciding with legislation raising the wage floor and periods of continuous decrease occurring during periods of inactivity in minimum wage legislation at the federal level. As outlined in the brief history of the minimum wage presented in section 2.2.1, the real value of the minimum wage declined significantly during the 1980s. Consequently, the first increase within the observation period, in 1989, represents a turning point in the real value of the minimum wage. Prior to the increase, its real value stood at \$6.62. It then rose to \$7.60 in 1991. Following a period of cyclical movements, the real value of the minimum wage reached a nadir in recent history of \$6.26 in 2006, before rising to \$8.29 in 2009. The subsequent standstill of the federally mandated minimum wage and price inflation resulted in a decline in its purchasing power. Consequently, an increasingly number of states have passed bills to increase wages, resulting in a growing array of effective minimum wages across the United States.

⁵ The 1989 amendments increased the minimum wage to \$3.80 an hour beginning April 1, 1990, and to \$4.25 an hour beginning April 1, 1991. The 1996 amendments increased the minimum wage to \$4.75 an hour on October 1, 1996, and to \$5.15 an hour on September 1, 1997. The 2007 amendments increased the minimum wage to \$5.85 per hour effective July 24, 2007; \$6.55 per hour effective July 24, 2008; and \$7.25 per hour effective July 24, 2009 U.S. Department of Labor (2022).

⁶ The time frame for the main analyses is 1989 to 2018. 1987 and 1988 are used to illustrate the falling level of the real value of the minimum wage in the late 1980s, prior to the raising of the minimum wage in 1989-1991. 2019 is shown for a fuller picture, but the last year of analysis is 2018 due to the declining reliability of income data with the onset of the COVID19 pandemic.



Figure 1: Trends in nominal and real federal minimum wage levels

Note: Annualized minimum wages are constructed by averaging the nominal federal minimum wage during the twelve months in a given year (reference year). For the real value of the federal minimum wage, the nominal federal minimum wage is inflated using the consumer price index (CPI-U) using 2018 as the base year. Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021).

Figure 2 illustrates this growth in variation in statutory minimum wages. For each year between 1987 and 2019, the graph plots the annualized statutory minimum wages for each state, represented by the grey dots, as well as the nominal federal minimum wage, which has been presented in figure 1 already. Additionally, the graph depicts summary statistics on the variation of state minimum wages: the 50th percentile, for example, represents the median of all state minimum wages. Likewise, the 75th and 90th percentile of all state minimum wages represent the higher points in the distribution of statutory minimum wages. As can be seen, there is substantial variation in statutory minimum wages, especially in the 2000s and in most recent years. The population-weighted median of statutory minimum wages is essentially congruent with the federal minimum wage level, except immediately before increases in the federal level. This shows that stagnation in the federally mandated minimum wage led to increasingly more states adapting higher minimum wages themselves, pushing the median of statutory minimum wages above the federal level. The most recent period illustrates this pattern even more clearly. The 75th percentile has left behind the median since 2004, and the 90th percentile outdistanced the majority of state minimum wages as early as 1998. Since then, states with the highest minimum wages have elevated the standard of minimum wage floors considerably.

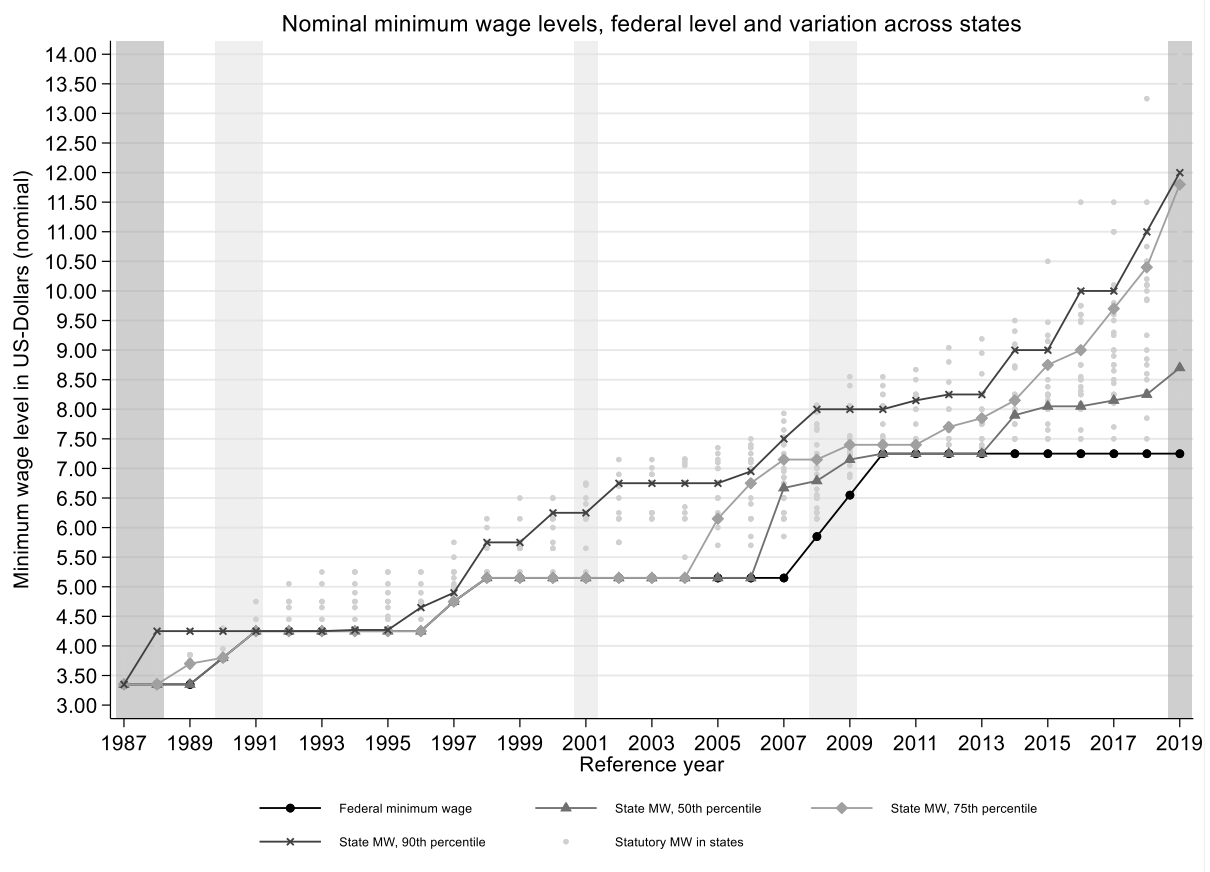


Figure 2: Variation in statutory minimum wages across the USA

Note: Annualized minimum wages are constructed by averaging the nominal statutory minimum wage at the federal level respectively at the state levels during the twelve months in a given year (reference year). Minimum wage percentiles are weighted by population size in the state using 1987-2020 CPS-ASEC surveys and person weights. The light gray dots in the scatter plot represent annualized statutory minimum wages in each state. Annualized minimum wage data from year t is matched with CPS-ASEC survey data of year $t + 1$, so that aggregate figures match the income reference year of income items in the ASEC. The years in the horizontal axis represent the reference year t . Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement weights.

Having outlined the evolution of minimum wages across states and over time, I will now conclude my argument that minimum wages play an increasingly important role as a social policy tool over time with a visual representation for the years 1989 and 2018. These two points in time will serve as the basis for my long-term analysis of the impact of minimum wage policy on the evolution of income inequality via the changing income situation of affected households.

Figure 3 shows all 50 states of the USA and the variance in statutory minimum wages at state level in 1989, the starting year for my main analysis over a period of almost 30 years. States

with the lowest minimum wages are highlighted in light blue, while the states with the highest minimum wages are highlighted in dark blue.

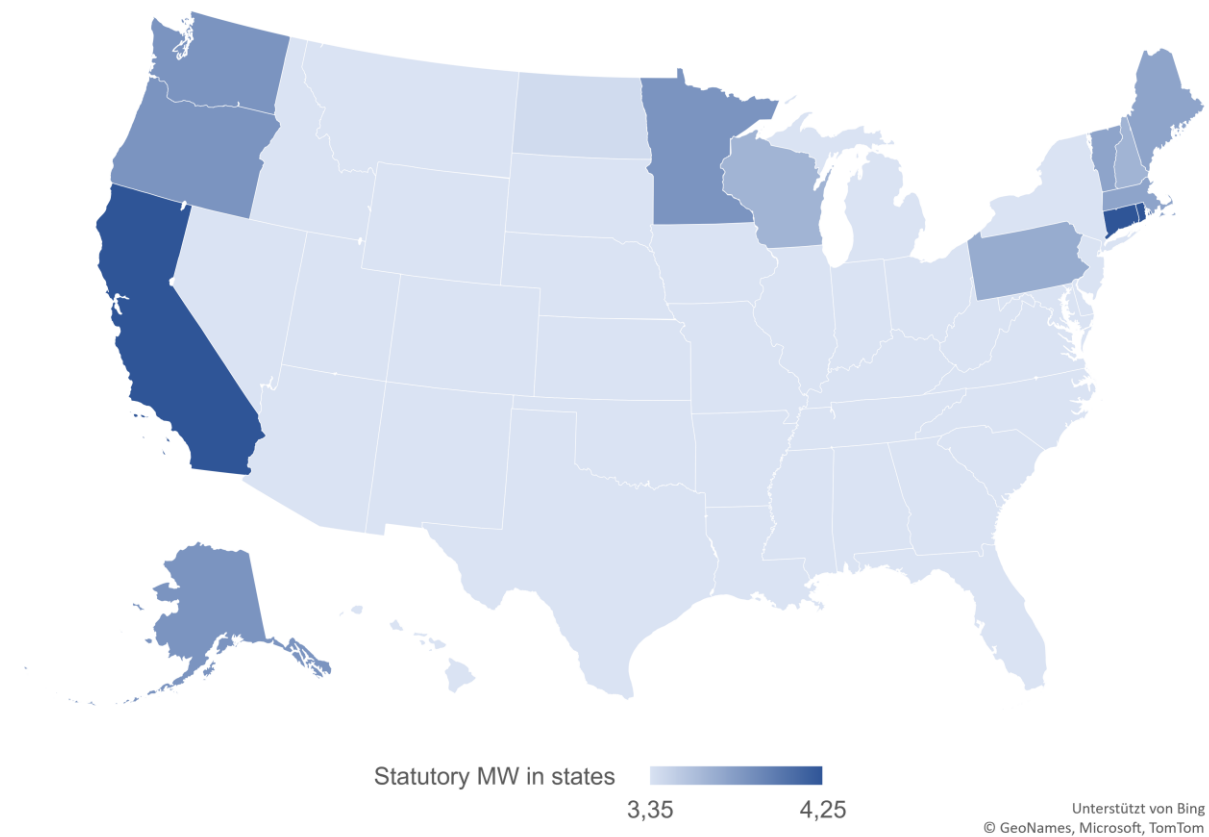


Figure 3: Variance in statutory minimum wage levels across U.S. states, 1989

Note: The statutory minimum wage is always the higher of the federal minimum wage and the state-specific minimum wage. Statutory minimum wage levels across states ranged from \$3.35 to \$4.25 in 1989, D.C. had a statutory minimum wage of \$3.35. States with the lowest statutory minimum wage levels in 1989 are shaded in light blue, states with the highest statutory minimum wage levels in 1989 are shaded in dark blue. Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019, (University of Kentucky Center for Poverty Research 2021), own representation based on GeoNames, Microsoft, TomTom.

Statutory minimum wage levels across states ranged from \$3.35 to \$4.25 in 1989. 14 states had minimum wage levels higher than the federally mandated level of \$3.35. The map highlights the fact that higher minimum wage levels were mostly to be found in states in the Pacific region and in New England. Most states, and all states of the Mountain region, the Southern regions, and Washington D.C. had statutory minimum wage levels at the federally mandated level of \$3.35.

Figure 4 shows the same map of states for the year 2018, the last year of my analysis period. The way in which statutory minimum wage levels differ across states has undergone a notable transformation. 29 states had minimum wage levels higher than the federally mandated level of \$7.25. While the difference between the lowest and highest statutory minimum wage levels was less than one dollar in 1989, the range of minimum wage levels is now higher. The highest state minimum wage level is \$11.50 in Washington state, and Washington D.C. had a minimum wage level of \$13.25. Those states that had the highest minimum wages in 1989 also tended to have

the highest minimum wages in 2018. The Pacific region and the New England region again stand out as two clusters with relatively high minimum wages, although not as clearly as in 1989. Other states have also introduced higher minimum wages, spread across the various regions. The South also no longer forms a unit with the lowest minimum wages across the board. Nevertheless, it can still be said that the Southern region is the region in which numerous states clearly still have the lowest minimum wages.

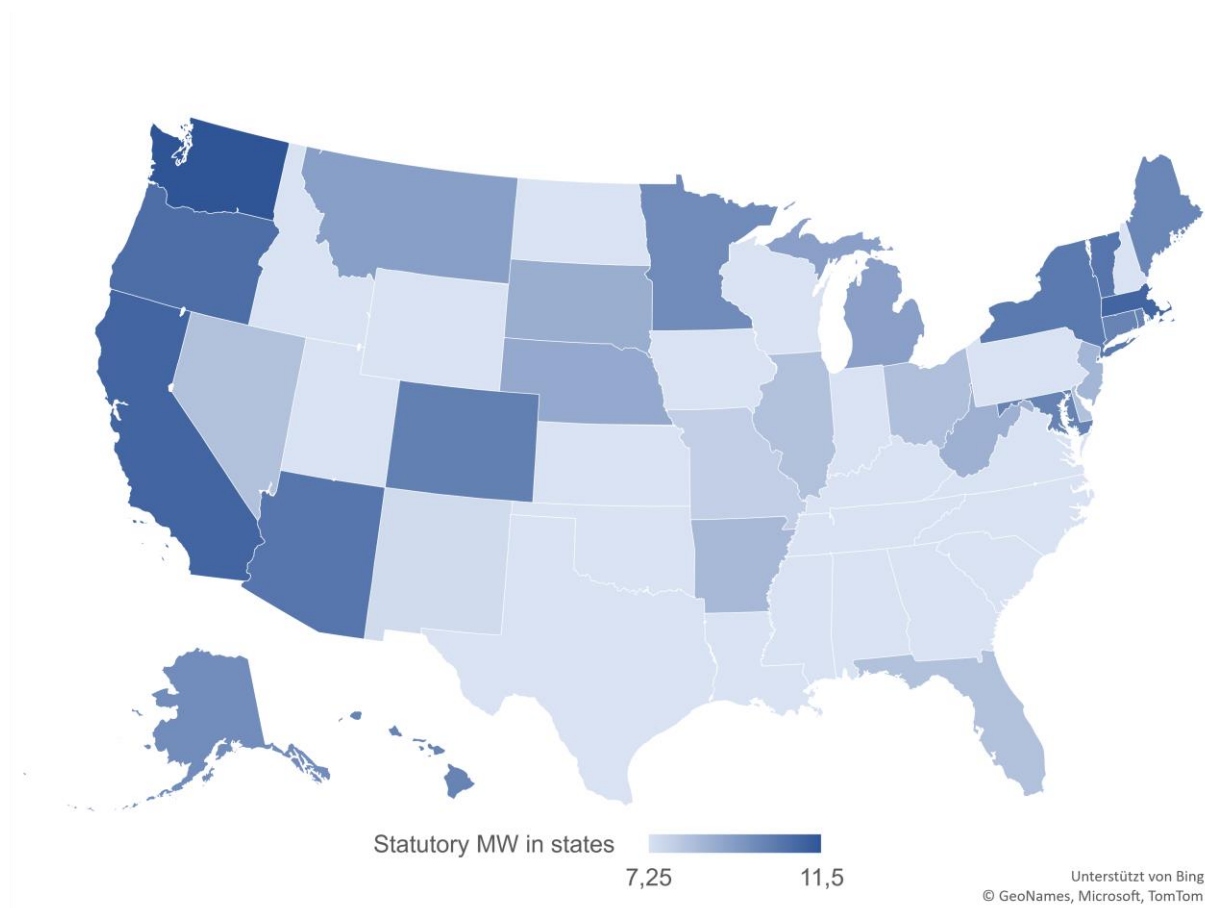


Figure 4: Variance in statutory minimum wage levels across U.S. states, 2018

Note: The statutory minimum wage is always the higher of the federal minimum wage and the state-specific minimum wage. Statutory minimum wage levels across states ranged between \$7.25 and \$11.50 in 2018, D.C. had a statutory minimum wage of \$13.25 and is not included in the definition of color shades for better visibility. States with the lowest statutory minimum wage levels in 2018 are shaded in light blue, states with the highest statutory minimum wage levels in 2018 are shaded in dark blue. Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021), own representation based on GeoNames, Microsoft, TomTom.

2.3. Different trajectories in minimum wage policy, poverty, and income inequality

The preceding chapter demonstrates that following the prolonged stagnation of the federally mandated minimum wage floor, the disparity in state minimum wages across states has grown steadily. Two periods stand out with noteworthy growth in the number of states setting minimum wages considerably higher than the federal level. The first of these is the period between 1999 and 2007. The second most recent period since the last minimum wage hike at the federal level is even more pronounced.

The following section will use three exemplary states to illustrate the diverging wage floors across the USA and the interrelationships between changes in minimum wage laws and bite of the minimum wage. In this context, it is of great importance to determine the relationship between the wage floor and the overall wage spectrum in order to gauge the number of individuals and families affected by it. If the minimum wage marks a very low threshold, it is unlikely to affect many workers and their families. Together, these factors shape the relevance and meaning of the minimum wage to income inequality and poverty. I will therefore illustrate poverty and income trends as a function of the different trajectories in minimum wage policy chosen by different states.

Figure 5 illustrates three different trajectories of minimum wage policy represented by the evolution of wage floors in three exemplary states. Louisiana, one of the few states with no state law, represents the "low-road" path and is at the low end of the variation in minimum wages (as shown in Figure 2). Other examples are Alabama, Mississippi, South Carolina, and Tennessee. As these states have not established state minimum wages, their minimum wage floors have always marked the lowest threshold over time. The opposite "high road" trajectory is exemplified by Washington State. In 2020, the \$13.50 wage rate in Washington State was the highest among all states. Together with several other states, Washington is one of the states that has had considerably higher state minimum wages since the beginning of the 1990s, outdistancing the majority of states especially in periods of standstill in the federal minimum wage. Other examples are California or Massachusetts, as well as the District of Columbia. In the case of Washington, the state minimum wage is additionally indexed and increases automatically with inflation. As a third category, Illinois serves as an example of states that have chosen an intermediate path. Today, several states have state minimum wages that range between the low federal minimum wage and the highest state minimum wages. Illinois is a state that represents an intermediate path *over time*. It left behind the low federal minimum wage floor in 2004 and has since been between the lowest and highest state minimum wages. Another example for this over-time trend is Michigan.



Figure 5: Statutory minimum wages in three U.S. states

Note: Annualized minimum wages are constructed by averaging the nominal statutory minimum wage at the state levels during the twelve months in a given year (reference year). Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021).

The different paths taken by these states with respect to minimum wage legislation are reflected in different trends in the real value of state minimum wages. Figure 6 shows the evolution of the real value of the minimum wage in the three exemplary states representing a low, medium, and high road in minimum wage policy. Overall, the real value of statutory minimum wages in Washington, Illinois, and Louisiana did not diverge much until 1998. Increasing disparity is even more clearly visible than in Figure 5 above, as this illustration reveals contemporaneous increases and decreases in the real value of the statutory minimum wage. Prior to that point, Washington had already used the opportunity to increase its state minimum wage ahead of upcoming increases legislated at the federal level. During the first period of increasing disparities between 1999 and 2007, Illinois prevented a further devaluation of the minimum wage by incrementally raising its minimum wage and has since followed a middle-of-the-road approach to minimum wage policy since then. However, as the state minimum wage in Illinois is not indexed to inflation, its trend since 2009 has paralleled the devaluation of the minimum wage in Louisiana. In contrast, Washington's indexing of the minimum wage has guaranteed that its real value will never decline but will remain constant or even increase if the state minimum wage is raised by state law. The extent to which a growing share of the U.S. population can benefit from a rising minimum wage floor that keeps pace with rising prices will depend on how many states adopt a high-road strategy.

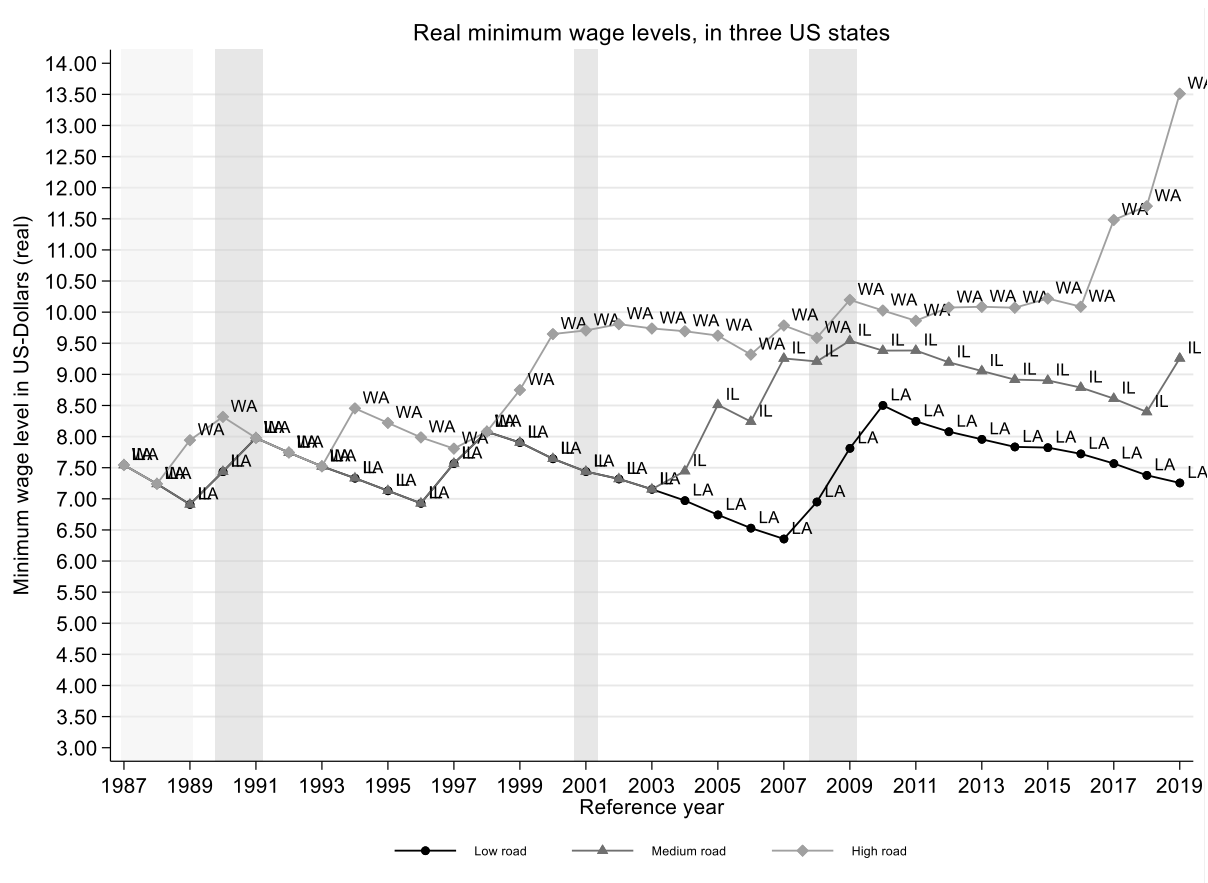


Figure 6: Real value of statutory minimum wages in three US states

Note: Annualized minimum wages are constructed by averaging the nominal statutory minimum wage at the state levels during the twelve months in a given year (reference year). For the real value of the federal minimum wage, the nominal federal minimum wage is inflated using the consumer price index (CPI-U) using 2018 as the base year. Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021).

However, the level of the minimum wage in itself does not necessarily indicate whether it is a meaningful social policy instrument in a particular place and time. For example, the extent to which a substantial part of the labor force is affected and how the minimum wage floor compares to wages further up the distribution are crucial. Changing labor market structures over time could imply that the relevance of a minimum wage at a given level differs at different points in time. To evaluate the potential impact of a minimum wage floor, scholars and practitioners often refer to its "bite". Broadly speaking, the bite of the minimum wage is strong when a meaningful share of the labor force is affected by it, and when the minimum wage is not far from the center of the earnings distribution but close to it, potentially affecting a larger number of employees.⁷ A widely used and popular measure to illustrate the bite of the minimum

⁷ In this thesis, I abstract from the coverage of minimum wage laws and the extent of compliance with them. The CPS-ASEC does not allow for identification of individuals who are covered or non-covered by minimum wage laws or whether they fall under regulations for tipped minimum wage workers. The broad coverage since the early 1990s, and the fact that coverage by law has not been curtailed since, supports the view that definite coverage of workers can be neglected. Accordingly, non-compliance with said law cannot be identified either. I will assume affected individuals to be those who work for hourly wage rates at the statutory minimum wage level (including a small bandwidth to reduce false negatives due to measurement error). Accordingly, individuals with hourly wages lower than the statutory minimum wage in a given state (and lower than the lower bound of the bandwidth) are not defined as minimum wage earners in the respective year and state. It is not possible to diagnose whether these individuals are not covered by law or if their employers do not comply with prevailing law.

wage is the Kaitz index. This sets the minimum wage in relation to the average or median wage of the working population in a given year, and thus depicts the ratio between these two figures (Garnero, Kampelmann, and Rycx 2015; Kaitz 1970). Low values mean that the wage floor is far from the middle of the income distribution, indicating that its potential impact is low. The higher the Kaitz index, the closer the minimum wage is to the center of the distribution and the more likely it is to affect a larger number of employees. Hypothetically, if the statutory minimum wage stalls at a low level while workers higher up the wage distribution benefit from rising wages, the minimum wage loses its bite as the distance between the wage floor and average wages increases, possibly accompanied by a declining share of the labor force working for these disproportionately low wages. Conversely, if the effective minimum wage were to double at a given point in time while other wages in the economy as a whole did not, its bite would escalate: the proportion of workers affected would rise sharply.

Figure 7 shows the evolution of the statutory minimum wage in Washington, Illinois, and Louisiana relative to the federal median hourly wage. Thus, it relates the minimum wage floor at state-level to the middle of the wage distribution over the USA as a whole. This graph thus again shows three different paths for the three different states over time. Compared to the other illustrations, the diverging trends are somewhat more pronounced, which is also consistent from a theoretical perspective: Louisiana's relatively low wage floor is even less able to keep up with median wages at the federal level.

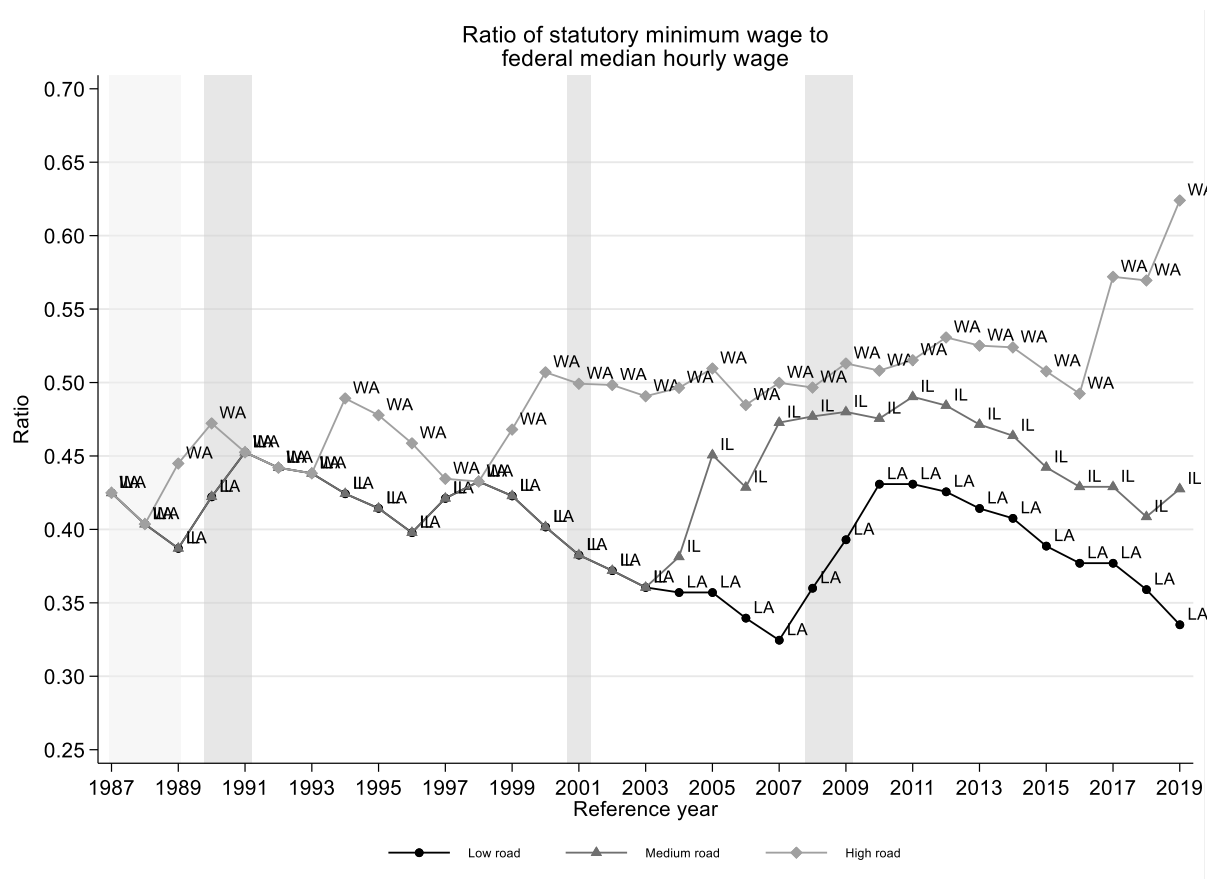


Figure 7: Ratio of state minimum wages to the federal median hourly wage, in three US states

Note: Median hourly wages are calculated on basis of CPS-ASEC data on respondents' total income from wages and salaries in the previous year, divided by the hours worked in the previous year. Annualized minimum wage data from year t is matched with CPS-ASEC survey data of year $t + 1$, so that aggregate figures match the income reference year of income questions in the ASEC. The years in the horizontal axis represent the reference year t . Shaded areas represent recessionary years as defined

by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on federal and state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement weights.

However, this pattern changes when the statutory minimum wage is set in relation to the state-specific median wage, presented in Figure 7. This factors in possible differences in general wage levels between the states. It is important to bear in mind that the ratio of the minimum wage to the median wage is influenced by both the level of the minimum wage and the median wage. It is conceivable that states that utilize minimum wages as a social policy may also be the states with relatively higher wages across a broad range of the wage distribution. If the median wage in a given state is proportionately lower in a state with low minimum wages, then the ratio between its wage floor and the median wage in the same state will not differ from a state with a higher minimum wage but proportionately higher median wages.

The previous order of the three exemplary states and their pattern is changing. In the most recent period since 2013, the observed trends and their relationship to one another are relatively similar to those depicted above. However, the patterns observed prior to that point differ significantly. Between 1999 and 2006 and again since 2013, Washington has recorded a more favorable lower-to-middle wage ratio compared to the other two states. Prior to the year 2000, Louisiana exhibited the highest statutory minimum wage in relation to the state-level median hourly wage. This is evidenced by the relatively lower wages in Louisiana in comparison to the other two states, as demonstrated here by the lower median wage at the state-level. This leading position, however, vanishes over time, particularly in the context of the protracted period of inactivity in the federal minimum wage legislation prior to 2007. Illinois' trajectory is consistent with its laggard role as presented in Figure 5 and Figure 6.

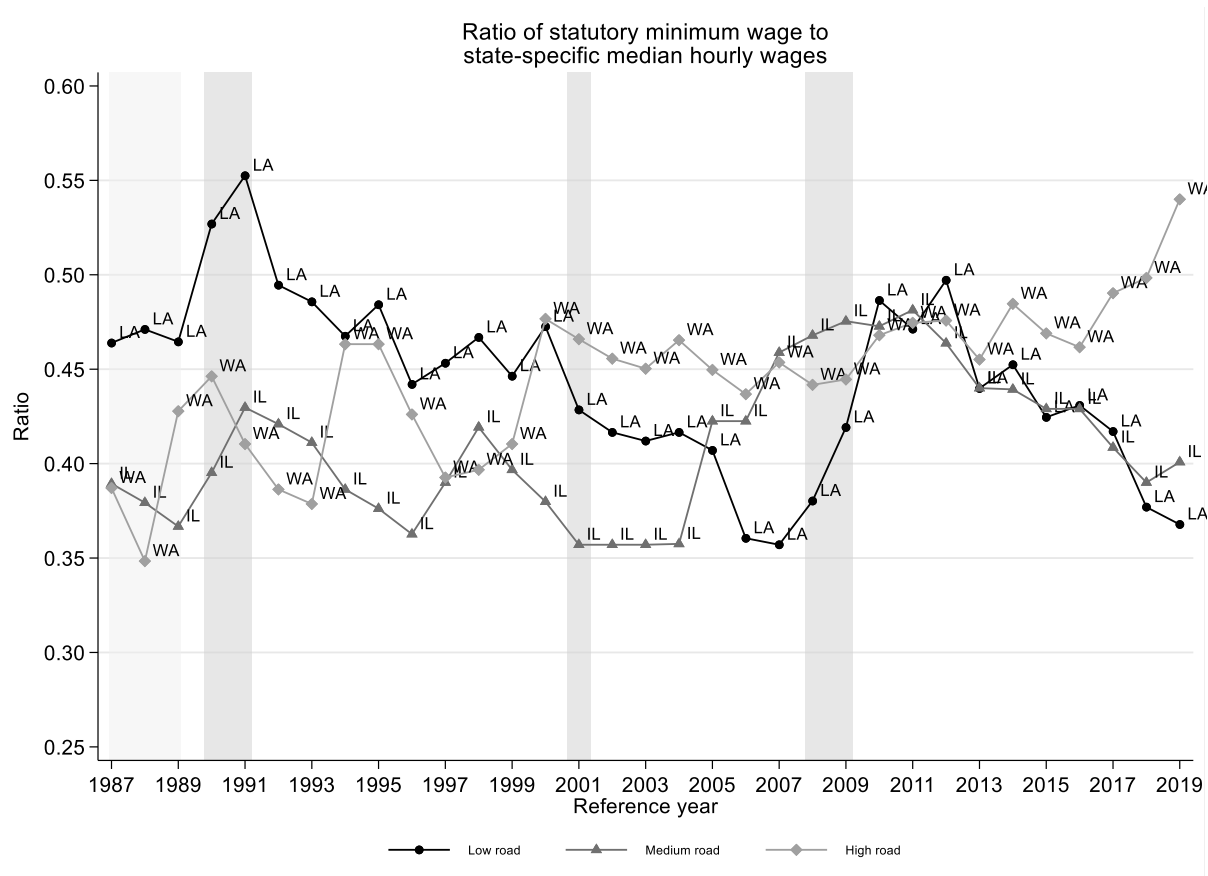


Figure 8: Ratio of state minimum wages to the state-specific median hourly wage, in three US states

Note: Median hourly wages are calculated on basis of CPS-ASEC data on respondents' total income from wages and salaries in the previous year, divided by the hours worked in the previous year. Annualized minimum wage data from year t is matched with CPS-ASEC survey data of year $t + 1$, so that aggregate figures match the income reference year of income questions in the ASEC. The years in the horizontal axis represent the reference year t . Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement weights.

On this basis, one can only speculate about the fraction of the labor force or population affected by minimum wages. In theory, a decline in the real value of the minimum wage and a decreasing ratio of minimum wage floors to median wages would imply that the lower threshold is so low that a diminishing share of the labor force is affected by it. This may be because employers adjust by also paying higher wages to their lowest-paid employees in order to keep up with overall wage developments, or because the low wage floor discourages potential workers from taking up work. Obviously, the number of workers affected by minimum wages depends on local labor market structures, such as the weight of different labor market segments.

Unfortunately, data on the number of workers paid the minimum wage at any given time is very limited. The Bureau of Labor Statistics, for example, only tracks the number of minimum wage workers who are paid the *federal* minimum wage (Bureau of Labor Statistics 2008, 2019b). Therefore, these figures are only representative for states in which the federal minimum wage applies. For states with higher statutory minimum wages, the share affected by federal minimum wages naturally diminishes and reflects sub-minimum wage earners only. There is no similar tracking for the share of the labor force being paid the respective statutory minimum wages in states. Estimates of workers potentially affected by upcoming minimum wage hikes suggest that in 2018, 6.2% of the population, and 10% of the labor force were paid the prevailing state minimum wage of \$11.00 in Washington State. In Michigan, which has chosen a similar trajectory to Illinois, 3.2% of the population and 5.2% of the labor force are directly affected by the state's prevailing minimum wage of \$8.90.⁸ In Louisiana, where figures are available for workers being paid the federal minimum wage, only 1.3% of the population and 2.3% of the labor force were paid the minimum wage in 2018 (own calculations based on Bureau of Labor Statistics 2020d, 2019a; Cooper 2018).

Figure 9 shows the share of minimum wage workers in the population employed in the last year on the left and in the total population on the right, based on data from the Current Population Survey's Annual Social and Economic Supplement (ASEC) matched to the respective statutory minimum wage in the income reference year. The proportion of minimum wage workers in the employed population appears to loosely track the relative level of the minimum wage, which is represented by the ratio of the statutory minimum wage to the state-specific median wages. This supports the assumption that a deterioration in the significance of a wage floor in a given setting – particularly due to decreasing ratios of minimum wage floors to median wages in a given state – is likely to result in a diminishing share of the labor force affected by it. When minimum wage workers are shown as a share of the total population, the shares are considerably lower and the differences across states and over time are smaller. Looking at the total population, the share of minimum wage workers may be affected by social structural and macroeconomic

⁸ In Illinois, 3.5% of the population and 5.4% of the workforce earn less than \$10.00, which is still higher than the state's prevailing minimum wage of \$8.25 Manzo, Manzo, and Bruno (2018).

conditions and trends in different states, such as the share of retirees or the unemployment rate in a given state.



Figure 9: Share of workers affected by minimum wages in population employed last year and total population, in three US states.

Note: Minimum wage workers are defined on basis of CPS-ASEC data using respondents' total income from wages and salaries in the previous year, divided by the hours worked in the previous year. Minimum wage workers are all individuals who have been employed for an average hourly wage over the previous calendar year at the level of the annualized statutory minimum wage in a given state in the previous calendar year. Annualized minimum wage data from year t is matched with CPS-ASEC survey data of year $t + 1$, so that aggregate figures match the income reference year of income. The years in the horizontal axis represent the reference year t . Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Data on state minimum wages is taken from UKCPR National Welfare Data, 1980-2019 (University of Kentucky Center for Poverty Research 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement weights.

The trends in the real value of the minimum wage, its relation to median wages, and the share of workers affected in the three exemplary states suggest that these concepts are interrelated. The rising real value of the minimum wage and its strengthening relationship to median wages in Washington suggest that individuals and their families affected by minimum wages have experienced an improvement in their income situation. If more and more states choose the high-road trajectory in minimum wage policy, this beneficial trend affects a growing overall share of the population in the United States. This is especially true when states with large populations follow this trend, such as California or New York State. With this trend, a randomly selected minimum wage worker in the USA is increasingly likely to earn a relatively high minimum wage. Accordingly, the real value of the average "effective" minimum wage in the United States is probably higher today than it was in the late 1980s.

If the rising real value of the minimum wage and its strengthening relationship to median wages had a significant impact on the distribution of household income, one might (but most likely would not) observe different trajectories of poverty and income inequality in states that chose a low, medium, or high path in minimum wage policy.

Poverty is measured by comparing a person's, family's, or household's income to an established poverty line or the minimum amount of income needed to meet basic needs. People whose income falls below the respective threshold are considered poor. The Census Bureau determines poverty status using an official poverty measure (OPM) that compares pre-tax cash income to

a threshold set at three times the cost of a minimum food diet (in 1963) and adjusted for family size. The official poverty measure (OPM) is the most widely used measure in research on the effects of the minimum wage on poverty in the USA, although it has been widely criticized (Brady and Parolin Forthcoming; Smeeding 2006; Johnson and Smeeding 2012).

Figure 10 shows poverty trends in the three exemplary states based on the official poverty measure. The poverty rates vary considerably between the three states and over time. Louisiana in particular stands out for its very high poverty rate. Louisiana's poverty rate declined from the mid-1990s and then began to rise again in 2009, but it has not returned to the peak it reached in the early 1990s. In Washington State and Illinois, the official poverty rate was less volatile; but overall, rising minimum wages were not accompanied by decreasing poverty. Rather, the opposite was the case, which supports the observation that minimum wage hikes were often realized at the end of business cycles of economic growth and shortly before downturns. This was the case, for example, with the increases in the federal minimum wage between 2007 and 2009, which coincided with the recession (between end of 2007 and mid-2009 in the USA) and the weak economy that persisted in 2009 and 2010 (Allegretto et al. 2017; Zipperer 2016).

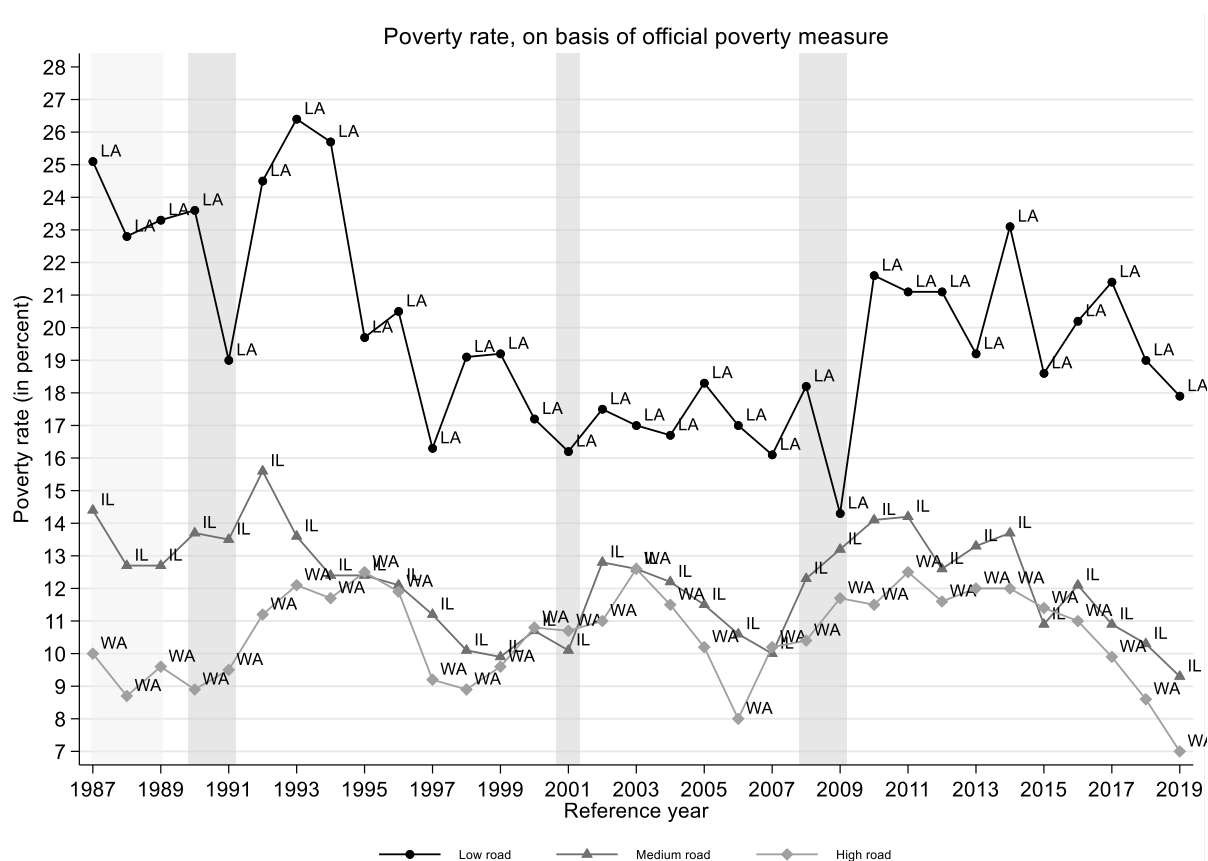


Figure 10: Poverty rate, based on official poverty measure (OPM) in three US states.

Note: UKCPR National Welfare Data (see figure above) from year t is matched with CPS-ASEC survey data of year $t + 1$, so that aggregate figures match the income reference year of income questions in the ASEC. Source: UKCPR National Welfare Data, 1980-2019, own representation (University of Kentucky Center for Poverty Research 2021).

At the time of the OPM's inception, the poverty line in the United States was 50% of median income; by the end of the decade, it had fallen to about 30 percent (Smeeding 2006). Relative poverty lines solve this problem as they are defined using a defined threshold, for example set at 50% of a given year's median income.

The relative poverty rate, measured as the share of the population living in households with less than 50% of median income (the federal median of equivalized disposable household income, left side of Figure 11), varies even more between the three states. Most notably, the relative poverty rate is substantially higher in Louisiana than in Illinois and Washington State. When the state's median income is used instead of the federal median income, the poverty rates in the three states are more similar, reflecting the different income levels across states.

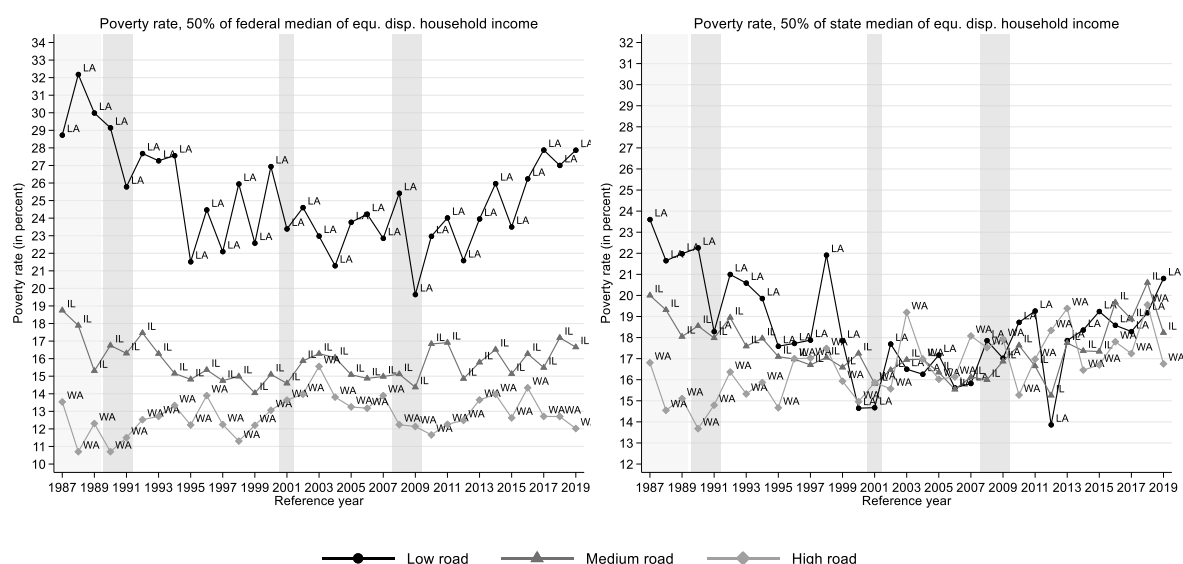


Figure 11: Poverty rate, defined based on the 50% threshold of federal (left side) and state (right side) median equivalized disposable incomes in three US states.

Note: The reference year represents the income reference year of the CPS-ASEC (survey year – 1). Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement weights. The years in the horizontal axis represent the reference year t . Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Own calculations, CPS-ASEC data 1987 – 2020, using Annual Social and Economic Supplement Household weights.

State-specific measures of income inequality based on the ratio of the 10th percentile of the income distribution to the median show similar patterns to those of state-specific relative poverty, as the two concepts are interrelated (Figure 12).

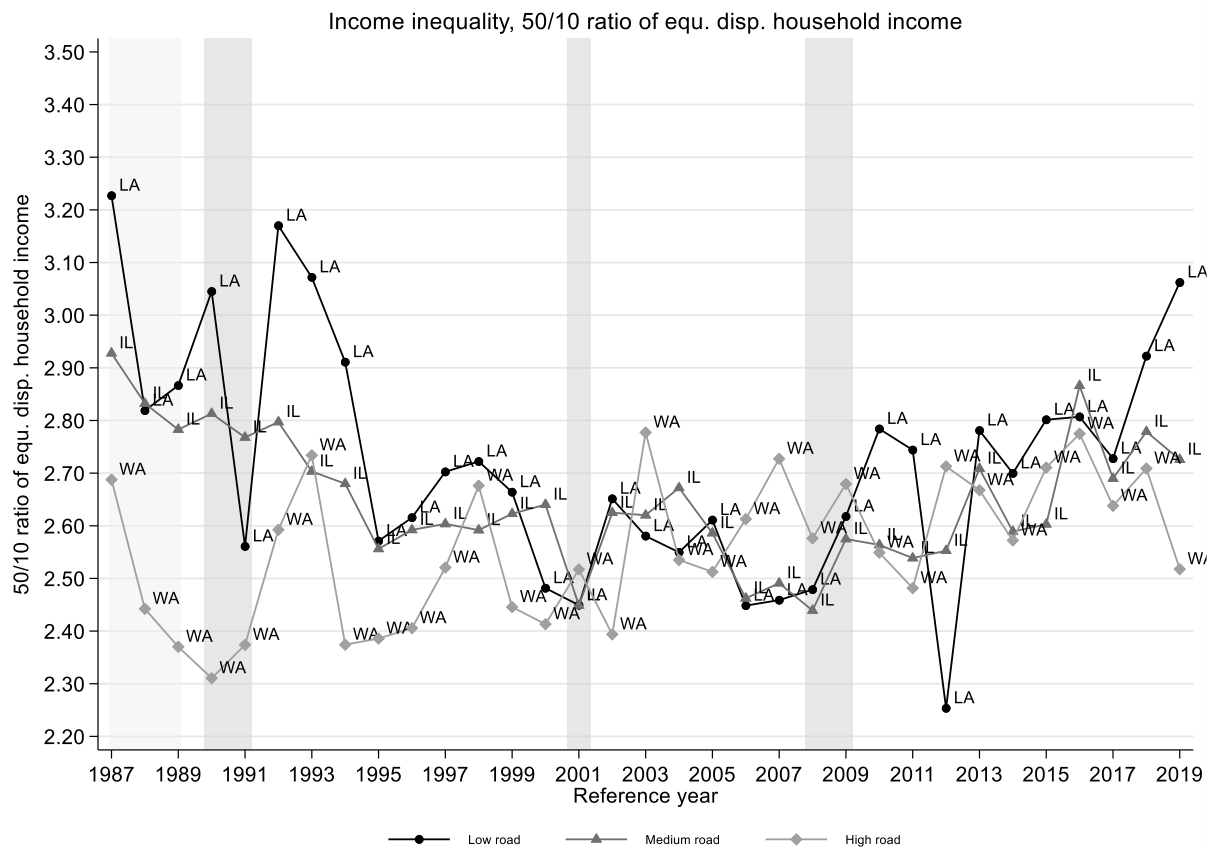


Figure 12: Inequality in equivalized disposable household income, 50/10 ratio, in three US states

Note: The reference year represents the income reference year of the CPS-ASEC (survey year – 1). Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement weights. The years in the horizontal axis represent the reference year t . Shaded areas represent recessionary years as defined by the National Bureau of Economic Research (Federal Reserve Bank of St. Louis 2021). Own calculations, CPS-ASEC data 1988 – 2020, using Annual Social and Economic Supplement Household weights.

Again, phases of rising minimum wages overlap with phases of growing income inequality. As previously indicated, minimum wage increases appear to be associated with phases of increasing inequality. There is often a time lag between the passage of minimum wage increases and the implementation of those increases. Minimum wages are enacted when the economy is expanding and unemployment is low, but by the time they are implemented, the economy may be contracting and unemployment may be rising again. (Reich 2009). A similar spurious correlation between minimum wage increases and poverty and income inequality in the lower half might lead to the patterns observed in the three exemplary states. This makes it vital to explicitly measure the impact of minimum wages on poverty and income inequality, to the exclusion of other possible impacts. The number of studies on the effects of minimum wages on poverty and incomes has grown considerably in recent decades, but the effectiveness and the target efficiency of the minimum wage as a social policy tool remains hotly debated due to a broad spectrum of research designs and results. In the following section, I will elaborate on the discussion of whether the minimum wage is an inefficient tool for combating poverty and income inequality.

2.4. Skepticism about the effectiveness of minimum wages as a social policy tool

At the beginning of chapter 1.1, I introduced minimum wages as a form of social policy. I discussed how minimum wage policies have featured prominently in policy debates in recent years. Political actors and congressional policymakers concerned about high levels of economic inequality regularly call for increases in the federal minimum wage. Minimum wages also play an increasingly important role at the state and local levels. Advocates of a higher minimum wage argue that it can act as an antipoverty tool and reduce the current high levels of income inequality in the USA.

However, proposals to raise the minimum wage have their supporters and opponents. Both politicians and minimum wage researchers have spent decades debating the effectiveness of the minimum wage in protecting workers by means of adequate minimum wage floors and reducing income poverty⁹. While there is evidence that changes in minimum wages strongly influence wage inequality (i.e. Autor, Manning, and Smith 2016), their effects on poverty and income inequality are less clear and are under-researched (Neumark 2016; Belman and Wolfson 2014:308–09). For a long time, there was no robust evidence on the distributional effects of the minimum wage on household or family income, even though this is a pressing policy question (Neumark and Wascher 2008). Whether the minimum wage raises living standards of households in the lower income brackets, and if so as a stand-alone policy or in combination with other policies, is a crucial question (Belman and Wolfson 2014:308–09).

Minimum wages and the additional income from raising the minimum wage floor initially flow to low-wage workers, not to low-income households. However, for the minimum wage to have an impact on poverty or income inequality, it is important that increases in individual minimum wages go to households in need and that they are in this sense well targeted (Belman, Wolfson, and Nawakitphaitoon 2015:607–09). Thus, the relationship between being paid the minimum wage and poverty is complex. Low hourly wages of an individual earner may or may not be associated with the economic vulnerability of the household in which they live (Giesselmann and Lohmann 2008; Lohmann and Marx 2008; Marx and Verbist 2008; Nolan and Marx 1999; Torsney 2013). Beyond the individual earnings of minimum wage workers, the circumstances of households, i.e. other earnings, the number of dependents, and income support and tax systems, are central to whether an individual's low pay means low income at the household level. Concerns about the effectiveness of minimum wages as social policy have long been raised because of this complex relationship. Particularly in the context of the fight against poverty, the minimum wage has been criticized for many decades for its poor targeting efficiency. As early as 1949, George Stigler argued that the minimum wage was ineffective in reducing poverty: he suggested that the impact of the minimum wage on the distribution of family incomes was unlikely to be positive, since the benefits of the better-paid jobs might accrue to families with relatively high incomes rather than to those in need (Stigler 1946).

Many scholars and practitioners have since argued that the beneficial effects of minimum wage increases are uncertain. From the standard supply and demand framework, there is a significant potential downside to minimum wages: higher wage floors would discourage employers from hiring low-wage, low-skilled workers and lead to job losses, particularly for these vulnerable

⁹ Poor targeting in the US is documented and discussed for example in Burkhauser and Finegan (1989), Burkhauser et al. (1996), Burkhauser and Sabia (2004); (2007), Freeman (1996), Gramlich (1976), Neumark and Wascher (2002, 2008), Smith and Vavrichuk (1992) and for Canada in Benjamin (1996, 2001), Campolieti and Gunderson (2010), Gunderson (2005), Mascella et al. (2009) and Sen et al. (2011).

groups. In this line of argument, the theoretical disadvantages would be unevenly distributed, further weakening the position of the most vulnerable in the labor force. To evaluate the minimum wage as an appropriate social policy measure, one must theorize about the potential ‘winners’ and ‘losers’ of higher minimum wages and the extent to which the benefits of minimum wage increases outweigh the downsides. These downsides include reductions in working hours, employment loss, or difficulties finding work for the most vulnerable in the labor market and are perceived as threats to the efficacy of the minimum wage as an antipoverty policy (Neumark and Wascher 2008; Belman and Wolfson 2014)¹⁰.

Possible job losses as a result of minimum wage increases have accounted for much of the research on the effects of the minimum wage. The evidence on employment effects is mixed, and several researchers have conducted meta-analyses of the employment effects of the minimum wage in order to assess the results of previous research in a quantitative and formal way. (Belman, Wolfson, and Nawakitphaitoon 2015; Belman and Wolfson 2014; Dube 2019b; Doucouliagos and Stanley 2009; Card and Krueger 1995b; Wolfson and Belman 2019). The debate is still open after more than three decades in which employment effects have been the most researched outcome in minimum wage research. Several scholars argue that estimates of the effect on employment range around zero, meaning that even if there is a negative effect on employment, it is too small to be detected by the statistical methods used (Belman, Wolfson, and Nawakitphaitoon 2015; Dube 2019b; Wolfson and Belman 2019; Kuddo, Robalino, and Weber). If the reviews and meta-analyses¹¹ are treated with caution, it can at least be argued that the evidence on employment effects of the minimum wage is very mixed. Moreover, even opponents of minimum wage increases have stated that “the existence of negative employment effects does not necessarily imply that minimum wages constitute bad social policy. Employment losses [...] may be acceptable if the increase in the minimum raises the incomes of poor or near-poor families.” (Neumark, Schweitzer, and Wascher 2005:867). However, the extent to which minimum wages actually raise the incomes of poor or near-poor families is under-researched, although it is the central question regarding the positive policy effects of minimum wages.

In addition to possible employment effects, arguments about the inefficacy and inefficiency of the minimum wage focus on assumptions about where potential beneficiaries of the minimum wage are located in the income distribution, and how their income situation is likely to change after a minimum wage increase. According to this line of argument, higher minimum wages could reduce poverty if, on balance, more families exit poverty as a result of a higher minimum wage than enter poverty as a result of a possible loss of employment or a reduction in working hours. The issues debated therefore focus on the income growth of families in need, and the potentially inefficient distribution of these benefits across the population as a whole. The potential positive effects of minimum wage hikes are most often assessed on the basis of changes in the income of poor or near-poor households, because this is the historically

¹⁰ For an introduction to the debate, see also the subsequent book reviews by Burkhauser (2010) and Dube (2011) following the publication of the standard by Neumark and Wascher (2008).

¹¹ Meta-analyses can suffer from the problem of averaging estimates from studies where the population studied often varies. Different populations imply that the minimum wage’s bite is different across studies, which leads to variation in estimated effects. Also, meta-analyses often assign more weight to estimates that are more statistically precise. If precision suffers from the degree of rigor of a study, this is a poor indicator for assessing its informative value, see Neumark (2016).

established way in which poverty is officially measured in the USA and is still used to gauge the success of the War on Poverty. The threshold below which families are considered as poor is based on an absolute measure – the cost of a minimum food diet – and is only adjusted for inflation and family size. In other words, unlike relative measures of poverty, which set the income of families or households in relation to the income of the ‘center’ of the population, the official poverty measure defines poverty on the basis of the amount of income required to ensure subsistence. Consequently, most studies measure the beneficial effects of the minimum wage on poverty in terms of absolute income gains, and arguments for and against minimum wages also refer to changes in the incomes of poor and near-poor families. Possible impacts on shifts in the income distribution, which might be located somewhat further up the distribution, are overlooked (Gramlich, Flanagan, and Wachter 1976:434–44; Neumark and Wascher 2008:142).

There are two main counterarguments in the extensive literature. The first is that minimum wages are poorly targeted because they flow to low-wage earners rather than to low-income households. The lower labor force participation of the poor and the relatively high share of minimum wage workers living in higher-income families result in an inefficient distribution of the benefits from increasing minimum wages. The second is that the potential income gains for poor and near-poor families and households are eroded by unfavorable interaction effects with other income support programs. Transfer withdrawal rates may imply that increases in the hourly wages of household members effectively result in little or no improvement in their income situation.

Under the first argument, opponents of minimum wage hikes argue that only a minority of minimum wage workers actually live in poor or near-poor households. According to this argument, many poor families have no members in employment. Furthermore, many minimum wage workers live in families with incomes substantially higher than the poverty threshold, for example teenagers or secondary earners in families (for an overview of the debate, see Card and Krueger 1995a; Neumark and Wascher 2008; Belman and Wolfson 2014). The first aspect, viewed from the perspective of the poor population, is inconsistent with the widespread existence of in-work poverty in the USA. In fact, the poverty rate among the employed is higher than that for the overall population (Kenworthy and Marx 2018; Brady, Fullerton, and Moren Cross 2010). However, poverty might be connected to low working hours, and in that case, the impact of the minimum wage is effectively lower. The low attachment of low-income households to the labor market is the concern that offers more evidence based on representative data. Members of low-income families are less likely to be economically active and are employed at lower rates and for fewer working hours than others in higher-income families. This reduces the number of people potentially affected by the minimum wage and the size of the contribution of a minimum wage earner to total family income¹². Early work suggested that minimum wage earners were spread evenly across the entire income distribution, based on the characteristics that minimum wage earners had. Many of the "typical" minimum wage earners were assumed to be higher up in the household income distribution, such as teenagers, young adults, and secondary earners in multiple-earner families (Card and Krueger 1995b;

¹² On the one hand, the potential share of a low wage in the total income is higher in low-income families and lower in high-income families. On the other hand, this potential is offset by limited working hours in low-income families and the higher contribution from social benefits.

Burkhauser, Couch, and Glenn, Andrew, J. 1996; Gramlich, Flanagan, and Wachter 1976). Opponents and skeptics of minimum wage increases suggested that this could be a growing concern given the increasing dominance of multiple-earner families and the rising number of students working in the expanding service sector (Burkhauser, Couch, and Glenn, Andrew, J. 1996; Burkhauser and Sabia 2004; Burkhauser and Finegan 1989; Burkhauser and Sabia 2007).

Under the second argument, the increase in earnings following a minimum wage hike may interact with income support programs or tax policy. If minimum wages increase a family's earnings and labor income, the members of that family may no longer meet the eligibility criteria for certain income support programs. The relevance of public transfers as a share of total income obviously varies widely across the population: while many people have no contact with income support at all, social protection may be the main or only source of income for the most vulnerable. For those with the lowest incomes, the flow from cash transfers is particularly important (Salverda, Nolan, and Smeeding 2011a). Scholars have long argued that the wage gains from a change in the minimum wage are dissipated by the structure of the US-American transfer system, because transfers in a number of programs are automatically reduced when labor income rises (Johnson and Browning 1983). However, few studies have been undertaken on the interaction of antipoverty policies and the minimum wage (Belman and Wolfson 2014:323) and the welfare system has changed considerably in recent decades. This might imply that today's system of income support better suits simultaneous labor market activity. More generally, it is debatable whether cuts in transfers should be used as a counterargument against minimum wages, when reduced caseloads are in fact beneficial outcomes that relieve state budgets. In this sense, the interaction with transfers should rather be a factor to be taken into account in analyses of the impact of the minimum wage on incomes – isolated from effects on the receipt of public transfers. The rise in earnings and labor incomes could continue to raise marginal tax rates on households and thus erode potential income gains. This may be the case, for example, if families' labor income is within the phase-out threshold for tax credits. However, low-income or poor families receiving the Earned Income Tax Credit are more likely to be in the phase-in range of tax credits, meaning that their (refundable) credit increases with labor income. This would imply that increases in the minimum wage would boost not only earnings but also the amounts received from refundable tax credits (Belman and Wolfson 2014:323; Romich and Hill 2018).

While there is ample evidence on employment rates and the labor market participation of the poor, little is known about where households with members in minimum wage work are located in the income distribution and how much their total household income depends on labor income and other sources of income such as public transfers. Thus, although the target efficiency of the minimum wage is at the core of the theoretical debate about its possible impact on poverty and income inequality, the actual evidence on how families' incomes are affected and how they are positioned in the income distribution is very limited. Instead, the image of the typical minimum wage worker as a teenager, young adult or low-educated persists, reinforcing the notion that most of the benefits of minimum wage increases accrue to non-poor households (Card and Krueger 1995a).

However, recent research suggests that the target efficiency of the minimum wage has changed over time and that the image of the typical minimum wage worker might be incorrect or at least biased. More importantly, the share of benefits flowing to workers in poverty appears to vary

at different levels of real minimum wage. This pattern seems to be based on systematic changes in the composition of minimum wage workers as the minimum wage floor rises (Dube 2019c; Lundstrom 2017; Cengiz 2019). These patterns have received little attention, even though they are crucial to the functioning of the minimum wage as a social policy tool and its impact on poverty and income inequality.

The assumption that, *over three decades*, low-educated and young people are disproportionately likely to be minimum wage workers has recently been strengthened using machine learning methods (Cengiz 2019). However, the data-driven method of predicting the probability of having an hourly wage at or near the statutory minimum wage demonstrates that the accuracy of identifying these demographic groups as high-impact groups *varies substantially across years*.¹³ The variation in the accuracy of identifying minimum wage workers based on their demographic traits is closely related to the variation in the level of the minimum wage. As minimum wages rise, the high-impact group becomes more heterogeneous, and narrow subgroups of the population, such as teenagers, young adults, or the low-educated, may become less adequate to represent the minimum wage workforce. This could also mean that the target efficiency varies with different minimum wage levels. Over the past three decades, target efficiency has increased, resulting in a higher share of the benefits flowing to workers in poverty (Lundstrom 2017:37). All in all, this shows that there is a considerable gap in knowledge about the living conditions of affected minimum wage workers and their families, and about the potential impact of the minimum wage as a social policy.

2.5. The impact of minimum wages on household disposable income

To theorize about the impact of minimum wage increases, it is important to understand how the share and composition of the minimum wage workforce alters as the (real) level of the federal minimum wage and state statutory minimum wages change. The debate on the effectiveness of minimum wages as a social policy tool indicates that there is disagreement on the question on who would be affected by minimum wage hikes. The share and composition of the affected workers determines the impact of minimum wages on household incomes in two ways. First, the composition of the minimum wage workforce in terms of the demographics of minimum wage workers and their family formation patterns indicates whether their additional earnings are likely to flow to low-income households. If minimum wage workers were exclusively teenagers living with their parents, we could theorize that minimum wage increases would flow relatively evenly to households across the whole income distribution. If minimum wage workers were exclusively single mothers working full-time, we could theorize that minimum wage increases would mainly flow to low-income households. This is because the total earnings from a minimum wage job and the lack of additional labor income from a partner is likely to position a single mother with dependent children relatively low in the income distribution. Second, the share of minimum wage workers in the total workforce, or even in the total population, has a strong influence on the potential policy impact of the minimum wage. If, for example, the minimum wage workforce accounted for 15% of total employment, the potential impact of the minimum wage would be relatively large. Raising the minimum wage would

¹³ The author argues that teenagers, who are the most-studied demographic group and the focus of much of the current controversy of minimum wage effects, are a small and a shrinking share of minimum wage workers.

likely have a significant impact on the labor market in terms of the distribution of wages. Taking these two aspects together, one could theorize that the potential impact on poverty and income inequality increases when a relatively large share of workers are affected by minimum wages, and when the earnings of minimum wage workers become a more important component of the income of the households in which these workers live.

As discussed in section 2.4, both the characteristics and living conditions of minimum wage workers and their contribution to household income are under-researched. Although the theoretical debate about the potential impact of the minimum wage on poverty and income inequality hinges on the target efficiency of the policy, the actual evidence on how families' incomes are affected and how they are positioned in the income distribution is scarce. In addition, the extent to which poor households benefit from minimum wage increases appears to vary depending on the minimum wage in force, which is due to the more heterogeneous composition of minimum wage employees at higher wage floors (Dube 2019c; Lundstrom 2017; Cengiz 2019). In what follows I will discuss what is known about *who benefits from minimum wages at all*, and *who benefits most* from minimum wage increases. I then go on to discuss the mechanisms behind the translation of increases in hourly pay into increases into total household income using exemplary constellations of households with minimum wage earners.

2.5.1. Who benefits from the minimum wage? The composition of the minimum wage workforce

Many scholars who debate the efficiency of minimum wage policy base their arguments on assumptions about the characteristics of minimum wage workers, especially their demographics, to argue that the benefits of minimum wage increases do not flow primarily to the poor. Empirical work estimating the effects of the minimum wage on incomes and poverty regularly draws on a broad literature on the social structure of minimum wage work. For example, there is broad consensus that low-educated workers, women, teenagers and young adults, or ethnic minorities are overrepresented among minimum wage workers. Potential poverty effects of minimum wage increases are often estimated for the relevant population groups because the small share of affected workers makes it difficult to detect policy impacts on aggregate outcomes such as economy-wide employment or population-wide poverty (Belman and Wolfson 2014; Dube 2019b; Belman, Wolfson, and Nawakitphaitoon 2015).

As mentioned in section 2.3, the share of the workforce and the population working for minimum wages is a crucial factor in its impact on poverty rates or income inequality. In addition, it is important to understand the composition of the minimum wage workforce as a starting point when debating its target efficiency. However, the composition of the minimum wage workforce has not been systematically tracked over time, and the changes in it have not been accounted for in studies estimating the impact of the minimum wage on poverty. Scholars often take account of changes in demographics, shifts in educational composition, or family formation *in the overall population* to rule out their impact on poverty, but they do not take into account changes in the composition *of the minimum wage workforce*, or the *subpopulation directly affected by minimum wage policy* per se.

The composition of the workforce affected by minimum wage policy can change due to two different types of factors. Sectoral changes in the labor market, macro-economic trends, demographic shifts, or educational expansion can *affect the low-wage labor market* in respect of its size and its composition. For example, a growing service sector could increase the low-wage sector, and occupational upgrading could decrease it. A changing share and composition of the low-wage sector means that the potential target group of minimum wages changes, regardless of the prevailing minimum wage floor. Another possible effect comes from the *minimum wage level itself*: different minimum wage levels will lead to systematically different compositions of the minimum wage workforce. At the bottom of the hourly wage distribution, workers are likely to be low educated and low skilled, and they are likely to work limited hours. This composition changes as you move up the distribution: The share of workers working full-time increases, the educational composition becomes more heterogeneous and includes more highly educated workers. What is more, increasing minimum wage levels lead to shifts in affected industries or regions.

In a debate about the efficacy of minimum wages in alleviating poverty and assisting low-income families, the characteristics of the families in which minimum wage workers reside are of greater consequence than the characteristics of the minimum wage workers themselves..¹⁴ For example, limited knowledge of the contribution of minimum wage workers to total family income means that, at best, only tentative assumptions can be made about the joint distribution of minimum wages and poverty.

The image of the "typical" minimum wage worker mentioned above seems to be perceived as relatively static and stable. For several decades now, the controversy over the effects of the minimum wage has been debated against the backdrop of a presumption of harm to the young and low-educated, and an expectation of limited benefits from the minimum wage based on the presumption that minimum wage workers are often teenagers or young adults and are likely to be only secondary earners in families. However, recent work suggests that the characteristics of minimum wage workers have changed over time (Lundstrom 2017; Oka and Yamada 2019; Levin-Waldman 2015; Casselman 2014, 2015). Consequently, minimum wage policy may target different population groups than often assumed, and its distributive effect might have changed.

Many studies have supported their arguments on the link between low-wage work and poverty with descriptive analyses of the characteristics of minimum wage workers and their families. Most importantly, scholars have studied the poverty incidence and income situation of households with minimum wage workers (for an overview, see for example Belman and Wolfson 2014; Neumark and Wascher 2008; Card and Krueger 1995a). However, these descriptive analyses often offer a snapshot of the composition of households with minimum wage workers at a given point in time only. Furthermore, the role of minimum wage workers in their families, i.e. whether they are the primary or secondary earners, heads of household or single mothers, has rarely been analyzed. Altogether, this provides relatively fragmented evidence on the characteristics of minimum wage workers and very limited evidence on the

¹⁴ This is partly rooted in the fact that until the 1970s, when the U.S. Department of Labor merged the May supplement of the Current Population Survey and the March supplement of the CPS, there was no data source covering both the wage rates and family incomes for the same people (Gramlich, Flanagan, and Wachter (1976).

distribution of minimum wage workers and households with members in minimum wage work across different income ranges.

The characteristics that have been most consistently tracked are the educational level of minimum wage workers, their age group, their ethnicity, and the share of women and men in the minimum wage workforce. Minimum wage workers today are on average older than they were at the end of the 1970s, in the 1980s, and in the early 1990s. In the past, approximately half of all minimum wage workers were teenagers and adults under 25 (Haugen and Mellor 1990; Levin-Waldman 2015; Smith and Vavrichek 1987, 1992; Freeman 1996; Long 1999; Card and Krueger 1995a:281–83). When the federal minimum wage was raised between 1996 and 1997, the majority of direct beneficiaries of the pay rise were over the age of 20; in the 2010s, less than half of all minimum wage workers were reported to be under the age of 25 (Belman, Wolfson, and Nawakitphaitoon 2015; U.S. Government Printing Office 1999). Minimum wage workers are now more likely to be ethnic minorities in the labor market, and the proportion of minimum wage who are White is falling. Hispanics and, to a lesser extent, Blacks account for an increasing share of minimum wage work. While Blacks and Hispanics made up one third of the minimum wage workforce in the mid-1990s, their share rose sharply between the early 2000s and 2018, from 13% to 18% for workers who identify as Black or African American, and from 13% to 19% for Hispanics and Latinos (Bureau of Labor Statistics 2008, 2019b). Both Hispanics and African Americans are disproportionately represented in the minimum wage workforce (Belman, Wolfson, and Nawakitphaitoon 2015). Minimum wage workers were also disproportionately women, making up about 60% of the minimum wage workforce for most of the period, with a slight dip toward 50% in the mid-2000s (Freeman 1996; Long 1999; Levin-Waldman 2015; Neumark 2007; U.S. Government Printing Office 1999). Today's minimum wage workers are more educated, whereas two decades ago, the minimum wage workforce consisted predominantly of low-educated, low-skilled workers (Long 1999; Levin-Waldman 2015; Bureau of Labor Statistics 2002, 2019b). Such workers are now more likely to be in professional or technical occupations and in service occupations in private households. In addition, the role of manufacturing as an industry in which minimum wage workers are employed has declined over the past three decades (Bureau of Labor Statistics 2002, 2019b; Congressional Budget Office 2014; Luce 2014; Reich, Jacobs, and Bernhardt 2014; Mishel 2013). Minimum wage workers were evenly distributed in full-time and part-time work, and this has not changed much (U.S. Government Printing Office 1999; Haugen and Mellor 1990; Burmeister 2004; Bureau of Labor Statistics 2002, 2019b)

There has been little change in the pattern of a disproportionate number of minimum wage workers living in poverty or in low-income families. (Horrigan and Mincy 1993; Gramlich, Flanagan, and Wachter 1976; Burkhauser and Finegan 1989; Burkhauser, Couch, and Glenn 1995; Burkhauser, Couch, and Wittenburg 1996; Freeman 1996; Burkhauser 2014; Belman, Wolfson, and Nawakitphaitoon 2015; Romich and Hill 2018). However, minimum wage workers' earnings appear to play an increasingly important role in their households' total income. While the majority of minimum wage workers were not the primary earners in their families in the past, their wages are increasingly a major source of family income (Smith and Vavrichek 1987; Burkhauser and Finegan 1989; U.S. Government Printing Office 1999; Card and Krueger 1995a:283; Dube 2014).

The changing profile of minimum wage workers challenges the arguments of opponents of minimum wage increases, who emphasize that minimum wage workers are disproportionately often teenagers, young adults, or low-educated, and who assume that this profile is relatively stable over time. More importantly, the composition of workers paid the minimum wage also appears to change as minimum wage levels change (Dube 2019c; Lundstrom 2017; Cengiz 2019). This underscores the inappropriateness of assuming a static picture of the typical minimum wage worker when estimating the impact of wage policy. Instead, it is essential to identify the population directly affected by minimum wages and to study their income situation with changing minimum wage levels. Analyzing the characteristics of minimum wage workers can help make assumptions about the families and households in which they live, especially when examining the poverty status of minimum wage workers or their role in the family in terms of the contribution of their earnings to total family income. For hypotheses about trends in poverty or income inequality, however, it is necessary to consider more explicitly how the income situation of families and households affected by minimum wages changes. Many of the studies that examine the relationship between minimum wages and poverty infer effects on poverty based on where minimum wage workers fall in the income distribution. But this misses a crucial: some of these minimum wage workers may work only a few hours a week, while others may work full time. Depending on how many hours they work, minimum wage workers can make very different contributions to their family's total income. This may also vary systematically along the income distribution. While teenagers and secondary earners may be distributed in higher income brackets, primary earners may be located in lower income brackets. The question of who will benefit most from minimum wage increases depends heavily on these intermediate steps.

2.5.2. Who benefits most? The distribution of benefits from minimum wage increases across households

As previously stated, the primary critique of the minimum wage's efficacy in alleviating poverty revolves around the question of where families who benefit from a minimum wage increase are located in the income distribution. It is of greater consequence, however, to determine not only who is affected by minimum wage increases, but also *who benefits most* from a minimum wage hike.¹⁵ This depends on several factors, in particular the annual working hours of minimum wage workers, the pooling of labor income at the household level, and other sources of household income. These factors together determine the extent to which a household's income situation changes after a minimum wage hike. The distribution of benefits across households can be viewed in absolute and relative terms. The additional dollars flowing into a household's total income after a minimum wage hike and a corresponding increase in the earnings of a minimum wage worker are the absolute income gains to households. A poor household with a full-time minimum wage earner will experience the same absolute change in income as a high-income household with a full-time minimum wage earner. The *relative* additional benefit is higher for a household living in poverty, as the increase in income is greater as a percentage of the initial income.

¹⁵ By "benefit" I refer to the additional income accruing to households with members in minimum wage work after a minimum wage hike.

For distributive measures of relative poverty and income inequality, however, it is absolute changes in income at different points of the income distribution that matter. Distributive effects that reduce income inequality and relative poverty would be the most likely if the minimum wage workers who benefit most from minimum wage hikes were disproportionately likely to live in low-income households. This reframes the question of where households affected by the minimum wage are located in the income distribution to one of where households that benefit *in particular* from a minimum wage increase are located in the income distribution. For absolute measures such as the official poverty measure, an even distribution of benefits would still result in families being better off and possibly crossing the poverty line.

The low labor market attachment of families in poverty as compared to higher-income families is relatively well documented. In the lower half of the family income distribution, both employment and labor market participation have a very strong positive association with income (Belman, Wolfson, and Nawakitphaitoon 2015:608). A large share of low-income households have no members in employment, with estimates ranging from one quarter to one half of all households (Burkhauser, Couch, and Glenn 1995; Belman and Wolfson 2014:314; Neumark 2016). This means that a significant portion of the target population is not affected by increasing minimum wage floors at all.

Additionally, low-income households are less likely to have more than one member in employment, and working members in low-income families often work fewer hours than workers in higher-income families (Belman and Wolfson 2014:313). This lower attachment to the labor market results in lower absolute income gains for low-income households on average and precludes meaningful impacts of the minimum wage on the income situation of families and households in lower income brackets. Evidence on the working hours of the target group is more mixed than on their employment rates. Research on the causes of in-work poverty supports the argument that work and poverty are linked through both low hourly wages and low working hours (Neumark 2016; Belman, Wolfson, and Nawakitphaitoon 2015; Horemans 2018; Lohmann and Crettaz 2018).

Often linked to prospective minimum wage hikes, scholars have estimated the amount of benefits that would flow to different demographic and income groups following an increase in the level of the minimum wage. Overall, estimates from different settings and scenarios across time suggest a relatively even distribution of the *gross absolute* dollar amounts flowing to households across the income distribution (Gramlich, Flanagan, and Wachter 1976; Johnson and Browning 1983; Horrigan and Mincy 1993; Burkhauser, Couch, and Glenn 1995). However, with a progressive tax system, the distribution of the net additional incomes might be more favorable. Estimates have shown that households in the bottom twenty percent of the distribution benefit disproportionately from minimum wage increases when the net additional dollar amount associated with a minimum wage hike is considered (MaCurdy 2015; Burkhauser, Couch, and Glenn 1995; Romich and Hill 2018).

In terms of the target efficiency of the minimum wage from a policy perspective and its impact on poverty and income inequality, what matters are the absolute income gains of the poor and non-poor, as well as across the income distribution. However, the same absolute amount of additional money flowing to households in different income ranges implies varying "value" for the households receiving it. The same dollar amount boosts a poor households' income by a

much higher percentage than it does for households higher up in the income distribution. Thus, even when the absolute dollar amounts flowing to households are not concentrated among the income-poor, the relative benefits are likely to be largest for those with the lowest incomes. For families and households that balance their spending at the subsistence level and live ‘from paycheck to paycheck’, living conditions could improve significantly if the benefits of minimum wage increases are large *relative to their household income*. The question of how low-wage workers’ lives are affected when they receive a pay increase has long been neglected. Meanwhile, a growing body of research shows that higher minimum wages alleviate poverty and that people are better able to pay for the medical care they need or to stock the fridge at the end of the month when the minimum wage is higher (Desmond 2019; Dow et al. 2019; Ruffini 2020; Raissian and Bullinger 2017) .

The relative contribution of minimum wages to household income among the poor and across the income distribution is unclear, and evidence is scarce. On the one hand, the potential share of labor income from minimum wage work in total income is naturally higher for poor families than for high-income families. Given that the maximum amount earned from minimum wage work is capped at the top (based on the prevailing statutory minimum wage and the maximum number of hours worked in a minimum wage job over the year), its share cannot be high in households with high total incomes. Thus, the relative importance of earnings from minimum wage work is more pronounced in low-income households. On the other hand, limited working hours in low-income families could lead to lower annual earnings, while the higher importance of income from public transfers diminishes the relative importance of income from minimum wages in poor families.

An early study suggested that labor income from low-wage employment was of minor importance relative to total post-tax and post-transfer income in the lowest income deciles. At the bottom of the income distribution, more than three-quarters of income comes from sources other than low-wage work (Johnson and Browning 1983). However, recent evidence suggests that minimum wage workers are increasingly those who rely on their earnings to support their families and households, in contrast to the image of the typical minimum wage earner who has been portrayed as a dependent of workers with higher earnings (Lundstrom 2017).

Similarly and likely related to the changing characteristics of minimum wage workers over time, arrangements within households and families may have changed. It remains an open question whether minimum wage workers now have a larger share of the total income of the household in which they live than they did in the past. If minimum wage earners contribute a substantial share of total household income, an increase in the minimum wage will lead to a large relative improvement in the income situation of that household. Recent research on the composition of the minimum wage workforce and the distribution of the benefits across income ranges suggests that the targeting of the minimum wage has improved over time. Given that wage increases from minimum wage hikes initially flow to low-wage individuals, some of the benefits of minimum wage policy will also flow to higher-income households. However, minimum wage increases disproportionately benefit those in the lower income rungs, given that the progressive tax system in the USA leads to higher net benefits flowing to those with the lowest incomes.

In addition to focusing on tackling income poverty among the general population, raising the minimum wage can be effective in reducing the gender and ethnic pay gaps, which in the long run means less inequality between these groups. Not only are women and ethnic minorities disproportionately likely to work for the minimum wage, but they also spend more of their working lives in minimum wage jobs, while others work in minimum wage jobs only temporarily, moving on to higher paying jobs after gaining experience (Carrington and Fallick Bruce C. 2001). Also, the limited correlation between poverty and labor market attachment has led several scholars to acknowledge that an exclusive focus on the (officially) poor population may be too restrictive, as the impact of minimum wages on poverty is limited (Belman and Wolfson 2014). The findings on the differential impact of the minimum wage on different population groups depending on its level reinforces this concern. Therefore, broadening the perspective to include the low-to-moderate income population may be more fruitful in discovering the effects of the minimum wage on the situation of low-income households and on income inequality in the population as a whole. Overall, the ambiguous conclusions that can be drawn from the changing characteristics of the workers and families involved call for a more explicit framework for how changes in an individual's hourly wage affect changes in a household's total income.

2.5.3. A framework for the translation of minimum wage hikes into increases in total household income

The broad debate and uncertainties about the effectiveness of the minimum wage as a social policy to combat poverty and income inequality make it vital to understand the patterns and linkages between individuals' hourly wages and their families' income situations. On this basis, one can theorize about aggregate outcomes such as poverty rates and income inequality following changes in wage-setting institutions such as the minimum wage. This requires looking at both levels of the concept, i.e. individuals in the labor market and the households in which they live. Minimum wages and the additional income from an increase in the minimum wage floor initially flow to low-wage individuals, not to low-income households. In this section, I will explain how an increase in the hourly pay of a minimum worker translates into an increase in their households' total disposable income. Low hourly wages of an individual earner may or may not be associated with the economic vulnerability of the household in which they live. The latter depends on several steps in-between the narrow concept of the hourly wage and the broad concept of the post-tax post-transfer income of the whole household. I will discuss the intermediate steps between these concepts and illustrate the varying effects of the minimum wage on representative family types.

The potential impact of minimum wages on poverty and income inequality necessitates that increasing wages translate into increasing household incomes. This translation can be more or less direct, depending on several factors intervening in the relationship between individual wages and household incomes. In what follows, I will describe the process of the translation of a fictitious minimum wage hike of \$2 from an individual's hourly wage, which is the narrowest income concept, into their total annual disposable household income, which is the broadest and most widely used for the measurement of income inequality.

Figure 13 shows five income concepts as five stages from individual hourly wages to annual disposable household income. The first concept, the hourly wage of an (affected) individual, is

determined by the current statutory minimum wage or its increase. The translation between the different income concepts takes place in four steps, each of which is determined by one central parameter:

- Step 1, from an individual's hourly wage to the annual earnings of the same individual, determined by their annual hours worked,
- Step 2, from an individual's annual earnings to the household's annual labor income, determined by the earnings (and other types of labor income) of other household members,
- Step 3, from a household's annual labor income to the household's annual gross income, determined by income sources other than labor income, such as public income support, and
- Step 4, from a household's annual gross income to the household's annual disposable income, determined by the household's tax liability (both income tax and social security tax).¹⁶

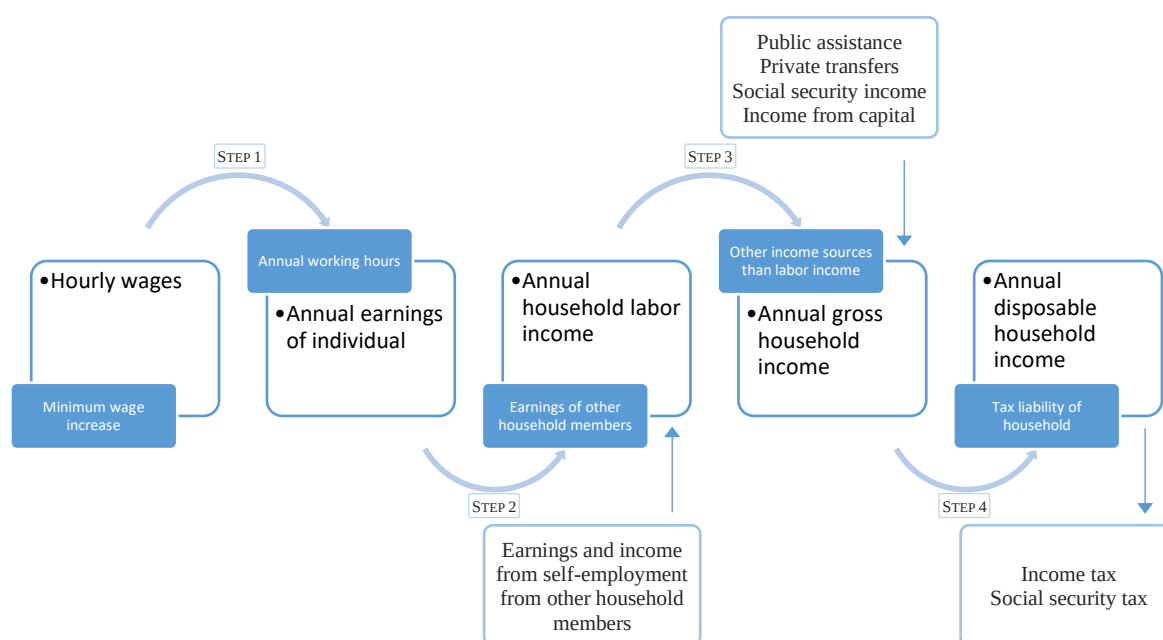


Figure 13: The minimum wage process - from hourly wages to annual disposable household income

The first stage, shown in Figure 13, is the hourly wage of an individual. The effect of a minimum wage hike on the hourly wage of affected workers is – albeit simplified here – straightforward: affected workers are those with hourly wages lower than the new minimum wage prior to its increase. Thus, if we assume an increase of \$2 in the federal minimum wage, all workers with wages at the current statutory minimum wage of \$7.25 and below the new statutory minimum wage of \$9.25 will be affected and receive a pay rise that could range from 1 cent to the full \$2.¹⁷ An affected worker's hourly wage will then increase to the new minimum wage level. I

¹⁶ Based on the concept of income pooling in households, I assume pooling of all income sources in the household first, and consider deductions in the form of tax duties afterwards (even though the deduction of social security taxes is based strictly on an individual's earnings).

¹⁷ For the sake of simplicity in this example, I will abstract from workers earning less than the initial statutory minimum wage due to non-coverage or noncompliance. Research by Boeri, Garibaldi, and Ribeiro (2011) and Autor, Manning, and Smith (2016) suggests that individuals with hourly wage rates below the statutory minimum

will assume the effect of the minimum wage on the hourly wages of affected workers as given in the following.

The extent to which a rise in the hourly wage rate of an affected worker translates into a rise in their annual earnings depends on their annual working hours. Annual earnings will increase the most for an individual who works full-time, year-round; assuming 40 hours work per week and 52 workweeks per year, this equates to an annual wage increase of \$4160 for a worker affected by the full \$2 per hour minimum wage increase. A part-time worker who works 20 hours per week will see their annual earnings rise by only half as much as a full-time worker. In other words, higher annual working hours imply a relatively large benefit from the minimum wage hike, as annual earnings will rise sharply.

Starting from the next step, the composition of the household plays an important role in determining how directly the minimum wage increase affects the household's total income. The extent to which the annual earnings of the individual receiving the pay rise affect the annual gross labor income of the entire household depends on the earnings of other household members. In *absolute terms*, the labor income of the minimum wage worker earning \$4160 more a year will lead to the same increase in total gross labor income of a household, regardless of the number and earnings of other household members.¹⁸ In relative terms, the household's labor income will increase more (by a larger percentage) in households where the individual's earnings make up the lion's share of total labor income. For this first example however, I will assume the simplest case of a single-person household. Thus, the increase in this household's annual earnings translates directly into an increase (of 27.6%) in its annual labor income of \$4160.

The next step from the household's annual labor income to its total gross income is determined by sources of income other than labor. These may be income from public assistance, social security, private transfers, or capital income. The fictitious single-person household does not receive any social security payments, private transfers, or income from capital. However, I do assume that this household receives moderate near-cash income from the Supplemental Nutrition Assistance Program (SNAP) and a small amount from the Low Income Home Energy Assistance Program (LIHEAP) Energy Subsidy, which slightly blurs the relationship between total household labor income and total gross household income. The higher the share of other sources of income in total gross income as opposed to total labor income, the more blurred it

wage can be affected by a minimum wage increase as well due to a phenomenon sometimes called the "lighthouse effect": The minimum wage hike has a normative effect on the pay schemes of noncomplying employers or in non-covered sectors. Individuals with wages higher than the initial statutory minimum wage can be affected as well: The ripple or spillover effect refers to increases in hourly wages that have been higher than the new minimum wage level prior to its introduction. Wage differentials prior to the increase that were located below the new minimum floor might further be translated to wage differentials above the new minimum level because employers may want to preserve initial wage differentials.

¹⁸ At this point, I refer to the impact on gross labor incomes and consider the tax liability of households at a later stage. Social security contributions are a flat tax at the individual level that is unaffected by the labor income of other household members. Income taxes are paid by tax units, which means that the earnings of other household members (if they are part of the same tax unit) will affect the income tax rate of the minimum wage earner. The income tax system is progressive, and tax units with higher total earnings pay higher income tax rates than tax units with low total earnings. If minimum wage earners live in the same tax unit with other household members who have relatively high incomes, the marginal tax rate on additional income from minimum wage work will be higher. I will refer to taxation at a later stage because it is common in research on inequality to consider taxation as a final step between the total gross income of households and their post-tax income.

becomes. If this household's gross income consists only of minimum wage earnings, then the minimum wage increase translates directly into an increase in the household's gross income. The final step, from total gross household income to household disposable income, further blurs the relationship between the hourly wage rise and the income situation of a household. Social security taxes¹⁹ and income taxes are deducted from the total gross income of the household. Thus, depending on the tax liability of the household, part of the increase in pay will not translate into an increase in disposable income. The income tax liability (federal and state income tax) of a single person working for the minimum wage is relatively low due to exemptions, deductions, and a progressive tax rate, and increases only slightly when earnings rise with the minimum wage hike. A single person's tax credits, for example from the Earned Income Tax Credit (EITC), are very low, however. But Social Security taxes are flat, which means that 7.65% of the rise in their household labor income (equaling their rise in annual earnings) will be deducted.

The case of a single-person household working full-time, year-round for the minimum wage is the simplest case and shows the most direct translation of a minimum wage increase into a rise in disposable household income. The impact of the individual's increase in hourly wages is large because there are no other household members with labor income blurring the step to the household's total labor income and because there is very little income coming from other sources, which would further blur the relationship. Tax deductions reduce the impact on disposable household income only slightly. However, in other household constellations with further workers, higher shares of total household income coming from other income sources, and other tax liabilities, the path from the hourly wage of one worker to the net income of the household can be far less straightforward.

As described above and illustrated in Figure 13, the second step, between the annual earnings of the individual receiving the pay raise and the annual labor income of the household they live in, raises the impact of the minimum wage from the individual to the household level. From here, the composition of the household determines how directly the minimum wage increase affects household incomes. Stages 3, 4, and 5 are located at the household level and thus depend on the presence of other household members, the amount of earnings and labor income of other working household members, and other sources of income. Other sources of income may vary according to the family constellation, either because eligibility or the level of transfer depends on living arrangements, as in the case of public income support, or because other members of the household have other sources of income, such as private transfers, social security incomes, or income from capital. Both other earnings and other sources of income depend heavily on family composition, i.e. the ratio of workers to dependents, the number of children living in a household, the number of pensioners living in a household, and so forth. At this point, it is crucial whether other sources of income are reduced by the increase in labor income resulting from an increase in the minimum wage. For example, if a family faces high rates of transfer withdrawals, its income from public assistance will decline, and ultimately, an increase in the minimum wage will not translate into an increase in the family's total income. In addition to this impact on the absolute increase in a household's income, the *relative* contribution of a

¹⁹ I refer to both the Old-Age, Survivors and Disability Insurance program (OASDI) tax, and Medicare's Hospital Insurance (HI) program. For simplicity, I deduct both the social security tax and the income tax at this stage, even though social security taxes strictly refer to an individual's labor income (see footnote 18).

minimum wage worker's wage increase depends on the minimum wage worker's 'role' in the household. The minimum wage worker's contribution through minimum wage work will be greater if they are the primary breadwinner in a household with few other sources of income, and substantially less if they are a secondary earner in the household who contributes relatively little to the total household income.

The impact of the minimum wage on the total disposable income of households can be illustrated by three exemplary family constellations (see Table 1). Each of these three families is directly affected by the prevailing minimum wage or a minimum wage hike because at least one of their members works for an hourly wage rate at a minimum wage level of \$7.25. However, their household composition, the ratio of workers to dependents, the importance of other sources of income, and their tax liability vary widely. I distinguish between a one-person household working full time, a traditional breadwinner family with two children, in which one of the parents works full time for the minimum wage and the other has no paid employment, and a "modified" breadwinner family with two children, in which one parent works full time at a higher paying job and the other parent works part time at the minimum wage. The minimum wage has a different impact on total household income in these different family constellations, and the relative contribution of minimum wage work varies widely, depending on the earnings of other household members, additional income from other sources such as public transfers, and the household's tax liability. For simplicity, I will limit the fictitious examples to income from labor and estimated cash and near-cash income from public assistance programs (SNAP and LIHEAP) and tax credits from the Earned Income Tax Credit (EITC), indicating plausible values for income support, tax liability, and tax credits to demonstrate the blurring effect of other income sources.²⁰

Table 1 shows the sums of the assumed income sources in a simplified way for the three different families. Each row indicates the corresponding income at the household level. As described above, the formation of families and households becomes important once the earnings from minimum wage work are pooled with the earnings of other persons (at the minimum wage level or at higher hourly wage rates). The composition of the household determines the existence and number of additional sources of income. The first row shows the sum of all earnings from minimum wage work, which can come from one or more working members of the household. The second row shows the sum of other labor income, i.e. earnings from employment at higher hourly rates or earnings from self-employment. At this point, the exemplary families are at the third stage of the minimum wage process, i.e. the total annual labor income of the household (see Figure 13). Subsequently, additional income sources contribute to total gross household income. In the exemplary families, I list only two potential sources of income that are common in lower income areas: income from the near-cash income support programs SNAP and LIHEAP. From the total gross income of households, I subtract the total tax liability of each household, taking into account deductions for social security

²⁰ For this example, I disregard income from Social Security, private transfers, incomes from capital and assistance programs other than SNAP and LIHEAP and other tax credits than the EITC. It is likely that households receive income from these sources as well; however, they do not make up the main sources of income in the majority of households affected by the minimum wage (own calculations). For the fictitious examples, I use public-use calculators for EITC claims, tax liability, SNAP and heating assistance from different state governments' service sites to approximate reasonable amounts received from income support, tax credits, and of payable taxes.

contributions and income taxes after the refundable Earned Income Tax Credit (EITC). The last row shows the total disposable income of each family.

In the left column, we see the example of a single person working full-time, year-round, which is the simplest case and was the basis for describing the translation of an increase in an individual's hourly wage into the total disposable income of the household above. At \$7.25 an hour and working 40 hours over 52 weeks a year, their labor income from minimum wage work is \$15,080 (first row). We see that when we add up the other sources of income and subtract their tax liability, the disposable income of the single-person household is fairly close to the annual earnings from minimum wage work. In other family types, this relationship may be much looser.

In the middle column, we see the example of a traditional breadwinner family with two children, with one full-time, year-round worker earning the minimum wage, and a partner who is not in the labor force. Income from minimum wage work is the same as that of a single-person household, as the affected individuals work the same number of hours over the year. Further, there is no other person in this household with income from labor—either from minimum wage employment, higher-paid work, or self-employment. Thus, step two to the total labor income of the household works just as directly as that in the first example. However, a family of four with two children can expect to receive substantially higher income from SNAP, while the LIHEAP benefit is relatively low and constant starting at incomes around \$15,000. With the high amount from SNAP, I assume a total of \$6812 from cash or near-cash public assistance programs. This gives the family a total annual gross income of \$21,892. I can also assume that the family receives a large tax refund from the EITC at the end of the year (in this case \$5,828), because the credit exceeds their tax liability. This means that their gross household income increases further and translates into an annual disposable household income of more than \$26,000 (last row). The translation from the earnings of the minimum wage worker do not translate into their total household income as directly as in the case of the single-person household because the household receives additional income from public support and from the refundable tax credit. However, the large tax refund the family receives is conditional on the very earnings of the minimum wage worker. This means that an increase in the minimum wage would increase not only the household's labor income, but also its tax refund. At the same time, income support could be reduced through transfer withdrawal rates. Putting the different sources of income in relation to each other, the earnings of the minimum wage worker still play a large role in the total household income, accounting for more than half of the total disposable income.

In the rightmost column, we see the example of a 'modified' breadwinner family with two children. One parent works full-time for a higher hourly wage (\$20), while a second earner works part-time for the minimum wage. The employment structure of this household is therefore very different from the other two households discussed previously: the minimum wage worker is a secondary earner in this case. Their annual earnings from part-time work (assuming 20 hours a week) are \$7,540 (first row). They play a minor role in the total labor income of the household, as the other partner and primary earner works full-time in a higher-paid job and contributes \$41,600 to the total income (assuming an hourly wage of \$20.00). Given that the minimum wage worker works only part-time, this parent's annual earnings increase by only half as much as a full-time earner like those in the first two families, reducing

the impact of a minimum wage increase on the family's total income. Compared to the other two families, where the increase in the minimum wage worker's annual income led to a 27.6% increase in the household's total labor income, this household's labor income increases by only 4.3%. With a total labor income of \$48,540, this family is not eligible for public assistance, which means that in this simplified example, they have no other sources of income that would blur the step from total labor income to their annual gross income. With a relatively small amount of tax credits, the family has a tax liability of almost \$7,000 and ends up with a disposable income of over \$40,000. This is not nearly as close to the minimum wage worker's earnings as in the other two examples. Their earnings play only a minor role in this family's income situation and make up only 18.1% of the household's total disposable income (15.5% of their total gross earnings).

Table 1: Amounts and shares of earnings from minimum wage work in total income of exemplary family types

Income sources	Single person in full-time employment		Traditional breadwinner family with 2 children		'Modified' breadwinner family with 2 children	
	Amount	Share in disp. income (in %)	Amount	Share in disp. income (in %)	Amount	Share in disp. income (in %)
Earnings from minimum wage work	15080	103.36	15080	57.77	7540	18.10
Other labor income	0	0.00	0	0.00	41,600	98.41
Cash or near-cash income from assistance programs (SNAP + energy)	1376	9.43	6812	26.10	0	0.00
Total gross (simplified)	16456		21892		48540	
Total tax duty (considering EITC)	1866.58	-12.79	-4211.42	16.13	6876.29	-16.50
Disposable income	14589.42	100.00	26103.42	100.00	41663.71	100.00

The three exemplary family types illustrate that earnings from minimum wage work can affect the total income of a household to very different degrees. The initially introduced framework based on the different stages of the hourly wage, annual earnings, a household's labor, gross and disposable income, and the steps in between appears straightforward for a single-person household. The exemplary family types highlight that an increase in the minimum wage would have very different impacts on the disposable incomes depending on the number of hours individuals work per year. However, many more factors come into play when we move to the household level. The incomes of other people living in the same household, sources of income that vary with different family constellations, such as public transfers or tax credits, alter the impact of a minimum wage increase on total household income. These factors determine how the benefits of a minimum wage increase translate into different income gains in different families. In two of the three families, income from minimum wage work plays a dominant role,

while in one family the minimum wage worker's contribution to the family's total disposable income is relatively small²¹.

What is more, the examples show that estimates can vary remarkably depending on the income concept used to measure the impact of the minimum wage on household income. For example, estimating the impact of total gross household income instead of disposable household income neglects the relationship between rising earnings and tax systems. While in some families, increasing marginal tax rates may diminish the potential impact of the minimum wage, increasing tax refunds in others may reinforce the positive impact of a minimum wage. What is more, if tax policy changes over time, the impact of minimum wages on disposable incomes may change as well. In other words, it may be fruitful to investigate the impact of the minimum wage on different income concepts in order to understand exactly how minimum wages influence a household's living situation.

2.6. Summary and conclusion

Minimum wages have featured prominently in policy debates in recent years, and are increasingly being used as a social policy tool to raise the incomes of individuals and families. For decades, policymakers and minimum wage researchers have debated the target efficiency and the effectiveness of the minimum wage as a social policy tool to reduce income poverty. Despite the skepticism, the role of minimum wage policy has increased, particularly at the state and local levels, with a growing diversity of statutory minimum wages across the United States as a consequence of the standstill over the federally mandate minimum wage. In 2024, 30 states and the District of Columbia have a higher minimum wage than the federal minimum wage, ranging up to \$16.00 in California, \$16.28 in Washington State, and \$17.00 in Washington D.C. In 19 states and in D.C., the minimum wage is indexed to inflation, ensuring that its value does not fall relative to prices as the federal minimum wage has over the past decade. Since the late 1980s, when states increasingly took advantage of the opportunity to enact minimum wages at the state level, the variation in statutory minimum wages across the USA has grown considerably, and states have followed different trajectories in minimum wage policy. Some of them have been quick to enact higher state minimum wages to keep the wage floor in line with the rising cost of living and now have the highest statutory minimum wages. At the other end of the spectrum, many states have no state minimum wage at all, or their state minimum wage laws set the minimum wage at the federal level. Thus, this group has always, or most of the time, taken the 'low road' in minimum wage policy. Other states are in the middle and have reacted belatedly to the declining real level of the federal minimum wage. Today, these are states with minimum wage levels in the medium range. Depicting these trajectories using three exemplary states also revealed interrelationships between the level of the minimum wage and its bite, which in turn shapes the relevance and importance of the minimum wage for poverty and income inequality.

²¹ I refer to the contribution or 'role' of minimum wage workers as the amount of additional income they add to the total income in absolute or relative terms. Besides this, paid labor matters for many other reasons besides the net gain in total household income. I briefly discuss the "non-monetary" aspects of work, which go beyond the scope of my work, in the last chapter of the thesis.

Politicians and congressional policymakers concerned about high levels of economic inequality regularly call for increases in the federal minimum wage. Nonetheless, the effectiveness of the minimum wage in combatting poverty or income inequality has been hotly debated. The core of the critique of the target efficiency of the minimum wage is based on assumptions about how families with minimum wage earners are spread across the income distribution and how minimum wage workers contribute to their families' income in poor and non-poor households. The "typical" minimum wage earner was, and still is, assumed to be a teenager or young adult, low-skilled or low-educated, and the second earner in a higher-income family, contributing only a small share of the family's total income. However, both the characteristics and living conditions of minimum wage workers and their contribution to household incomes are under-researched. Recent work suggests that the characteristics of minimum wage workers have changed over time, and a comparison of the attributes of minimum wage workers and the families in which they live supports the view that it is inappropriate to assume a static picture of minimum wage workers. Additionally, the level of the minimum wage and its target efficiency seem to be related. While a low minimum wage floor is likely to affect the least educated and least experienced most, a higher real level of the minimum wage floor is likely to lead to a more heterogeneous group of affected workers. Consequently, minimum wage policy might target other population groups over time, and its distributive effect might have changed.

Debates about the power of the minimum wage to combat poverty and income inequality largely overlook the changing target groups of the minimum wage. However, in order to theorize about the impact of minimum wage increases, it is important to understand *who benefits from minimum wages at all*, and in particular, *who benefits most* from minimum wage increases. The translation of an increase in an individual's hourly wage following a minimum wage hike into an increase in the total household income of the family in which they live varies remarkably across different family constellations. While earnings from minimum wage work play a dominant role in some family constellations, in others the minimum wage worker's contribution to total disposable income is relatively small. The blurred relationship between individuals' hourly wages and the net income of the household in which they live hinges on several factors, including the annual hours worked by the minimum wage worker, other income pooled together at the household level, and alternative sources of income, including those from tax refunds. Consequently, a minimum wage hike and the subsequent increase in the hourly pay of an individual will lead to varying changes in the respective household's total income. The absolute change in a household's income depends primarily on the annual hours worked by the family member that works for the minimum wage. However, for the translation into household disposable income depends on whether other sources of income, such as public income support, are cut back when a household no longer meets the eligibility criteria due to higher earned income. In addition, it is important how the tax system moderates the translation of a household's gross income into its disposable income. Progressive tax rates and increasing tax credits could lead to favorable translation processes into disposable income. These intervening factors can lead to different additional dollar amounts for different families even when earnings from minimum wage work increase by the same amount. Even though these arguments are used in debates on the target efficiency of minimum wages, they are under-researched and the effective changes in the incomes of families and households with minimum wage workers are rarely analyzed explicitly. The exemplary family types in section 2.5.3 illustrate the pronounced

differences in the additional incomes flowing to families after a minimum wage hike. All three family constellations benefit from the minimum wage, but clearly some family constellations benefit more than others, which has important implications for effects of the minimum wage on poverty and income inequality.

Initially, the contribution of the minimum wage to poverty and income inequality depends on its impact on the incomes of households and families with minimum wage earners. When increases in the minimum wage raise the incomes of households with low incomes, while the incomes of households situated further up the income distribution do not experience the same degree of increase, the incomes of these households become more closely aligned. This reduces income inequality at the lower end of the income distribution. The minimum wage policy would also have the potential to combat poverty if households were to cross the relative or absolute poverty line as a result of a higher minimum wage. Looking at the exemplary families described above, the single person and the traditional breadwinner family with two children would see their total income rise to a similar extent with a minimum wage hike, possibly with small to moderate reductions in additional near-cash public income support and increases in refundable tax credits in the case of the traditional breadwinner family. In comparison, the income of the modified breadwinner family would increase significantly less. In that case, the greatest benefits of the minimum wage increase would accrue to lower-income households in particular.²² This means that if low-income households *across the population* benefit disproportionately from minimum wage increases compared to middle- or higher-income households, minimum wages would reduce income inequality between low- and higher-income households and relative poverty. If the growth of incomes was evenly distributed, poor families could still see their incomes rise and move beyond the absolute poverty line, which is the official measurement of poverty in the USA. What is more, the examples indicate that, depending on what income concept is utilized when measuring the impact of the minimum wage on household incomes, the estimated effects on poverty and income inequality might differ remarkably.

However, the overall impact of minimum wages on poverty or income inequality is not solely dependent on *increases* in the minimum wage. The varying impact of the minimum wage on the disposable income across different family types, which also depends on income from other sources that is included in total income, implies that it is not just a minimum wage hike per se that can alter the overall impact of minimum wages on poverty or income inequality. First, changes in the other income components can affect how minimum wage increases translate into total disposable income of the household a minimum wage worker lives in. This applies to the labor incomes of other household members as well as to income support programs or taxation. If the eligibility criteria for certain programs change, or if certain programs are greatly expanded, this is likely to affect the potential impact of minimum wages on household income, poverty rates, and income inequality. Second, changes in household structure or family formation may directly affect the number and share of households in the population for whom a minimum wage increase has a significant impact on their household income. With regard to the exemplary families from section 2.5.3, a growth in the share of single-person households

²² This is still the case when economies of scale in consumption are taken into account. Using the modified OECD equivalence scale to account for the household size and composition, the single-person household has an equivalized disposable income of \$14,589.42 and the traditional breadwinner family has an equivalized disposable income of \$12,430.20

could imply that more households benefit strongly from minimum wage increases. Conversely, if minimum wage workers are increasingly secondary earners in their households, comparable to the situation in the third exemplary family type, then the impact of the minimum wage as a social policy on the living conditions of households diminishes. Third, if one wants to assess the impact of the minimum wage on aggregate outcomes such as the poverty rate or income inequality across the total population, demographic shifts matter a great deal. The majority of the population is not directly affected by the minimum wage: the majority does not live in a household with a person employed at the minimum wage. This is true of all households in which no one is employed, in which only older people who no longer work live, or in which only people who work for higher wages live. If one does not limit the estimation of potential poverty effects to specific groups, such as young adults, the low educated, or the working-age population, demographic shifts are crucial. Consequently, changes in demographics, family formation, and employment behavior can, on the one hand, significantly alter the share of the population affected by the minimum wage. On the other hand, these changes can also alter the potential impact on overall poverty or income inequality due to shifts in the income distribution, which are independent of the minimum wage or the population affected by it. These points also imply that the choice of population to be studied when measuring the impact of minimum wages is crucial. For example, the impact of the minimum wage may change even during periods of stagnant minimum wage levels.

The changing impacts of the minimum wage due to changes in policies other than minimum wage policy and due to demographic shifts are neglected in empirical research on the effects of minimum wages on poverty or income inequality. While studies may try to estimate the causal impact of minimum wage increases on aggregate-level measures, it is vital to acknowledge that the impact of policies should not be measured in isolation. They are established in institutional and demographic contexts, and one should also examine how policies such as the minimum wage perform *within these contexts*.

Chapter 0 discusses how changing labor market, welfare state, and demographic contexts can alter the impact of the minimum wage and elaborates on the distribution of wages, the annual earnings among households, the role of other sources of income such as public income support along the income distribution, the role of taxation in different income ranges and demographic shifts and family formation.

Skepticism about the effectiveness of the minimum wage as a social policy can be attributed to the steps between the income stages from the hourly wage of an individual to the total net income of a household, as described above. The main arguments put forward – both by political opponents arguing against increases in the minimum wage and by scholars explaining the minimum wage’s only modest effects on income inequality or poverty – are as follows:

- a) Many households in poverty are poor because of low working hours and not necessarily because of the low hourly wages of their working household members. This argument can be allocated to step one, which refers to the individual’s annual working hours. Annual hours of work determine the extent to which an increase in the hourly wage can lead to an increase in annual earnings. The same is true of similar arguments that emphasize that many minimum wage workers are only employed part-time.

- b) Many minimum wage workers are second earners and live in families that have a relatively high income due to the earnings of other workers. This argument is based on the second step, from the annual earnings of an individual, the minimum wage worker, to the total labor income of the household. As other earnings dominate the total labor income, the minimum wage plays a negligible role in this scenario.
- c) Increases in the earned income of households can lead to reductions in benefits, which will be phased out as households' incomes rise and they are better able to support themselves. This argument refers to step 3 between the annual labor income of the household and its total gross income, determined by sources other income than labor: income from public assistance usually depends on the income situation of the household.
- d) Increases in the earned income of households can lead to higher tax liabilities of households. This will reduce the benefit of the minimum wage increase. This happens either because the household's tax rate increases, or because their tax credits decrease in a phase-out area. If, however, households are in the phase-in area, the amount of tax credits to which they are entitled can also increase, which ultimately leads to a reduction in tax liability and higher net income when income from gainful employment increases. These issues relate to the final step from a household's gross income to its disposable income.

These arguments form a significant part of the ongoing debate surrounding the effectiveness of the minimum wage as a social policy and its efficiency as an antipoverty policy. However, they have not been systematically weighed against each other, even though a systematic framework would make it possible to estimate the impact of the minimum wage on households' income and, consequently, their poverty status. Additionally, the lack of systematic research on the extent to which minimum wage increases affect subsequent stages of annual earnings, household labor income, gross income, and disposable income, leaves open the question of why the impact of the minimum wage is limited. It remains unclear at what point in this "pipeline" the minimum wage becomes an imprecise tool for raising the incomes of low-income households or for tackling relative income poverty and income inequality. Empirical studies have estimated the impact of the minimum wage on various dimensions of individual and household economic circumstances and their distribution, such as the impact on wages and wage inequality, earnings, and gross household income. Analyses have been conducted for different population groups and time periods. However, the causes of insufficient targeting or lack of impact on poverty or income inequality have not been systematically researched. Examining whether poor or low-income households benefit disproportionately more than higher-income households could provide estimates of the overall impact on distributive measures such as relative poverty or income inequality. Investigating why the impact of the minimum wage diminishes in certain family constellations or contexts could provide insights into how minimum wage floors can be an effective social policy.

The different contexts in which minimum wage policies are embedded from a demographic or institutional perspective have been largely neglected. The impact of the minimum wage has been analyzed in the context of highly affected industries or labor market sectors, such as retail or food services, as well as for periods with varying levels of unemployment. However, there are no empirical studies on the interaction between minimum wage policies and demographic

changes over time, changing patterns of family formation, or the strong shift to workfare with cuts in traditional income support and increasing household dependence on earned income. Policies are enacted and modified in specific contexts, and it is vital to study how policies like the minimum wage perform in those contexts.

3. Minimum wages and income inequality: Changing labor markets, social policies, and demographic contexts

The minimum wage has the effect of initially affecting the hourly wages of the lowest paid in the labor market. It is therefore one of the clearest examples of the regulatory power of states over the level of inequality produced by markets. States not only respond to the inequality that markets have produced, but also define and constitute those very markets, which means that states and market are inherently constitutive of each other. States are involved in the allocation of economic resources to owners, but also to managers and workers. Processes in markets depend on rules set by the state, such as how goods and services are bought and sold, standards for work and production, the definition of property rights, the provision of infrastructure, or the rules that underpin currencies and credit (Brady 2009; Fligstein 2018; Sen, Rybczynski, and van de Waal 2011).

Theorizing about the impact of minimum wage policy on income inequality requires consideration of the distributional effects of a higher wage floor. The relevance of a minimum wage floor depends on the current wage structure, on the distribution of work in the population, its interplay with how other types of income, besides labor income, are distributed across income strata, and changing demographics and patterns in family formation that affect the overall distribution of income flows and income inequality.

Net household income inequality is the result of these various factors, but the precise link and interaction between minimum wage policy and the areas of changing labor markets, changing policies, especially public transfer and tax policies, and changing demographics remains unknown. The lack of a systematic connection between these various areas is not limited to research on the minimum wage as a socio-political instrument. It relates more generally to inequality research, where there is little systematic connection between the literature on (individual) wage dispersion and that on the distribution of (household) income. Changes in the distribution of wages have rarely been systematically weighed against the distribution of employment among workers and their households. However, it is not simply the distribution of individual wages that shapes how annual labor income is allocated across the population. The distribution of annual labor income depends on how total income from wages and salaries varies across individuals, which depending on their employment status and the amount of work they do during the year. At the household level, what matters is how these individuals are distributed over households. It makes a big difference whether workers with a high volume of work are evenly distributed across households in the population, or whether individuals with higher annual labor incomes are systematically more likely to form households together, while individuals with lower or zero annual labor incomes are more likely to live (together) in households at the lower end of the income distribution. Moreover, there has been little systematic consideration given to how transfers and the tax system affect the conversion of household labor income into household disposable income. Finally, another step is how

demographic shifts can alter the shape of the distribution of household income (Gottschalk and Smeeding 1997; Salverda and Checchi 2015).

The translation of an increase in the minimum wage into a change in the disposable income of a household as outlined in section 2.5.3. is embedded in distributional concepts that change over time and also vary regionally. For example, the overall wage structure plays an important role in the extent to which a minimum wage affects wage inequality at all. The distribution of working hours across different social strata determines whether the minimum wage disproportionately affects individuals and households that are only poorly integrated into the labor market or whether the working hours of minimum wage recipients have increased over time. In the first case, the income from minimum wage work has little impact on total household income, while in the second case their earnings play an important role in the total income of their families. In this chapter, I discuss the role of the socio-structural and political landscape in which the minimum wage is situated. These landscapes also determine distributional contexts and the extent to which minimum wage policy can ultimately influence income inequality.

The first section of this chapter views minimum wages in changing labor market contexts. The prevailing wage structure is particularly crucial for the minimum wage to have a significant impact on wage inequality. If only a very small share of the labor force is paid the minimum wage floor, then minimum wage policy is unlikely to have a significant impact on overall wage inequality, the distribution of earnings, and the distribution of household incomes. Initially, an increase in the minimum wage raises the wages of workers earning hourly wages below the new minimum wage. I elaborate on this initial step and discuss the findings on "ripple effects", i.e. effects beyond the directly affected workforce and the impact on sub-minimum wage workers (section 3.1.1). Assuming a certain size of the affected workforce and a certain degree of enforcement and compliance, minimum wages will affect the wage structure and wage inequality by raising wages at the bottom of the wage distribution. I discuss these effects against the background of the growth of low-wage employment, which has increased the proportion of potentially affected workers in the labor force over time. I then summarize the empirical evidence on the impact of minimum wages on wage inequality (sections 3.1.2.1 and 3.1.2.2).

After that, I turn my attention to the minimum wage and the distribution of work. The impact of the minimum wage on income inequality depends largely on how low-income households are integrated into the labor market. I discuss trends in working poverty, as the working poor are the desired target group of minimum wage policy, and the main trends in labor force participation and working hours, which will influence the extent to which minimum wages translate into higher earnings. I then turn to changes in labor market activity and work intensity at the household level. The flow of benefits from a minimum wage hike depends strongly on the distribution of hours worked (over the year), both at the level of individual workers and at the level of households. If, for example, minimum wage workers systematically worked part-time, their earnings would increase significantly less than if they often worked full-time, year-round. Further, if low-income families and households are only marginally integrated into the labor market, the additional income flow would be limited to the lower income rungs. An uneven distribution of work, with the benefits of a minimum wage hike accumulating in higher income rungs, would result in 'inefficient' targeting, as most of the benefits from the higher minimum wage flow to higher-income households. However, increased labor market activity in the lower income rungs over time, for example in the context of a strong shift to workfare

and in-work benefits that incentivize work, could mean that the benefits of a minimum wage increasingly flow to low-income households.

Section 3.2 discusses the link between minimum wages and changing policies to support low-income households. Changes in redistribution through the welfare state and taxation shape the potential impact of minimum wage policy on income inequality over time. One of the central arguments of opponents of minimum wage increases is the potential loss of public income support that would result from high marginal taxes on increased earnings and labor income if the minimum wage were raised. Additionally, rising income and social security tax liabilities could further diminish the benefits of a higher wage floor. However, public transfer and taxation systems have changed considerably in recent decades, and an increasing proportion of family income support is compatible with, or even reinforced by, higher labor income. In this case, higher wage floors could be particularly beneficial for low-income families in employment. I discuss the empirical evidence that strongly suggests that the interplay between rising minimum wages and income tax credits is improving the income situation of many American households today. In addition, policies can change in ways that better complement higher wage floors and support those who still need public support to meet their needs.

Section 3.3 looks at demographic shifts and socio-structural changes that affect the impact of an increase of raising the wage floor on the income distribution of the whole population, not just the working population. Aging and the influx of immigrants with varying degrees of labor market participation have a strong influence on labor supply in the growing low-wage sectors and determine the size and structure of the workforce. Changing patterns in household composition shape the picture of the typical minimum wage worker and the typical household that relies heavily on minimum wage income. If the size of the labor force increases, e.g. due to immigration of large numbers of people of working age, the importance of labor market policies for the income distribution of the total population increases. If these additional workers are disproportionately concentrated in the low-wage sector, the importance of the minimum wage will be even greater. Patterns of household composition ultimately determine whether minimum-wage employees are increasingly the primary earners in the household or whether minimum-wage income plays a subordinate role in the total household income.

3.1. Minimum wages in changing labor market contexts

Initially, the direct effect of a minimum wage hike on workers' hourly earnings is straightforward: the hourly earnings of workers paid an hourly wage below the new minimum wage increase to the new minimum wage level. Assuming a certain size of the affected workforce and a certain level enforcement and compliance, minimum wages truncate or at least thin out the lowest tail of the wage distribution up to the new prevailing wage floor and "create a spike at the minimum" (Neumark and Wascher 2008:107).

However, both theoretical considerations and empirical evidence suggest that the effects of minimum wage legislation on wages is not so clear-cut. On the one hand, wages above the new minimum wage floor may also be affected. On the other hand, wages below the new minimum wage level will not necessarily be "topped up" to the new mandated threshold. In addition to the impact of the minimum wage on the employees directly affected, this section also examines the impact of the minimum wage on the overall wage structure. Issues such as the proportion

of employees covered by the statutory minimum wage are relevant here. For this reason, I discuss the prevailing wage structure as the context in which the minimum wage policy operates, including the growth of the low-wage sector. Building on this, I also look at the distribution of work across individuals and households. Working hours are not evenly distributed across all workers and households, which has a strong influence on how households benefit differently from rising minimum wages. In what follows, I will elaborate on the impact of minimum wages on wages before turning to the relevance of the prevailing wage structure and the effect of minimum wage increases on overall wage inequality.

3.1.1. The impact of the minimum wage on wages

The main effect that the minimum wage has on wages is to raise the hourly pay of workers who earned less than the new minimum wage prior to its increase to the level of the new minimum wage floor. This creates a "spike" at the minimum wage, with a disproportionate number of workers in the low-wage sector being paid an hourly rate exactly at the mandated minimum wage. In addition to the workers who receive mandated raises that bring their pay up to the new minimum wage floor, workers who earn just above the new minimum are also likely to receive a pay rise. These so-called "ripple effects" or "spillover effects" refer to non-mandated changes in wages that occur in response to a mandated change in the minimum wage floor (Neumark and Wascher 2008:107; Wicks-Lim 2005:2).²³ They may arise for two main reasons.

First, employers may respond to the increased minimum wage by preferring employees with somewhat higher skills as compared to the lowest skilled they employed prior to a minimum wage hike. This increased demand could push the wages of workers being paid above the minimum wage. Second, in the context of internal pay scales, employers may voluntarily give a raise to the group of workers slightly above the new minimum wage in order to maintain internal wage hierarchies, as wage differentials often serve to reward employees for higher skill levels, seniority, or supervisory responsibilities (Neumark and Wascher 2008:107; Dube 2019c).

The potential of ripple effects is cited by both proponents and opponents of mandated wage floors. Opponents raise the issue of additional costs to employers, who may be forced to raise pay for a larger number of their employees, in addition to the higher wages of their least-skilled employees, in order to maintain behavioral incentives or to attract workers with somewhat higher skills. Proponents of minimum wage increases however argue that minimum wage legislation can benefit a wider range of workers and not only the relatively small share of the workforce who earn hourly wages below the new minimum. In this sense, the effects of a minimum wage law are broad, as raising the wage floor sets a benchmark for wage norms and strengthens the bargaining power of workers with relatively low wages, and adjusts wages up the wage structure (Wicks-Lim 2005). Ultimately, this can reduce the size of the overall low-wage sector.

²³ I will refer to the effect of non-mandated changes in wages above the level of the new minimum wage as ripple effects. To the effect of wage increases of workers who are not covered by the (local) minimum wage law but receive pay raises as well, I will refer to spillover effects. These can be either groups of workers or jobs that are not covered by minimum wage law, industries that are not covered by minimum wage law, or spillovers into (neighboring) regions, which per se do not fall under the jurisdiction of a minimum wage law. "Lighthouse effects" refer to impacts of minimum wage legislation on informal sectors.

In addition to the impact on hourly wages *above* the new minimum wage level, wages *below* the new minimum wage level are not necessarily simply "topped up" to the new mandated threshold. It is possible that the variation in hourly wages that existed before the minimum wage increase is maintained after the minimum wage hike. In particular, in the context of internal pay scales, the variation in hourly wage rates may be shifted upwards, representing a variance in hourly wages starting from the new statutory minimum wage. This would mean that the lowest paid workers before the increase would earn the new minimum wage after the increase, while others might be lifted to hourly wages even higher than that. In the context of firms, this serves the same purpose as internal ripple effects. Employers maintain behavioral incentives by maintaining the same wage structures at a higher absolute level.

Furthermore, existing subminimum wages may also be affected, as the new mandated wage floor creates norms for wage levels even in the unregulated and informal sectors and increases the bargaining power of the lowest-paid workers. The minimum wage thus serves as a signal for wage setting in the informal sector that induces workers to ask for higher wages, a process referred to as a "lighthouse effect". The assumption underlying an effect for the subminimum wage is therefore an increase in bargaining power that offsets the negative supply shock following a rise in the mandated minimum wage (Boeri, Garibaldi, and Ribeiro 2011). While the impact in the informal sector is less significant in the USA than in countries with larger informal sectors, the large and growing group of tipped workers can legally earn a subminimum hourly wage as long as tips push their total hourly income above the minimum (Autor, Manning, and Smith 2016). An increase in the federal or local minimum wage can similarly serve as a norm or signal for workplaces with tipped workers.

The evidence of an overall positive effect on the wages of workers directly affected by a minimum wage increase is strong. This is because the majority of studies estimating the impact of the minimum wage on employment use the same research design to measure the effect on wages and to argue for its strength (Neumark and Wascher 2008:113). The vast majority of studies estimating effects find that minimum wage increases lead to higher wages overall and for specific demographic groups, such as teenagers, the less educated, and single-women, who are perceived to be particularly vulnerable (Belman and Wolfson 2014:201–10).

Empirical work has also tested for the formation of spikes in the wage distribution at the minimum wage level, and the evidence clearly indicates that in industrialized countries, the minimum wage raises the wages of the lowest-paid workers and creates a spike in the wage distribution (Card and Krueger 1995a; DiNardo, Fortin, and Lemieux 1996; Lee 1999; Neumark and Wascher 1992; Belman and Wolfson 2014:192).²⁴

While the formation of a spike in the wage distribution is not a topic of much controversy, the effects on workers with initially higher wages have received more attention. The size of potential ripple effects is frequently discussed by both proponents and opponents, as they can imply substantially larger impacts of minimum wage policy.

Most studies that estimate changes in the hourly wages for workers who were already earning more than the new minimum wage find that these workers also receive a wage increase.

²⁴ In developing countries, the evidence is substantially more mixed, as labor markets in developing countries are often characterized by large informal sectors and more widespread noncompliance. For an overview see Neumark and Wascher (2008:115).

Altogether, it can be concluded that there are spillover effects even for workers with wages considerably higher than the minimum wage floor (Cengiz 2019; Cengiz et al. 2017; Autor, Manning, and Smith 2016; Neumark, Schweitzer, and Wascher 2004; Card and Krueger 1995a, chapter 9; Manning 2003; Lee 1999; DiNardo, Fortin, and Lemieux 1996; Wicks-Lim 2005; Dube, Giuliano, and Leonard 2019; Lemieux 2008; Brochu et al. 2018). However, for these workers with hourly wages up to 50% above the new minimum wage floor, the estimated wage increases are small. The clearest evidence comes from workers earning hourly wages slightly above the new minimum wage (up to 10% higher) who received substantial pay raises (up to 80 cents for every dollar of minimum wage increase). Thus, although there is broad agreement on the empirical evidence of the *existence* of ripple effects, there is less agreement on the size of the wage effects for workers whose hourly wages were higher than the new minimum wage.

However, wage increases for workers who are only indirectly affected by the minimum wage through ripple effects account for around 40% of the total wage increases from minimum wage changes (Cengiz 2019). This corroborates the sizable changes in average hourly wages after a minimum wage hike, and highlights the significantly larger impact of the minimum wage beyond the workers directly affected. While only small proportions of the workforce's hourly wages are at or below the minimum wage (5% of both men's and women's hourly wages), the ripple effects reach significantly higher percentiles of the wage distribution, in particular with regard to women (up to 10th to 15th percentile for men, and up to the 20th percentile for women) (Brochu et al. 2018). Further, the magnitude of the ripple effects has been found to be larger for higher minimum wage levels (Dube 2019c; Cengiz 2019), again highlighting that the impact of minimum wage increases is larger the higher the mandated wage floor is.

Some of the empirical evidence was based on worker-level panel designs to investigate the reasons for wage increase among higher-paid workers. Designs that track the earnings trajectories of workers also suggest that the larger part of ripple effects comes from additional pay raises for incumbent workers, as opposed to higher wages for positions that are matched with labor market entrants (Dube, Giuliano, and Leonard 2019; Flinn 2006). In particular, the maintenance of internal wage scales plays a major role in ripple effects (Cengiz 2019; Dube, Giuliano, and Leonard 2019).

Compared to the broad literature on ripple respectively spillover effects, there is little evidence on the effects on sub-minimum wage workers. In countries where the informal sector plays a significant role in the labor market, it has been found that wages in the informal sector actually increase after a minimum wage hike (Boeri, Garibaldi, and Ribeiro 2011). For the U.S. case, with a much smaller informal sector, no effect of subminimum wages on wages could be found (Card and Krueger 1995a).

3.1.2. Minimum wages and the prevailing wage structure

Minimum wage increases result in wage increases for workers earning below the new minimum wage before it takes effect. Assuming that a given share of the (covered) workforce earns hourly wages below the new minimum wage floor, and assuming some degree of enforcement and compliance, minimum wages truncate, or at least thin out, the lower tail of the wage distribution (Neumark and Wascher 2008:107). Ripple effects mean that it is likely that not only individuals at the bottom of the wage distribution may benefit from a minimum wage hike. However,

because the impact of minimum wage policy on workers' wages tends to level off at a certain wage level, minimum wage increases tend to reduce the overall wage inequality. The strength of this effect, however, depends on the share of workers who are affected by the minimum wage increase and the extent to which their wages rise (Fortin and Lemieux 1997).

What distinguishes the minimum wage from other labor market institutions and policies that affect the wages of certain groups in the labor market is that its effect is by definition located at the bottom of the wage distribution. The magnitude of the impact on the wage distribution then only depends on the size of the affected workforce and the size of the wage increases received by the lowest paid workers. Other institutions or policies, such as overtime premia or licensing, affect specific groups in the labor market whose position in the overall distribution varies. This makes the possible impact of such policies more ambiguous as it depends on where the targeted groups are located in the wage distribution. This is similar to the more problematic inferences that can be drawn about the effects on household income following a minimum wage hike. Here, too, it is unclear where the workers targeted by minimum wage policy are located in the distribution of household incomes. The impact on the distribution of wages of workers is thus more straightforward.

The combined effect of the factors shaping the impact on wage distribution, i.e. the size of the affected workforce, the size of the wage increase, and the degrees of enforcement and compliance, is often referred to as the "bite" of the minimum wage. It describes the extent to which the minimum wage is "binding". When a significant portion of the workforce is directly affected and receives substantial wage increases, the minimum wage has a more pronounced impact on the overall wage structure than when the minimum wage workforce makes up only a small proportion or when the targeted groups receive only modest wage raises.

As discussed in section 2.5.1, the size and composition of the workforce directly affected by minimum wages depends on structures of (local) labor markets, the sectoral and occupational composition of workers, macro-economic conditions, demographics, and the educational composition of the workforce. These factors may vary over time and across regions and need to be taken into account in arguments and analyses of the potential effects of the minimum wage. Additionally, the minimum wage level itself influences the share and composition of the minimum wage workforce. A higher minimum wage will – on average – affect a larger part of the workforce than a lower wage floor. As the wage floor rises, the number of industries and regions affected will increase, and the workforce affected is likely to become more heterogeneous. The multiplicity of these factors affects how the magnitude of the impact of the minimum wage as a labor market institution on wage inequality.

The relevance of the minimum wage as a labor market institution depends largely on the current wage structure. This is determined by developments in employment and wages in the different labor market sectors. These factors influence the size of the workforce affected by an increase in the minimum wage and the extent of wage compression. In a first step, I will outline the growth of employment in the service sector, which has contributed significantly to the growth of the potentially affected workforce. I will then discuss the evidence on the impact of minimum wages on wage inequality. Here, too, the prevailing context is important: if, for example, wage inequality is relatively high to begin with and the minimum wage reduces a substantial part of the distribution at the lower end through a relatively large increase in the mandated lower wage

limit, the impact on overall wage inequality is substantial. However, if the overall wage distribution is relatively homogeneous and the minimum wage affects only a small number of workers whose wages only go up marginally, the impact on overall wage inequality is negligible.

3.1.2.1. The growth of low-wage employment

By international standards, the USA stood out as one of the countries with the fastest employment growth between 1970 and 1990, largely reflecting its rapid population growth, especially among the working-age population. Productivity growth is usually considered to be a central condition for increasing economic growth. Esping-Andersen contradicts this claim with his volume thesis on the possible expansion of services (Esping-Andersen 2011). Overall productivity in the USA grew more slowly than in other countries, but economic growth was still high due to the immense growth of jobs in the service sector. The volume of job growth allowed the absorption of immigrant masses, the growth in women's employment, and the partial relocation of industrial workers (Esping-Andersen 2011).

The service sector has been the major source of job growth and its share of employment reached more than 70% in 1990 (Godbout 1993). Part of the increase in the USA was likely an interplay of a sharp rise in labor-intensive service jobs, which require more workers than other occupations, and a large increase in the working-age population through immigration that could fill those jobs. Thus, high economic growth was achieved, at least in part, through less productive service jobs, which means that the U.S. labor market was characterized by relatively high productivity gaps in a cross-country comparison (OECD 2003; Esping-Andersen 2011). Furthermore, the aging of the population and the growing participation of women in the labor force increased domestic demand for services related to health care, food, day care, and leisure activities (Godbout 1993).

The growing service economy poses the dilemma that productivity growth in most services is much slower than in manufacturing. Baumol (1967) suggested that personal and social services in particular suffer from a "cost disease" that leads to a persistently weak low-wage sector. The subgroups of the services sector differ significantly in their ability to enforce prices for services in markets. While financial and production-oriented services are institutionally well protected and less exposed to substitution competition, social, personal and household-oriented services have much less market power. Usually, four service sectors are differentiated, which vary in their potentials of productivity: the first subsector, which subsumes wholesale, retail, restaurants and hotels, has repeatedly been shown to have below-average productivity potential. In less productive service subsectors, relatively more employees are needed to generate a certain amount of national product, which impairs the income opportunities of employees in this sector. If, on the other hand, the value added in certain sectors is above average, workers are likely to see their income opportunities improve. The second and third subsectors include transport, storage, and communication on the one hand, and production-oriented services, banking, insurance, real estate, rental, data processing, research and development on the other. These are characterized by high productivity potential, and employees in the third subsector in particular can benefit from attractive working conditions. The fourth subsector comprises personal and household services, which subsume public administration and defense, social security,

education, health and social work, and domestic workers. Similar to the first subsector, its productivity potential is below average. However, while the other service sectors have been relatively stable since the early 1990s, the fourth subsector now plays a much larger role today: in 1993, full- and part-time workers in personal and household services accounted for 25.8% of the total workforce; in 2019, they accounted for 31% (U.S. Bureau of Economic Analysis 2020a, 2020b).

Unlike other sectors, the personal and social services are difficult to rationalize. The original example of Baumol and Bowen (1965) pointed out that the same number of musicians is needed to play a Beethoven string quartet today as was needed in the 19th century. The productivity of classical music performance has not increased, but the real wages of musicians, as in all other professions, have increased greatly since the 19th century. The dilemma, then, is that the wages of professions that have not increased their productivity must still keep pace with the general wage trend in order to maintain the quality of the respective service.

This response to the cost-disease problem carries the risk that labor-intensive activities with minimal added value, especially personal services, will experience slow or non-existent growth and will eventually be priced out of the market, leading to their eventual extinction. This has, at least partially, been the case in several Nordic countries and in continental Europe. The solution to this problem is to subsidize services, which is particularly important for vital collective goods such as health and education, or for culturally valued goods.

Another response, however, could be to allow labor costs to adjust to differences in productivity. It is hardly possible to reduce the number of teachers, artists, cleaners, or caregivers without having to accept a decline in the quality of services, which means that some services offer little opportunity to increase productivity. The alternative market-clearing approach is unregulated wage adjustment, which would mean that earnings in service sectors with stagnant productivity would fall to zero over time. The inevitable consequence of offering services at such low wages is that such services will cease to exist. This market-clearing strategy might initially stimulate service consumption due to low prices, but increasing poverty due to poor wages will reduce aggregate demand. While most European nations have allowed earnings in the service sector to follow general wage developments in the economy and have subsidized services via direct public provision, the United States has favored tax-subsidized private provision of services. Large proportions of personal services have consequently been marketized.

This phenomenon has resulted in the expansion of the service sector in the United States, which has led to a situation where the majority of workers are earning very low wages. Services are subsidized only indirectly via subsidies to workers, respectively the needed consumers of those services. A significant share of service sector jobs has suffered from very low unionization levels and hence low bargaining power. This has resulted in a significant number of poorly paid service jobs: employers were reluctant to raise wages due to limited productivity potential, and lack of power has made it difficult to bargain for higher wages. This paved the way for a highly polarizing development in the growth of the service sector.

The 1990s saw the longest period of sustained economic growth in the US, and therefore the longest period of employment growth. Job expansion during this decade was characterized by an asymmetrically polarized pattern: on the one hand, there was a very strong expansion of jobs

in the top tier of the employment structure, particularly in high tech sectors, reflecting the emergence of a dynamic ‘new economy’ of well-paid jobs. At the beginning of the growth of the service economy, Bell (1976) had already highlighted the enhanced opportunities for highly qualified employees in the knowledge and service economy of post-industrial societies. On the other hand, expansion was dominated by the creation of so-called ‘McJobs’, i.e. low-paid, insecure, and dead-end jobs in the service sector. Cross-country analyses have identified a high proportion of low-paid work and relatively high levels of wage inequality as prerequisites for the expansion of the service sector (Iversen and Wren 1998). In contrast to earlier periods of strong economic growth, which were characterized by a non-polarized upgrading of the employment structure in the 1960s and relatively even job growth across the employment structure in the 1970s and 1980s, the growth in the middle tier of the employment structure was very weak in the 1990s (Wright and Dwyer 2003). The accelerated growth in bottom-end jobs was due to strong growth in retail trade and personal services. However, this growth was no longer accompanied by an increase in the female labor force participation rate, which stalled around 1990 (Blau and Kahn 2013; England 2010). High levels of immigration, particularly of Hispanics, coincided strongly with the expansion of employment at the bottom of the employment structure, which was more racially polarized than in previous periods of growth. Approximately two thirds of the job growth in the bottom quintile of the employment structure was filled by immigrants, of whom 75% were Hispanic (Wright and Dwyer 2003).

What followed was a period of slow job growth in the early 2000s that culminated in massive job losses during the Great Recession and a very slow recovery afterwards. This severely limited job opportunities for American workers for an extended period after the turn of the century. However, the economic expansion following the Great Recession became more resilient over time, indicating a recovery in low- to middle-wage jobs before the downturn associated with the coronavirus pandemic set in (Bureau of Labor Statistics 2020c). In particular, Black and Hispanic workers were pushed to the bottom of the employment structure in the context of recovering employment growth, although Hispanic employment growth was somewhat more balanced than in previous periods (Dwyer and Wright 2019). Immigration slowed significantly during and after the Great Recession, which notably led to a shift in the balance between US-born and Latin American immigrants. Hispanic job growth has been increasingly dominated by U.S.-born Hispanics, who are more likely to be in higher-paying jobs than immigrant workers (Kochhar 2014).

It has become increasingly clear that the changes in the labor market are making it much more difficult to create jobs that provide an adequate standard of living. The growing share of the service sector, which is characterized by significantly lower levels of unionization, is increasingly leading to precarious conditions in the economy. In countries with relatively weak social safety nets such as the USA, the quality of jobs plays a particularly important role in determining the living standards of individuals and families (Gautié and Schmitt 2009).

The largely polarized growth of the service sector in the 1990s shows a significant continuity of strong employment growth in high-wage jobs on the one hand, and low-wage jobs on the other (Dwyer and Wright 2019), at least until the beginning of the coronavirus pandemic and the associated economic downturn. Against the backdrop of a relatively low (federal) minimum wage, highly polarized employment growth may mean that poverty in the USA is increasingly affecting the working poor and not just families who are largely excluded from the labor market.

Besides these changes over time, the demand for low-paid service work may vary strongly by region as well. The same applies to the supply of labor: for example, the influx of immigrants into low-wage work can vary greatly across regions of the United States. This needs to be taken into account when estimating the potential impact of a minimum wage on poverty and income inequality. Overall, polarized employment growth and the increasing share of low-paid jobs, especially in the growing service sectors, are likely to influence wage inequality.

3.1.2.2. *The impact of the minimum wage on wage inequalities*

By international standards, the USA is a country with high wage inequality (Salverda and Checchi 2015). In addition, wage inequality has risen sharply in the USA and is now at a high level in a national context compared to the distribution of wages 40 years ago (Autor, Katz, and Kearney 2008; Autor and Dorn 2013). Given the current level of wage inequality in the USA, the minimum wage may potentially have a broad and significant impact. What is more, the rise in wage inequality has been identified as a key driver of the rise in income inequality (Piketty and Saez 2014; OECD 2016).

The high level and, at times, sharp increase of wage inequality in the United States has led to a broad research landscape and numerous empirical studies on its trends and causes. Wage inequality along the *entire* wage distribution increased during the 1980s in particular. This increase has been documented in a large body of research in terms of its variance, the overall Gini coefficient, or the ratio of wages at the 90th percentile to those at the 10th percentile (90/10 ratio), and is a robust finding across a wide range of databases and ways of measuring wages (Acemoglu and Autor 2011; Antonczyk, DeLeire, and Fitzenberger 2018; Katz and Autor 1999). The increase in overall wage inequality slowed down in the 1990s. This was based on diverging paths of inequality within the lower and upper halves of the wage distribution, or what is often referred to as upper-tail inequality. Inequality between medium and high wages has increased steadily since 1980, while inequality within the lower half of the income distribution rose sharply in the first half of the 1980s and plateaued or contracted thereafter (Autor, Katz, and Kearney 2008). Thus, wage inequality in the U.S. increased predominantly because high wages drifted away from the rest of the population (Acemoglu and Autor 2011; Lemieux 2010), while the patterns were more complex in the lower half of the wage distribution. This complexity of patterns is also reflected in the diverging wage trends of different educational groups. The wages of people with higher education (college graduates and postgraduates) increased steadily compared to the wages of high school graduates. In contrast, wage differentials between workers with low education (without a high school degree) and those with medium-level education (high school degree or some college) widened moderately in the 1980s. Within the group of workers with a high school education or less, inequality increased slightly in the 1980s, but remained at the same level or even decreased in the 1990s and 2000s (Autor 2014; Acemoglu and Autor 2011; Lemieux 2010).

The rise in wage inequality in the USA and in many other industrialized countries is usually attributed to two sets of factors. The first is that technological change has increased the productivity of and demands for high-educated or high-skilled workers, which in turn has raised their wages relative to less-educated or less-skilled workers (Acemoglu and Autor 2011). In addition, the growth in the number of college graduates slowed just as demand for high-

educated workers increased, pushing up their wages even more (Goldin and Katz 2007). This explanation of skill-biased technological change (SBTC) implies that market forces are the main mechanism through which wage inequality has increased. However, many scholars agree that in addition to, or in combination with changes in supply and demand for education and skill, institutional factors have shaped wage inequality as well. In particular, changes in pay-setting institutional, primarily the decline in unionization since the 1970s and the fall in the real value of the minimum wage in the 1980s, have been identified as central drivers of rising wage inequality (DiPrete 2007; Kristal and Cohen 2017; Weeden and Grusky 2014; Brady, Baker, and Finnigan 2013; Western and Rosenfeld 2011; Katz and Freeman 1995; Card 1992a; DiNardo, Fortin, and Lemieux 1996; Freeman 1993; Lee 1999; Brady 2003).

Trends in wage inequality in the lower half of the wage distribution coincided with the disempowerment of low- to medium-wage workers through the removal or weakening of wage-setting institutions. Today, there is strong evidence that the decline in the real value of the minimum wage, in particular during the 1980s, played a major role in the sharp rise in lower-tail wage inequality, or, more precisely, the ratio between median wages and the first decile of the wage distribution (the 50/10 wage ratio) in the USA in that period (DiNardo, Fortin, and Lemieux 1996; Lee 1999; Autor, Manning, and Smith 2016; Autor, Katz, and Kearney 2008; Chernozhukov, Fernández-Val, and Melly 2013; Belman and Wolfson 2014:303–05). Estimates vary, but overall, it can be concluded that the fall in the real value of the minimum wage has contributed between a third and a half of the total increase in wage inequality in the lower half of the wage distribution. Additionally, national statutory minimum wages are associated with lower levels of wage inequality across countries (Garnero, Kampelmann, and Rycx 2015). Compared to other institutions or policies that affect wages and pay-setting, the evidence on the impact of the minimum wage on wages and their inequality is strong. The impact of collective bargaining, unionization, the effect of overtime premia or licensing are more ambiguous, as the targeted groups are, by definition, not located at a specific point of the wage distribution as is the case with a mandated minimum wage floor. Declining unionization has been found to be another driver of wage inequality in the lower half of the wage distribution (Fortin and Lemieux 1997; Kristal and Cohen 2017; Western and Rosenfeld 2011), but it is unclear whether it affects workers slightly higher in the wage distribution rather than those directly affected by the minimum wage or its ripple effects.

Another effect of the minimum wage with regard to wage inequalities is its potential to reduce between- or within-group inequality in wages. Here, again, the effects are less straightforward than on overall wage inequality. The impact on wage inequalities across social groups depends on the social stratification of the minimum wage workforce compared to the rest of the workforce. For example, the share of women and men working for minimum wages, the age structure, or the ethnic composition of the minimum wage workforce shapes the extent to which wage inequalities between social strata can decline. If a disproportionate share of workers benefiting from a minimum wage increase are from a particular social group that earns lower hourly wages in the labor market than another group, the existing inequality in wages between groups may be reduced. While these factors do not affect the overall impact of the minimum wage on wage inequality, they are significant in reducing inequalities between social groups. Moreover, the varying benefits for different social groups may systematically affect the extent to which minimum wages can affect the distribution of family or household income. If, for

example, many single mothers are employed at hourly rates at the minimum wage floor, and assuming that they are on average more likely to experience income poverty, then a minimum wage effect on poverty and income inequality is more likely than if a disproportionate share of the minimum wage workforce are teenagers.

There is less agreement on whether certain groups in the labor market in particular have benefitted, and how the minimum wage has shaped inequality between groups (Belman and Wolfson 2014:303). Research suggest that wage inequality declined particularly among women, as they are more likely to be employed in low-wage positions. Thus, the evidence on the equalizing effects of the minimum wage is strongest and clearest for women in the lower half of the income distribution, reducing the inequality between the median and the 10th percentile of the wage distribution (Autor, Manning, and Smith 2016; Belman, Wolfson, and Nawakitphaitoon 2015). The educational and experience wage differentials, which remained unchanged in the lower bottom of the wage distribution, would have increased if there had been no increase in the real value of the minimum wage. Additionally, the gender wage differential and within-group wage inequality among women would have declined less since the beginning of the 1990s if the minimum wage had remained constant (Blackburn and Bloom 1991; Oka and Yamada 2019).

Overall, since the minimum wage became a very popular policy instrument across U.S. states in the early 1990s (see section 2.2), wage inequality in the lower half of the wage distribution has not increased further. Prior to that, wage inequality increased sharply throughout the 1980s, both in the upper and in the lower half of the distribution of wages. There is strong evidence that the fall in the real value of the minimum wage in the 1980s played a major role in inequality growth. Conversely, empirical studies of the post-1990 period suggests that increases in the minimum wage have counteracted further increases in inequality.

Given the impact of the minimum wage on hourly wages and their inequality, and the evidence that rising wage inequality is a strong driver of rising *income inequality*, it seems plausible to assume strengthening pay-setting institutions such as the statutory minimum wage can ultimately combat income inequality and poverty. If income inequality remains unaffected when the minimum wage rises, it is crucial to understand what factors have prevented a beneficial effect on the income situation of families and households rather than discarding minimum wages as a policy tool for combatting poverty and inequality. These factors may be the distribution of work across individuals and households, interactions with other income components in total household income, in particular public transfers and tax credits or liabilities, as well as overall demographic shifts and patterns in family formation of the minimum wage workforce and the rest of the population.

3.1.3. Minimum wages and the distribution of work: Working hours and employment

The impact of minimum wage policy on household income inequality depends on the distribution of work, including the distribution of working hours across individuals, and the distribution of employment across households. Minimum wages target low-wage individuals, and not low-income households. This complicates the relationship between the minimum wage as a social policy and the desired benefits from it, be it a lower poverty rate or a decrease in

income inequality in the lower tail of the income distribution. As outlined in section 2.4, low hourly wages of an individual earner may or may not be associated with economic vulnerability of the household in which they live (Giesselmann and Lohmann 2008; Lohmann and Marx 2008; Marx and Verbist 2008; Nolan and Marx 1999; Torsney 2013). Firstly, the hourly wage rate says little about an individual's total income from labor, but merely sets a ceiling on labor income, since people cannot work infinitely long hours. The monthly and annual earnings of individuals depend on their working hours. Secondly, besides the individual earnings of a minimum wage worker, the existence of other household members with earnings, the sum of their labor incomes, and the number of dependents in the households they live in are central to whether an individual's low pay coincides with low income at the household level.

The poorly researched relationship between individual wages and earnings on the one hand and total (labor) income at the household level is similar to the weak link between the literature on the dispersion of (individual) wages in the labor market and the literature on the inequality of (household) incomes in society as a whole. Research on wage inequality has often focused on the most restrictive income concept – that of the distribution of hourly wage rates. This narrow concept fits better the desire to research changes in market and institutional forces that affect the prices paid to different types of labor and thus the levels and distribution of wages, or discriminatory mechanisms leading to unequal compensation in the labor force. At the other end of the spectrum is a large literature focusing on the broadest concept of income, i.e. annual household income, often after taking account of redistribution by the state and adjusting for household size and structure. This is in line with the research interests of scholars who study the impact of policy changes, the incidence and intensity of poverty or wealth, and the distribution of economic resources and economic well-being across the population (Gottschalk and Danziger 2005).

As discussed in section 2.4, the minimum wage has often been accused of being ineffective because of the relatively low labor market activity of poor families. First, skeptics argue that many poor families have no working members. Second, when poverty and employment coincide, this is believed to be due to short hours rather than low wages.

The first point appears inconsistent with the widespread existence of working poverty in the USA. Research on poverty and the low-income population has focused much of its attention on joblessness as a major factor driving economic vulnerability (Brady, Baker, and Finnigan 2013). The conventional wisdom is that policies like the minimum wage can do little to reduce poverty and income inequality in the lower half of the income distribution because the poor are less likely to be economically active than the non-poor. In fact, the poverty rate among the employed is higher than the poverty rate for the population as a whole, and the working poor are a larger population than the unemployed poor (Kenworthy and Marx 2018; Brady, Fullerton, and Moren Cross 2010). Therefore, the population that is affected by low incomes despite being in work might arguably affect the overall distribution of incomes if their incomes are affected by a minimum wage increase.

However, poverty might be associated with low working hours. In that case, the impact of the minimum wage will be effectively lower. Against the background of the working hours of people living in low-income households, this point seems more a reason to question the effectiveness of minimum wages. Members of low-income families are likely to be less

economically active, to be employed at lower rates and to work for shorter hours than higher-income families. This reduces the number of people who may be affected by the minimum wage and the size of the contribution of an "average" minimum wage earner to the total family income²⁵.

To get an idea of the extent to which households in different income brackets benefit from minimum wage increases, one can argue from the point of view of the population group that the minimum wage policy should ideally be targeted, namely at households with low incomes. The most important argument of critics of the minimum wage is that families with low incomes are less affected by the minimum wage policy because they are less integrated into the labor market than families with higher incomes. In the lower half of the distribution of family income, both employment and labor market participation have a very strong positive association with income (Belman, Wolfson, and Nawakitphaitoon 2015:608). Due to the high proportion of low-income households without working household members, a considerable part of the target group is not affected at all by an increase in the minimum wage floor.

In addition, it can be argued that members of low-income families are often employed for fewer working hours than persons living in higher-income families and are less likely to live in households with an additional member in employment (Belman and Wolfson 2014:313). This reduces the (relative) contribution of minimum wage earners to the total income of their families and households, and rules out significant effects on the income situation of families and households in the lower income rungs. Studies on the causes of working poverty support this argument: working poverty in the USA is high compared to other post-industrialized countries, and one might initially assume that employment and poverty are sufficiently related. However, scholars have argued that the interface between work and poverty is hardly affected by minimum wages, as working poverty is often the result of low working hours rather than low wages. Indeed, more than 46% of poor workers have an hourly wage higher than \$10.10 and 36% an hourly wage higher than \$12, two thresholds that have been proposed as federal minimum wage levels (Neumark 2016). Other studies find that people living in households located in the lowest income quartile are overrepresented in the group of near minimum wage earners (Belman, Wolfson, and Nawakitphaitoon 2015). Overall, the results are mixed.

In what follows, I will discuss the relationship between minimum wages, employment, and poverty from different perspectives. In a first step, I elaborate on trends in working poverty. I discuss findings on working poverty at both the individual and household level to get a picture of the potential of minimum wages as a social policy tool targeting the (working) poor. Subsequently, I summarize the most important trends in the labor force participation of individuals, part-time and temporary employment, and the development of working hours in general and across industries and social groups in section 3.1.3.2. In section 3.1.3.3, I then elaborate on one of the main factors that determine the relationship between income levels at the individual and the household level – the employment structure of households. That section summarizes the changes in the labor market activity of households and their work intensity. Section 3.1.3.4 then takes a different point of view. On the one hand, the potential effects of minimum wages on income inequality and poverty depend on the labor force participation and

²⁵ On the one hand, the potential share of a low wage in the total income is higher for low-income families and lower for high-income families. On the other hand, this potential is offset by limited working hours in low-income families and the higher contribution from social benefits.

work intensity of the target groups. On the other hand, employment, especially that of the target groups, can be influenced by minimum wages themselves. Section 3.1.3.4 presents the empirical evidence for the effects of minimum wages on employment and working hours.

3.1.3.1. *Minimum wage work and working poverty*

Skeptics of minimum wage policy argue that the relationship between employment and poverty is too weak for the minimum wage to be an effective tool in the fight against poverty and income inequality. However, the widespread existence of working poverty in the USA militates against this argument.

In 2018, the working poor rate was unchanged from the previous year at 4.5 percent. At the end of the 1980s and before the 1990/1991 recessionary years, the poverty rate among workers was 5.6 percent. A closer look at the poverty risk of workers with different working hours suggests that low working hours are indeed a strong determinant of working poverty, as discussed in section 2.4.

Full-time workers who worked more than half a year (usually full-time) were far less likely to be among the working poor than part-time workers were in both 2018 and 1987. In 2018, 2.8% of full-time workers were classified as poor, compared to 11.1% of part-time employees (Bureau of Labor Statistics 2020b). In 1987, the poverty rate among full-time wage and salary workers was 3.7%, whereas 12.7% of those who involuntarily worked part-time fell below the poverty line. Conversely, the proportion of working poor working full-time increased sharply: 53% of the working poor worked full-time in 2018, compared with just 29% in 1987. However, the working poor in part-time employment were disproportionately often *involuntarily* employed in part-time work (in both 1987 and 2019) (Klein and Rones 1989; Bureau of Labor Statistics 2020b).

Women were more likely than men to be among the working poor in both 2018 and 1987. In 2018, 5.3% of all women who worked 27 weeks or more per year were classified as poor, while only 3.7% of men were affected. In 1987, this was the case for 6.1% of women and 5.3% of men, indicating that the differences in poverty risks between working women and men increased slightly over time. Black or African American workers and Hispanics or Latino workers are much more likely than White and Asian workers to be poor. In 2018, the poverty rate of Black or African American workers was 7.8% and that of Hispanic or Latino workers was 7.9%, compared with just 3.9% for White, and 3.2% for Asian workers. Racial disparities between Black and White workers decreased between the late 1980s and 2018. In 1987, people in working poverty were disproportionately more likely to be Black: 13.2% of all Black workers were poor, compared to only 4.7% of White workers (data on Asian and Hispanic or Latino individuals not available) (Klein and Rones 1989).

People with low earnings are particularly likely to fall below the poverty line, while those in involuntary part-time employment only are less likely to be in poverty. Low wages may therefore be the primary cause of poverty among workers, whereas spells of unemployment and involuntary part-time work also correlate with low earnings as a result of the functioning of low-wage labor markets. For instance, people employed in service occupations are more likely to be working poor (9.4 percent) than people employed in other major occupational groups

(Bureau of Labor Statistics 2020b; Klein and Rones 1989). This suggests that the minimum wage has a positive impact on many of the working poor.

Approximately 5.3% of families in which at least one person was in the labor force for more than half of the year lived in poverty in 2018, compared to 6.3% in 1987 (and 6.4% in 1990 (Klein and Rones 1989; Bureau of Labor Statistics 2020b; Gardner and Herz 1992). This rate was significantly lower among married-couple families (2.8% in 2018, 4.4.% in 1987), but significantly higher among families with related children under the age of 18 (8.9 percent). Working poverty was most common among families where only one family member worked and earned low wages (Klein and Rones 1989; Bureau of Labor Statistics 2020b; Gardner and Herz 1992). Individuals, especially women, who are the sole breadwinners in their household are particularly at risk of working poverty. This risk increases further with the number of dependent children, partly because income needs to be distributed among more people and partly because the presence of children reduces women's labor force participation (Gautié and Ponthieux 2016; McCall and Percheski 2010; Bureau of Labor Statistics 2020e). In contrast, families with more than one worker were much less likely fall below the poverty line (Kenworthy and Marx 2018). Moreover, the working poor rate was significantly higher in families headed by women (15.2% in 2018, 17.2% in 1987) than in families headed by men (7.2% in 2018, 7.8% in 1987), especially when children were present (Klein and Rones 1989; Bureau of Labor Statistics 2020b). As with persons who maintain families without a spouse, unrelated individuals are more likely than others to be the sole support of their families or households and are therefore at a higher risk of poverty. Especially teenagers and young adults who live on their own are likely to be poor, with rates of up to 37.5% for teenagers (aged 16 to 19) and 14.5% for young adults in 2018 (20 to 24 years) (Klein and Rones 1989; Bureau of Labor Statistics 2020b). Arguments against the effectiveness of the minimum wage due to the high proportion of teenagers and young adults among minimum wage workers should therefore be treated with caution.

Overall, the working poverty rate was slightly lower in 2018 than it was in the late 1980s. Today, significantly more people in working poverty are working full-time than in the late 1980s (53% versus 29 percent). The main culprit of working poverty still appears to be low earnings. The differences in the risk of poverty between working women and men increased slightly, but the racial disparities between Black and White workers decreased significantly.

Although the working poor are more likely to work full-time today than they were in the late 1980s, they are still less likely to work full-time than nonpoor workers. However, shorter working hours do not seem to be the main factor in the context of working poverty, as is often suggested in the literature on the impact of the minimum wage on poverty (see section 2.4). Rather, people on low earnings are particularly likely to fall below the poverty line, suggesting that higher minimum wages may be effective in tackling working poverty and consequently income inequality.

3.1.3.2. Trends in labor force participation and working hours

Post-industrial nations are under pressure from the social and economic forces associated with increasing globalization and technological advances, particularly in information and

communication technologies. The mobility of capital and labor has increased, and the balance of power between employers and employees has shifted towards employers (Kalleberg 2018).

Changes in the global economy have played a crucial role in creating the conditions for the emergence of new forms of employment, particularly precarious work. Increased international competition has put businesses under pressure to become more efficient and reduce costs, which has fueled employers' perceived need for greater flexibility in the employment relationship (Kalleberg 2018).

However, the extent to which these trends affect employment relations and the working lives of individuals and their families depends on a country's social welfare protection and labor market institutions. Furthermore, the impact on individuals and their families' lives with regard to their identity, behavioral changes or well-being depends on cultural norms related to the division of labor and the importance of (secure) work, stable careers, and economic security (Kalleberg 2018).

The multiplicity of these factors determines trends in labor force participation, part-time and temporary employment, and the evolution of working hours in general as well as across industries and social groups. The distribution of work across individuals and households determines the extent to which minimum wages affect certain social groups in the population and to the extent to which they can reduce inequalities. I will summarize the main trends for individual workers before moving on to changes in labor market activity at the family respectively household level in the following section.

The labor force has been exposed to long-term and persistent trends, particularly in terms of aging and slowing growth. Both of these trends were primarily due to the slowdown of population growth and aging of the population, rather than to market-driven processes (Bartsch 2009). In the 1990s, sustained economic growth led to a strong demand for labor, which resulted in an increase in employment and labor force participation even among groups that had previously had relatively low employment, such as single mothers (Nightingale and Fix 2004). However, since 2000, labor force participation rates have declined remarkably, reversing a nearly 50-year trend.²⁶ The participation rates of people aged 55 and over have remained constant, but have dropped for women and men between the ages of 20 and 54. While the declining rates for men continue a trend, those for women are a sharp reversal of the previous trend (Hamermesh 2019). The growing number of prime-age men who have become disconnected from the labor force is also reflected in the decline in average annual working hours (see below). Hispanic women and Black men have the highest rates of labor market disconnection. This pattern has largely persisted over time but has become even more evident in case of Black men since 2000. The increasing share of prime-age Black men who are disconnected from the labor market has concentrated among those without a college degree (Wilson and Jones 2018). In addition to these major trends among prime-age men and women, the labor force participation rates of the youngest working-age groups declined prior to the Great Recession (Bartsch 2009).

Part-time employment, defined in the US as employment of less than 35 hours a week (Kalleberg 2000; Bureau of Labor Statistics 2020a), is the most common form of nonstandard

²⁶ The labor force grew by about 16 million from the end of the 1980s to the end of the 1990s, and by 16.6 million (1.1 percent) from the end of the 1990s to the start of the Great Recession, see Bartsch (2009).

work. Historically, part-time work has increased during economic recessions and decreased during economic expansions, as workers who wish to work full-time are better able to find full-time jobs during periods of economic growth. While part-time employment has grown rapidly in many European countries and has been the main source of employment growth since the 1980s, part-time employment in the US has generally not increased significantly (Kalleberg 2000). Based on data from the Bureau of Labor Statistics, which defines part-time employment as employment for less than 35 hours per week, the number of part-time workers has increased sharply since 1990. However, the share of part-time to total employment has remained relatively stable. It was 16.9% in 1990, 17.4% in 1999, and rose to over 19% during and after the Great Recession. By 2019, the proportion of part-time employees had declined again to 17.1% (Bureau of Labor Statistics 2020a). Part-time employment of 30 hours or less per week has declined as a share of employment in recent decades. In 1989, 14.4% of all jobs were part-time. This proportion decreased to 13.3% in 1999 and 12.6% before the Great Recession. It reached 14.1% in 2009, likely due to recessionary effects, and fell back to 12.3% in 2013 (OECD 2011, 2015b).

In many European countries, part-time employment is not in itself a non-standardized form of work and often reflects the preferences of employees. In the USA, however, part-time jobs are often highly insecure and, compared to full-time jobs, are characterized by fewer performance-related incentives and fewer training and career opportunities. However, employees may choose to work part-time for personal, non-economic reasons, i.e. to have more time for family obligations, education, or partial retirement. In contrast, part-time work is classified as involuntary when workers prefer full-time work but have their hours cut in their current job or cannot find full-time work due to a lack of demand. Working part-time involuntarily, or for economic reasons, often means these workers are in precarious jobs. In contrast to the relatively stable proportion of part-time employment, the percentage of persons who are employed part-time involuntarily in the USA increased significantly between 2000 and 2014, albeit at a low level (Kalleberg 2018).

Part-time work and fixed-term contracts are often related. The proportion of workers who were in temporary employment, i.e. employed on a fixed-term contract with a predetermined ending date, is relatively low in the USA compared to other countries with relatively high levels of employment protection. In addition, the decline of unions has weakened institutional protection in regular jobs, and the paucity of protections against dismissal has made regular jobs more precarious and has ultimately narrowed the protection gaps between these forms of employment (Kalleberg 2018). However, the combination of different nonstandard features of work often leads to specific working arrangements that can be highly precarious and seriously affect workers' well-being. In the USA, many retail and food service businesses use on-call workers, who are hired directly and temporarily as needed and who effectively work part-time. This also means that these workers' schedules are not set in advance and often change in unpredictable ways, causing considerable stress for workers and their families.

In the years leading up to the Great Recession, 29% of workers reported that their hours varied over time during the year. In the years during and after the Great Recession between 2008 and 2013, that percentage rose to almost 40% of workers. This trend was mainly due to high unemployment during the Great Recession of 2007/09 and the associated strong growth in low-wage and part-time jobs during the recovery, as well as the growth in temporary and contract

work. The long-term decline in unionization has weakened employment stability and the earnings of workers in general (Hout, Levanon, and Cumberworth 2011; Katz and Krueger 2016; Rosenfeld 2014). Workers with inconsistent work hours have lower weekly earnings than workers with stable work schedules. Additionally, workers with irregular hours have higher poverty rates than workers with stable schedules, and this gap widened during and after the recession (Finnigan 2018).

The USA currently leads the wealthy nations with the highest number of hours worked per adult, alongside Ireland, the Czech Republic and Poland, Greece, New Zealand, and Israel (OECD 2020). Average annual working hours per employee, defined as the total number of hours worked per year divided by the average number of employees per year, declined steadily in the USA from around 1,840 hours per year in the late 1980s to 1,780 hours per year in 2019 (OECD 2020). Average weekly hours decreased in the three most recent recessions in 1990-91, 2001, and 2007-09.

However, the number of hours worked per employee is likely to develop differently across groups of workers and industries. For instance, the decline in average weekly hours in goods-producing industries was significantly greater than the decline in hours in service-providing industries (Kroll 2011). The long-term trend of declining average working hours since the 1970s is mainly due to the combined effects of disproportionate employment growth and low and falling average working hours in retail trade and services (Kirkland 2000). At the same time, goods-producing industries, which generally have higher levels of working hours, have less weight in the private sector average. This has led to a decline in the average workweek in the private sector. Average weekly working hours were lower in the service-producing sector, particularly retail trade and services. Hours worked in retail and services also fell, while their share of employment rose sharply (see section 3.1.2.1).

Since the early 1990s, working hours in retail and services have increased again slightly. In the most recent recessions of 1990-91, 2001, and 2007-09, employment losses and average weekly hours fell more in goods-producing industries than in service-providing industries during recession years (Kroll 2011). In the 2007-09 recession, however, the decline in aggregate weekly hours in service industries was particularly large and greater than in any previous recession since the 1973 recession (Kroll 2011). In both the 1990-91 recession and the 2007-09 recession, manufacturing, construction, professional and business services, and retail were the driving forces behind the decline in working hours. In the 2001 recession, manufacturing and professional and business were largely responsible for the decline in total private average weekly hours (Kroll 2011).

This polarization is also evident in working hours. While a group of prime-age adults are not integrated into the labor market or are integrated only for very limited hours, employed adults work are working more and more hours.

The gender gap in hours worked per year has narrowed over the past four decades due to the increasing participation of women and the growing number of men leaving the labor market. While women's working hours increased mainly between the late 1970s and 2000, the longer-term decline in working hours of prime-age men mainly occurred after 2000 (Wilson and Jones 2018).

Black men work fewer hours today than they did in the late 1980s and fewer hours than White and Hispanic men. The hours of low-educated Black men with less than a high school diploma or with only a high school diploma have particularly declined over time. In contrast, Black women do not work fewer hours than white women do. However, in times of economic downturn, for example during the Great Recession, their working hours tend to fall more sharply. Hispanic women are generally more likely to be nonearners, but the working hours of employed Hispanic women are not significantly lower than those of white women (Wilson and Jones 2018). In general, Black workers are more likely to lose their jobs during downturns and to earn lower wages upon reemployment than comparable White workers. In addition, Black hourly workers are more likely to have their hours reduced during recessions than White hourly workers (Chattopadhyay and Bianchi 2020).

However, the variation in annual working hours among prime-age adults of different racial, ethnic, and gender groups is due to disparities in labor market participation. Some groups are much less likely to enter and remain in the workforce. Looking only at prime-age adults who work, the racial and ethnic differences are significantly smaller, and both the average number of hours worked per year and the changes in hours worked over time vary less (Wilson and Jones 2018).

For workers, hours inequality has likely decreased over time: workers with the lowest hourly wages increased their annual hours by an average of more than 24% between 1979 and 2016 to 1,688.5 hours. Their working hours have grown considerably faster than those of higher-wage earners (e.g., 9.4% around the median hourly wage, and 3.6% among the top fifth of wage earners). The increase in annual hours for low- and middle-wage earners was mainly due to more weeks worked over the year rather than more hours worked per week, suggesting that employment stability has increased for low-wage earners (Wilson and Jones 2018). In addition, ethnic and racial disparities in men's working hours have declined since the late 1980s. Since the late 1980s, the working hours of Black and Hispanic men employed the previous year have increased, while those of White men have remained stable. In 2016, employed White men worked an average of 2,155 hours, compared to 2,047 hours for employed Hispanic men and 1,983 hours for employed Black men. Compared to the racial and ethnic work hour differences among all prime-age men, these differences are small. Among women, ethnic and racial differences in working hours are much smaller than among men, both today and over time since the end of the 1980s. Among women in employment, White women worked 1,854 hours in 2016, Black women worked 1,845 hours over the year in 2016, and Hispanic women worked the fewest hours per year at 1,796 hours per year. However, all three groups increased their annual working hours between the late 1980s and 2016, and working Black women worked the most hours until the Great Recession (Wilson and Jones 2018).

3.1.3.3. Changes in labor market activity and work intensity across households

In a world of full-time-working single-earner households, the correspondence between wage dispersion and income distribution appears straightforward, but the growing labor market participation of women and the role of household joint labor supply complicates the relationship between the earnings and income distribution (Salverda and Checchi 2015). The step from the employment patterns of individuals to that of households is blurred by the fact that not all

persons form their own, unique households. When individuals do not live alone, they form living arrangements together. These living arrangements involve persons with different labor market statuses, which are however not randomly mixed, but often based on household decisions. For instance, a couple may decide whether both partners will work the same number of hours or whether one of them will work more. However, it is also possible that selection processes lead to a group of households whose members have difficulty finding a job. Ultimately, the distribution of labor income among households depends on the resulting composition of households and the patterns of income pooling.

Changes in household employment structures and in the pooling of incomes determine the extent to which minimum wage increases lead to *relatively significant* increases in households' labor income. If the income of a minimum wage worker increases after the minimum wage floor is raised, the total income from work in the household increases accordingly. In relative terms, however, the labor income of the household will increase more (by a larger percentage) in households in which the individual's earnings make up the lion's share of total labor income. In contrast, an increase in the earnings of a minimum wage worker is relatively less important if they are a secondary earner, or a teenager living in a household with other people who are responsible for a major part of the household's income.

The link between minimum wages and the distribution of total household income depends heavily on the labor market activity and work intensity of households in different income brackets. In what follows, I will discuss trends in the *distribution of employment* across households. How individuals in and out of the labor force and with varying levels of attachment to the labor market form households is crucial. For example, if low-income households have low average working hours, this reduces the potential impact of minimum wages on their income situation. From another perspective, the impact of the minimum wage would be reduced if minimum wage workers lived in households with other people who work more or who earn higher wages. As discussed in section 2.5.1, the profile of the typical minimum wage worker has changed over time, with increasingly more minimum wage workers being the main breadwinners in their families. This section examines the changes of employment structures across households, which contributed to this new importance of minimum wage work in households' income situation.

The rise in income inequality in the U.S. from the mid-1990s onwards was strongly influenced by new patterns of employment and income pooling across families and households (McCall and Percheski 2010). By international standards, the USA was once one of the most polarized countries in terms of household employment (Western, Bloome, and Percheski 2008; Gregg, Scutella, and Wadsworth 2010). This polarization has led to an increasing proportion of households with two full-time workers on the one hand, and a growing share of jobless or low work intensity households at high risk of working poverty on the other. When employment is polarized across households, improvements in employment rates do not lead to reductions in jobless households. Furthermore, if such improvements are distributed unevenly, policies that affect workers' wages will not benefit households equally (Gregg, Scutella, and Wadsworth 2010). While the unemployment rate for individuals has fallen, the unemployment rate for households did not. In contrast, the workless household rate increased between the mid-1990s and mid-2000s from 11.5% to 12.2%. The main factor behind this rising rate, despite growing individual employment, was the increasing polarization of employment across households.

Household formation and composition, in contrast, played a significantly smaller role. Thus, most of the divergence between household and individual joblessness rates was due to an increasingly skewed distribution of employment across households, rather than to changes in household structure (Gregg, Scutella, and Wadsworth 2010).

The employment rate of married women has risen dramatically since the 1980s, but gender gaps in market and domestic work persist (Raley, Mattingly, and Bianchi 2006; Cohen and Bianchi 1999). In dual-income families, wives' annual hours of work rose sharply between the 1970s and 2001 (Raley, Mattingly, and Bianchi 2006), and their earnings increased more strongly in the lower deciles of the income distribution than in the upper deciles, equalizing family incomes (Western, Bloome, and Percheski 2008; Daly and Valletta 2006). Overall, working wives contributed 38% of their families' income, up 8 percentage points from under 30% in 1989 (Bureau of Labor Statistics 2014). Among couples in which both partners are employed (husband-wife couples), 19% of wives earned more than their husbands in 1989, while 29% of wives earned more than their husbands in 2019 (24% and 38% including families in which husbands have no earnings from work) (Bureau of Labor Statistics 2014). In addition, women's employment became less sensitive to their family characteristics (McCall and Percheski 2010).

In 2019, 81% of all families in the United States had at least one employed member, which is in line with the rate recorded in the mid-1990s (Bureau of Labor Statistics 1997, 2020e). While the proportion of White families with at least one employed family member remained constant (82% in 1996 and 81% in 2019), the proportion in Black and Hispanic families increased significantly. In the mid-1990s, 75% of Black families had at least one employed member; in 2019, it was 80 percent. For Hispanics, that proportion rose from 82% to over 88% in 2019, making Hispanics, along with Asians, the ethnic group with the strongest labor market inclusion on the family level.

The proportion of families with a working member is 10 percentage points higher for families with children, and was 98% for married-couple families with children in the late 1980s and 2019. The employment rates of families maintained by fathers (85%) and mothers (75%) are slightly lower.²⁷ The proportion of families maintained by men that included an employed person was stable between the mid-1990s and 2019 at 84% to 85%. This proportion increased among families maintained by women from 72% in the mid-1990s to 75% in 2019 (Bureau of Labor Statistics 1997, 2020e). In both the mid-1990s and in 2019, two thirds of all families with children had both partners working (Bureau of Labor Statistics 2020e, 1997).

The proportion of families with at least one unemployed person was 4.9% in 2019, the lowest proportion since the early 1990s. In 1995 (the earliest year with comparable data), the share was 7.9 percent. Among families with an unemployed member, 71.2% had at least one other family member employed, and 62.4% had at least one other family member who worked full-time in 2019. These proportions were roughly the same in the mid-1990s. In both 1995 and 2019, 19% of families had no family member employed (Bureau of Labor Statistics 1997, 2020e)

Blacks and Hispanics were more likely to have an unemployed member than White or Asian families in both 2019 and the mid-1990s, but the gaps between ethnic groups have narrowed.

²⁷ Families are classified by the Bureau of Labor Statistics either as married-couple families or as families maintained by women or men without a spouse.

In 1995, both Black and Hispanic families were twice as likely to have an unemployed member as White families. In 2019, 4.5% of White families had an unemployed member, whereas 7.9% of Black and 6.6% of Hispanic families had an unemployed member. Black families, in particular, were significantly less likely to have another employed member if at least one family member was unemployed in both 1995 and 2019. However, the proportion of Black families in which no one was employed was not significantly higher than that of White families (20% in contrast to 19.4 percent) in 2019, whereas the difference in 1995 was approximately seven percentage points. Hispanic or Latino families and Asian families were significantly less likely to have no employed family member. Only 11% of Hispanic families had no working member in 2019, while 18% had no working member in 1995 (Bureau of Labor Statistics 2020e, 1997).

Families maintained by men or women without a spouse present are more likely to have an unemployed member than married-couple families (8% each versus 4% in married-couple families). 39% of families maintained by men and 46% of families maintained by women had no one in employment (Bureau of Labor Statistics 2020e).

The majority of wives continued to be secondary earners in families, but the share of equal breadwinning has been increasing since 1970 and continued to increase between 1990 and 2001. The proportion of wives who were the main breadwinner in the family rose slightly but still made up only a small proportion of couples in 2001 (Raley, Mattingly, and Bianchi 2006). Another factor in the polarization of employment across households is the trend towards a growing share of dual-earner couples. Additionally, the woman is the main earner in a growing number of dual-earner couples (van Bavel, Schwartz, and Esteve 2018). In contrast to earlier decades, starting in the mid-1990s, couples in which wives outearned their husbands were not economically disadvantaged, but had higher total couple earnings than other couples. The total earnings of these couples rose strongly, whereas the economic standing of the male breadwinner family stagnated (Schwartz and Gonalons-Pons 2016).

Overall, the distribution of employment across households has changed considerably. Although some of the large-scale changes began in the 1970s, there have been many changes since the 1990s. Employment across households has polarized overall. However, the proportion of families with no one in employment is at the same level as in the early 1990s. The same applies to the proportion of families with at least one person in employment. Polarization has therefore been characterized more by a growing proportion of dual-earner couples, with both partners working increasingly long hours. The theory on potential “opportunity costs” would suggest that well-educated women have relatively high economic incentives to take up employment because they can earn more than women with less education. However, according to the “need for income” effect, married women with a lower level of education, who typically have a husband with lower earnings than higher educated women do, are more likely to enter employment because the family is in greater need of additional incomes. The limited earnings potential of lower-educated women discourages their employment, but it remains an empirical question which of the two effects dominates (England 2010).

The proportion of families with at least one working member has been stable over time. However, Hispanic and Black families are much more likely to have at least one working member today than they were in the mid-1990s. The unemployment rate among families is now lower, and the ethnic differences in the likelihood of having an unemployed member have

narrowed. Single mothers tend to work more. While the total proportion of families without a working member remained constant, it fell sharply for Black families, so that White and Black families were equally likely to have no one in employment in 2019. Hispanic families are much less likely to have no member in employment than they were in the mid-1990s and compared to White and Black families.

The general polarization of employment between households can dampen the impact of the minimum wage on income inequality when, on the one hand, an increasing proportion of households have no one in employment and, on the other hand, employment is increasingly concentrated in other households. Assuming that the first group are more likely to be low-income households, the potential impact of the minimum wage on income inequality and poverty may decrease. However, trends in employment and hours worked at the individual level suggest that the impact of minimum wage increases on income inequality and (working) poverty may be increasing. In addition, the increasing integration of ethnic minorities into the labor market is likely to increase the impact of the minimum wage on the income situation of many low-income households and to narrow the ethnic income gap in general. Ultimately, the impact of the minimum wage on income inequality depends not only on the employment and working hour patterns of different population groups, but also on changes in the size of these groups over time, which determine their “relevance” to the general population (see section 3.3). Furthermore, minimum wages themselves could influence employment and working hours. I will discuss this point and empirical evidence in the next section.

3.1.3.4. The minimum wage’s impact on employment and working hours

Labor market institutions, such as the minimum wage, may have the benefit of keeping wage distributions more equal, while at the same time have adverse effects on employment (Fortin and Lemieux 1997). Research on cross-national differences in unemployment has devoted considerable attention to the impact of labor market institutions, such as employment protection legislation, unionization, and the centralization of wage bargaining, on the one hand, and welfare state policies, such as unemployment benefits and active labor market policies, on the other. Institutions have been seen as sources of labor market rigidity that distort the efficiency of labor markets (Nickell 1997; Siebert 1997). However, the empirical evidence for strong employment effects of institutions is mixed (Avdagic and Salardi 2013; Baccaro and Rei 2007; Baker et al. 2005).

The impact of labor market institutions on employment trends and structures is likely to depend on how institutions target specific (social) groups, such as new entrants to the labor market, ethnic minorities, or persons with low education. The institutional impact on different groups may vary (e.g., Brady, Fullerton, and Moren Cross 2010; DiPrete et al. 2006). Hence, the overall impact of an institution on employment depends on both the size of these impacts and on the social structures. This view is supported by the extensive literature on the rising dualization between labor market insiders and outsiders (King and Rueda 2008). When institutional arrangements increase the bargaining power of insiders in an economy, vulnerable groups (or, the outsiders) may bear the burden of reduced employment and labor market opportunities (Biegert 2019). For example, if the minimum wage is raised, those who are not yet in employment may have greater difficulty entering the labor market. However, the extent of the

employment effects of labor market institutions is an empirical question and can be heterogeneous due to the structure of a particular economy and the bite of the respective policies. From a cross-national perspective, there is little evidence that employment, especially among low-wage workers, has declined more sharply in countries with stricter labor market institutions that benefit low-wage workers (Fortin and Lemieux 1997).

Overall, the impact of minimum wages has been studied less than the impact of other institutions such as employment protection legislation, unionization, and the centralization of wage bargaining. In principle, labor market institutions, such as the minimum wage, can both increase and decrease structural inequality on the labor market or in the population as a whole. On the one hand, minimum wages can reduce inequality in the labor force: workers' wages are compressed by a minimum wage floor and wage differentials between insiders and outsiders, or the more privileged and vulnerable groups, can fall. On the other hand, a higher minimum wage may make it more difficult for job seekers to enter the labor market. Employers may be reluctant and more selective in the hiring process. This can lead to inequalities between those already in the labor market and those looking for work. Consequently, this could increase inequality in (labor) income in the population.

The potential benefits of minimum wage policy are regularly weighed against the potential costs, in particular the reduction in employment and working hours for the population group that the policy is intended to help, namely the lowest paid. This thesis does not deal explicitly with the impact of minimum wages on employment. However, the influence on the employment prospects and working hours of the affected population have a direct impact on the extent to which an increase in an individual's hourly wage can actually lead to an increase in earnings and incomes. For example, if an increase in hourly wages for employees is offset by a reduction in their working hours, the annual earnings and total income of families and households will remain unchanged. In this example, minimum wages do not affect families' incomes or income inequality. However, if minimum wages do not lead to a reduction in employment and working hours, their impact on income will depend primarily on the working hours of the workers concerned. The increase in earnings is therefore greatest for those who work full-time (or more) and least for those who work shorter hours. In addition, employers can compensate for the increase in hourly wages by reducing fringe benefits (Neumark, Schweitzer, and Wascher 2004).

Concerns and assumptions about employment losses after a minimum wage hike are based on basic supply and demand. If labor becomes more expensive, employers may hire less of it. However, there is considerable evidence that the labor market is not characterized by a perfectly competitive supply and demand framework (Manning 2003; Ashenfelter, Farber, and Ransom 2010). Frictions in the labor market may give firms some degree of wage setting power. Such frictions may be attributable to the fact that not all jobs are valued equally by all workers, even at a given wage level, or to the likely decrease in job vacancies and turnover due to the higher cost of filling those vacancies following an increase in the minimum wage (Manning 2003). Furthermore, labor supply and employment may even increase if the minimum wage is higher than the reservation wage for particular jobs or if the incentives to take up work as an alternative to staying unemployed rise. The existence and magnitude of the effects of adjustments in the statutory minimum wage are ultimately empirical questions, as their direction cannot be clearly determined in theory. New minimum wage research has increasingly shifted away from general

assumptions about job losses to more refined research questions about downsizing in specific contexts or for specific groups of workers. It is also an empirical question as to by how much minimum wages can be raised before they lead to job losses or reductions in working hours, which are important for the economy as a whole and for the minimum wage workers affected (Dube 2019c).

A large body of research has examined the impact of minimum wages on employment, particularly in the US context. Overall, the results on employment effects vary considerably, which has led to an intense debate on their validity and robustness. Several researchers have performed meta-analyses of the impact of the minimum wage on employment in order to quantitatively and formally assess the results of previous research (Belman, Wolfson, and Nawakitphaitoon 2015; Belman and Wolfson 2014; Card and Krueger 1995b; Doucouliagos and Stanley 2009; Dube 2019c; Wolfson and Belman 2019). It is argued that the estimates of the employment impact are distributed around zero, which means that even if there is a negative impact on employment, it is too small to be detected with the statistical methods used (Belman, Wolfson, and Nawakitphaitoon 2015; Dube 2019b; Wolfson and Belman 2019). Recent work suggests that minimum wages have a relatively small impact on low-paid employment and refined research designs have helped to reconcile the mixed results of previous decades. It has been found that both the initial level of the minimum wage and its bite prior to an increase, as well as the structures of the (local) labor markets and the sectoral composition of employees, are important factors influencing whether minimum wage increases lead to employment effects at all and to what extent (Dube 2019c).

In light of the growing recognition that perfect markets do not exist and the evidence of minimal employment impact, minimum wage research has increasingly focused on the analysis of alternative adjustment mechanisms beyond the employment level. (Hirsch, Kaufman, and Zelenska 2015; Schmitt 2015). Studies have examined the effects of the minimum wage on the number of hours worked, on prices or profits, or on other adjustment channels used by employers after an increase in the minimum wage, such as cuts in training or non-wage benefits (for an overview, see e.g. OECD 2015a; Low Pay Commission 2015). Far fewer empirical studies have studied these alternative adjustment channels and the evidence is much less conclusive than is research on employment effects (Neumark and Wascher 2008:77–78; Belman and Wolfson 2014:130–31; OECD 2015a).

As well as affecting employment, higher minimum wages also affect the working hours of individuals and their income and thus on the income situation of the families in which they live. The most direct beneficial effect of the minimum wage on the total income of households is the translation from an increase in an individual's hourly wage to an increase in their (annual) earnings, which can improve the income situation of the entire household. However, changes in the employment prospects and working hours of the affected population have a direct impact on the extent to which an increase in an individual's hourly wage can actually lead to an increase in earnings and incomes.

The impact of the minimum wage on working hours has traditionally been much less researched. In recent years, more studies have focused on this area, but the evidence on the effects on working hours is inconclusive and highly fragmented, as many studies have estimated effects for various small subgroups of the population. In the U.S. case, estimates of working

hours vary widely and are based on different population groups and sectors (for a review, see Belman and Wolfson 2014:120–30). The evidence tends to show little or no effect on hours worked by teenagers and the overall population (Allegretto, Dube, and Reich 2009, 2011; Orrenius and Zavodny 2008; Sabia 2009a, 2009b). Studies of other narrow groups find no effects for immigrants without a high school diploma (Orrenius and Zavodny 2008), but relatively large negative effects for single mothers without a high school diploma (Sabia 2008). Other studies have estimated changes in working hours in highly affected sectors, but the overall results are inconclusive. In the restaurant sector, no effects on working hours could be detected (Dube, Naidu, and Reich 2007; Even and Macpherson 2014; Persky and Baiman 2010; Powers 2009). In the retail sector and nonprofessional services, the estimates suggest a slight negative impact, but in sum, the findings are mixed (Sabia 2009b; Orazem and Mattila 2002; Belman and Wolfson 2010). More recent studies on broader groups or labor market sectors increasingly tend to find little or no effects on working hours (Godøy and Reich 2019; Hirsch, Kaufman, and Zelenska 2015; Schmitt 2015; Dube 2019c).

In the UK, there appears to be more evidence of adverse effects on working hours than on employment. The negative impact on hours appears to be small to modest, and the reduction in working hours is not sufficient to reduce the weekly earnings of workers (Stewart and Swaffield 2008; Connolly and Gregory 2002; Robinson and Wadsworth 2007). Some of the estimates are only significant for certain subgroups of the labor force (often female full-time employees) or are not robust in sensitivity tests (Dickens, Riley, and Wilkinson 2009, 2012; Bryan, Salvatori, and Taylor 2013). Others find no evidence of significant effects on hours of work (Cribb et al. 2021). Thus, even if there are negative effects on working hours, they are not sufficient for adverse effects on earnings, and the same amount of earnings is achieved with fewer working hours overall.

In conclusion, the potential adverse effects of increasing the minimum wage on employment and working hours play an important role in discussing and measuring the impact of the minimum wage on income inequality and poverty. Changes in the employment prospects and working hours of the affected population may have a direct impact on the extent to which an increase in the hourly wage of individuals leads to an increase in their earnings and income. A reduction in working hours and an increasing risk of losing a job will diminish the income gains in households after the introduction or an increase in the minimum wage. However, if working hours remain unchanged, an increase in hourly wages will lead to an increase in monthly and yearly earnings of individuals and thus raise a household's total income.

Summing up, a review of the extensive literature on employment effects suggests that there is unlikely to be a discernible effect on employment, supporting recent findings from meta-analyses and literature reviews (Belman, Wolfson, and Nawakitphaitoon 2015; Belman and Wolfson 2014; Dube 2019c; Harasztosi and Lindner 2019; Wolfson and Belman 2019). The limited literature on the effects on working time suggests small negative effects on working hours. However, none of the studies that estimate the impact on working hours can distinguish between people who have voluntarily reduced their working hours, effectively trading zero cuts in total earnings for more leisure time, and workers whose hours have actually been cut because their employer adjusted to the minimum wage increase. Both cases would reduce the influence of the minimum wage on total income, but ideally, these cases should be treated separately.

Furthermore, reductions in working hours could ultimately leave total household income unchanged whilst simultaneously affecting other indicators of wellbeing. Individuals and families can benefit from additional time resources without losing income from work. This can lead to higher levels of wellbeing and life satisfaction through increased opportunities for leisure activities. What is more, if people have more free time available, they may be able to reduce certain elements of consumption expenditure. They may, for example, require fewer care services and household-related services, which could be sourced back to the household. By reducing the cost of services that no longer need to be purchased, households have more money to pay bills on time, pay for other goods and services, or invest in savings.

Both simulation studies and empirical studies on the effects of changes in the minimum wage on poverty have been criticized for ignoring possible employment effects. Simulation studies often disregard possible adjustments in employment or explicitly assume that there are no employment effects. Thus, they estimate the impact of a minimum wage by assuming that the same proportion of the population is in employment before and after a change in minimum wage legislation. In contrast, many empirical studies have focused solely on changes in wages, earnings, or income of people in the labor force. This means that these studies have ignored possible selection bias over time, for example when the least skilled drop out of the labor market and the observation sample (DiNardo, Fortin, and Lemieux 1996). However, these shortcomings are mitigated by the fact that these studies find no evidence of significant employment effects and rather small effects on working time. A review of the empirical evidence suggests that the aggregate effects on employment and working hours might be very limited, but at the same time there may be specific demographic groups in the labor market that are more likely to experience employment loss or reductions in working hours (for an overview, see Dube 2019a).

The median elasticity of employment to changes in the minimum wage is economically small, even when focusing on low-wage groups such as teenagers and restaurant workers (Belman and Wolfson 2014). Several studies have reported negative employment effects, particularly among teenagers, but the results vary widely. However, the greatest disagreement in findings occurred prior to the mid-1990s, before the increasing variation in minimum wages at the state level provided material for more rigorous studies. Since then, the results strongly point towards small employment effects, even for teenagers (Dube 2019c). For Eating and Drinking Establishments and retail, the elasticities are somewhat larger than the overall elasticity, but still not large in economic terms (Wolfson and Belman 2019).

Studies on employment and working hours focus on individuals. Poverty, however, is measured at the family or household level, and estimates of income inequality are usually based on the total gross or net income of households, too. None of the studies discussed above investigated employment effects or reductions in working hours directly at the level of families or households. The extent to which the identified effects of minimum wages on employment and working hours – albeit small on average – disproportionately affect low-income households or households representing minorities in society must be extrapolated from the findings on workers. While the greater impact among teenagers is unlikely to lead to disproportionate job losses among poor families, higher risks of reduced working hours, loss of employment, or difficulties in finding work in certain low-wage sectors may affect certain social groups more

than others. However, a detailed study of the effects at household level and their implications for the distribution of earned income or total income at household level is still pending.

3.2. Minimum wages and changing policies to support low-income households

This section discusses the link between minimum wages and changing policies to support low-income households. The potential impact of the minimum wage on income inequality depends heavily on the redistributive policies of the welfare state in which it is implemented. Therefore, changes in redistribution by the welfare state through public transfers and taxes will affect how minimum wage policies, which initially affect market-based incomes, may affect net household income inequality over time.

Inequality of incomes is influenced most importantly by earnings from work and how individuals with earnings from work cluster together in households. However, total household income is a sum of more than this single component. The relevance of different sources of household income is not independent, but strongly correlated. Opponents of minimum wage increases, for example, argue that higher minimum wages resulting in higher labor incomes lead to a reduction in public income support for affected families, often referred to as an increase in “marginal tax rates” on increased earnings and labor income.²⁸ Alongside lower income support, rising income tax and social security tax liabilities could further diminish the benefits of a higher wage floor and therefore counteract government efforts to encourage work and economic independence (Institute for Research on Poverty 2019).

Scholars, and especially opponents of minimum wage increases, have argued that wage gains from changing the minimum wage are dissipated by the structure of the US-American transfer system, which automatically reduces transfers in a number of programs when labor income rises (Johnson and Browning 1983). However, there have been few studies on the interaction of antipoverty policies and the minimum wage (Belman and Wolfson 2014:323) and the welfare system has changed considerably over the last decades. Furthermore, initially high marginal tax rates (Institute for Research on Poverty 2019) created by many welfare programs might today be mitigated by negative marginal tax rates associated with the phase-in regions of tax-based transfers like the EITC (Moffitt 2003).

The distributional implications of these correlations are ambiguous, as the importance of different sources of income varies widely across different household types and income strata, as does the importance of labor income in the income distribution. One example is public transfers as a share of total household income: While for some households social protection may be the main or only source of income, other households may have no contact with income support at all (Salverda, Nolan, and Smeeding 2011a). Moreover, certain types of social transfers may be concentrated in income brackets where they are less likely to coincide with significant amounts of labor income anyway, while other types of public transfers targeted at

²⁸ According to the Institute for Research on Poverty (2019), families face marginal tax rates when increased incomes from labor trigger an increase in tax liability or loss of public benefits. Families face so-called benefit cliffs, when a small increase in income makes them ineligible for the public benefits they had previously been receiving. According to the Congressional Budget Office (CBO), the effective marginal tax rate is the percentage of an additional dollar of earnings that is unavailable to a worker because it is paid in taxes or offset by reductions in benefits from government programs

people with somewhat higher incomes are more likely to interact with labor income. Given that public income support often depends not only on the total income of households but also the number of dependents (children, elderly, or dependent adults), households with similar earnings can experience very different marginal tax rates (Institute for Research on Poverty 2019).

Therefore, in discussing the interactions among different income sources, I also consider their importance for different household types at different income levels and how these different income sources have changed over time. In the early 1990s, welfare reform significantly changed the types of transfers that matter and who is eligible for them. Moreover, policies to support low-income households were complemented by changes in the design of the income tax system. Similar to many other affluent democracies that have moved from traditional welfare states to workfare systems, the U.S. welfare system has changed over time aiming to reduce welfare spending and increase labor force participation.

The Clinton administration introduced a series of welfare and tax reforms after 1992 in the wake of a long-standing debate about welfare reforms, culminating in the “end of welfare as we know it” in 1996, which was intended to reduce welfare dependency (Moffitt 2015). The pressure to take up work, even in low-wage and insecure jobs, increased, as steps were taken to link eligibility for unemployment benefits tightly to the willingness to seek and accept work. This strategy supported efforts to reduce income protection through cuts in “traditional” welfare benefits. The increasing demands placed on those claiming benefits are regularly accompanied by harsher sanctions for those who fail to comply. The increased obligation to work or seek work, however, was combined with incentives in the form of generous income tax credits. The (refundable) tax credits benefitted low-income households, raising the income of many households with low and moderate incomes (Moffitt 2015; Nichols and Rothstein 2016; Tach and Edin 2017; Wimer et al. 2020). The challenges of the labor market, in particular the enormous growth of low-wage employment (see section 3.1.2.1), were therefore addressed by means of an active labor market policy that provided strong incentives to take up low-wage work, preferably with long working hours. Thus, this approach firstly incentivized working more hours, which in itself would increase the earned income of workers, and secondly, the refundable tax credits acted as in-work subsidies and became an enormous public income support program.

Thus, while “traditional” forms of public income support were significantly cut, parts of the income tax system evolved into a public income support program. These trends suggest that policies to support low-income households may have become more compatible with higher labor incomes over time. This would address one of the most commonly cited arguments against increases in the minimum wage, namely, that increased labor incomes from higher wage floors lead to undesirable interaction effects, particularly through lower welfare entitlements and increased tax burdens. The higher compatibility with public transfers may be rooted in an unfavorable trend of declining income support through the welfare state, but it means that losing eligibility or meeting benefit cliffs has become less likely over time. However, the beneficial impact of income support based on the growing generosity of (refundable) tax credits is even reinforced by higher labor income, as initially, benefits increase with growing labor incomes. In this case, higher wage floors could be particularly beneficial for low-income families in employment.

In the following sections, I first look at different public transfer programs and the changes in them over time that may interact with changes in minimum wage policy. I focus on transfer programs that target able-bodied working-age adults, as these are most likely to impact the target group of minimum wage policies. Cuts in public income support and the increasing role of work requirements may lead to the working-age population becoming more dependent on earned income, such that being employed and receiving public income support may no longer be as incompatible as they once were. This is closely related to the changes in tax policy discussed subsequently, which underscore the increasingly important role of the income tax system, particularly (refundable) tax credits, in supporting low-income working households. Therefore, the following sections elaborate on the trends in the changes in public income support that have led to the increasing reliance of the working-age population on earned income, and then consider changes in tax policy that support households affected by low-paid work.

3.2.1. Minimum wages and changes in public income support. The increasing dependence of the working-age population on earned income

As outlined in section 2.4, concern about unfavorable interactions of minimum wage policy and income support programs has been one of the central arguments against the minimum wage as a useful social policy tool. The argument is that rising earnings following a minimum wage hike might trigger an increase in tax liability or loss of public support, or even make certain families ineligible for public benefits they previously received (Institute for Research on Poverty 2019).

In this section, I discuss the changes in the design and relevance of various public transfer programs in terms of participation rates. These changes occurred with the shift from a traditional welfare system to a workfare system and may interact with minimum wage policy. I focus on transfer programs that target able-bodied working-age adults (as opposed to programs targeting the elderly or the disabled), because they are most likely to impact the target group of minimum wage policies. Cuts in public income support and the increasing role of work requirements may lead to the working-age population becoming increasingly dependent on earned income. Whether intended or not, this could lead to improvements in the match between minimum wage policy and public income support. This, in turn, could mean that employment and the receipt of transfers are no longer as incompatible as they once were.

The importance of different transfer programs in a welfare state may change over time for a variety of reasons. Policy reforms that affect a program's eligibility criteria or generosity may lead to changes in participation rates or changes in average or maximum benefit levels. However, the role of different programs regarding spending or participation may also change due to business cycles or structural changes in labor markets or employment trends, such as the decline in full-time work or stagnant earnings, which lead to automatic adaptations in the spending of programs. Other factors that lead to similar changes may include, for example, a rise in (attested and recognized) disability, or changing demographic trends that increase the number or share of families that are vulnerable to economic risk, such as single-person or single-parent families (Hardy, Smeeding, and Ziliak 2018). All of these factors affect the patterns of the distribution of transfers across different population groups and how they change over time, manifesting in different rates of growth of the social safety net across age groups, family types, and income ranges (Moffitt and Pauley 2018).

The relevance of a minimum wage as a social policy tool depends on the broader context of the social safety net in which it is set. To assess whether minimum wages are an important social policy tool, it is important to look at how minimum wages and (means-tested) public benefits coincide at the level of families and households. On the one hand, as noted above, households may face high marginal tax rates as minimum wages and earned incomes rise because they no longer qualify for the same (amount of) benefits. In other words, households would experience cuts in the income they derive from public benefits when their earnings rise, ultimately leaving them with the same net incomes. However, whether and the extent to which the public benefits received by households decline depends on the social safety net and the legislation that currently governs eligibility criteria and the generosity of the benefits. In a setting with a rudimentary social safety net that provides little or no income support, an increase in the minimum wage cannot, of course, lead to cuts in transfers. On the other hand, the prevailing social safety net determines the level of income or the minimum living standard that households can attain, even if they are not in employment. This may influence the labor market behavior of individuals and households: A rudimentary social safety net may put more pressure on people without significant assets or other incomes to find employment than would a generous system of minimum income protection. Besides such behavioral effects, the generosity of the social safety net determines how households with and without employment, including employment in minimum wage jobs, are positioned relative to other households in the total income distribution.

Income from public transfers can play very different roles across families, as their share in households' total income varies widely (Moffitt and Scholz 2010). While many households receive no income support at all, for the most vulnerable households social protection might be the main or only source of income. Flows from cash transfers is particularly important for those households with the lowest incomes (Salverda, Nolan, and Smeeding 2011a). To assess whether higher minimum wages ultimately lead to a noticeable reduction in public transfers at the household level, it is relevant how the receipt of such transfers coincides with relevant labor income from minimum-wage work in households. The most vulnerable are not necessarily those with high earned incomes, whether from minimum wage work or from employment with higher hourly wages. It remains an empirical question as to how receipt of public benefits and earned income from minimum wage work coincide and where the respective families and households are located in the income distribution. As the welfare system in the USA has changed significantly, this pattern has likely changed.

In 1996, President Clinton oversaw the most contractionary welfare reform in modern US history. The goal of the reform was to end “too widespread welfare dependency”, as indicated by the large caseloads of the Assistance to Families with Dependent Children (AFDC) program. The government fundamentally redesigned the functioning of cash assistance to families at the bottom of the income distribution: The AFDC had been created in the 1930s and run as a joint state/federal program. The new legislation abolished it and created a new block grant to the states, the Temporary Assistance for Needy Families (TANF) Block Grant. These block grants had specific purposes, but states had almost complete control over the design of their public assistance programs. The purposes of the block grants, as stated in the legislation, were to provide assistance to needy families, ending the dependency of needy parents on government benefits, preventing and reducing the number of children born outside marriage and encouraging the formation of two-parent families.

The changes introduced by this legislation eliminated family entitlements to cash assistance. Under AFDC, any family that met eligibility requirements was entitled to assistance under established rules and regulations. The new law, however, granted states far greater discretion to decide who should receive money and how much. States were allowed to exclude certain groups from assistance, to redirect funds from cash assistance to teenage pregnancy prevention and marriage promotion, or to impose behavioral requirements on welfare recipients. If money runs out at the end of a budget year, families may simply be turned away (Blank 1997).

While the AFDC was a matching grant program that ensured that states that spent more received higher federal amounts, these open-ended federal payments ended with the reforms. Under TANF, states receive a fixed amount of money from the federal government. This means that when poverty or unemployment rise in a state, the federal government does not automatically react by increasing the payments to that state, even though more people might be require social assistance (Blank 1997). The block grants that the federal government provides to the states remain at the nominal value originally set in 1997. This means that the real value of the block grants and TANF maximum benefits has declined with inflation over time. Only a few states have increased their nominal pay level in attempts to keep up with inflation (Ziliak 2016).

While the Clinton reforms gave states control over who to help and how, the federal legislation imposed mandates that set strict work requirements and time limits on assistance. After 24 months of assistance through TANF, parents had to be working or in a work program to be eligible for further funding. States must ensure that a certain proportion of recipients work a minimum number of hours per week, with the possibility of sanctions for non-compliance. This regulation became stricter over time with the aim of increasing the caseload that was working or was in work programs: By 1997, 25% of all families receiving TANF support had to be working at least 20 hours per week; by 2002, the rule was adjusted to 50% and 30 hours per week. However, states have some discretion in defining what counts as “work”. Furthermore, to meet the concerns about work disincentives for AFDC recipients, federal legislation limited participation in TANF to a maximum of five years of lifetime use. States had the option of imposing even shorter time limits (Blank 1997).

After the introduction of TANF in the mid-1990s, cash assistance caseloads declined steadily as access to the program’s benefits waned (Stanley, Floyd, and Hill 2016). Over time, the percentage of the population that received TANF (respectively AFDC) declined from about 5% prior to the reforms to 1 to 1.4% after 2000. At the same time, the share that was not in the labor force among recipients declined, as did the share that was poor (U.S. Census Bureau 1996, 2006). Several studies show a growing share of families exiting TANF for nonwork-related reasons, i.e. without having found employment (Acs and Loprest 2004; Hildebrandt and Stevens 2009; Seefeldt and Sandstrom 2015). The economic situation of such disconnected families worsened dramatically, even if in some cases the children in these families continued to receive TANF benefits.

AFDC was replaced by TANF amid a major debate about its disincentives. The AFDC was clearly aimed at nonworkers, and its benefits declined dollar-for-dollar as the incomes earned by recipients rose. Thus, taking up work directly led to benefit cuts and finally, to effectively zero additional income (Nichols and Rothstein 2016; Ziliak 2016). In TANF, states determine whether and how much of earnings to disregard in determining eligibility and benefits. In

general, families must still have very low incomes to be eligible for TANF. They must have a qualifying income below their state's income threshold for a family of their size. However, these income thresholds vary widely, and what counts as a qualifying income differs between states. This means that states may disregard certain amounts or shares in earnings in their eligibility determination process, whereas other income sources may qualify fully as income. The maximum amounts of earnings an applicant can have and still be technically eligible for cash assistance varies widely between states. A family of three could have maximum monthly earnings of more than \$2,000 in certain states and still be eligible for cash assistance through TANF, whereas in other states, their maximum monthly earnings may be only around \$300 (Knowles et al.).²⁹ In other words, families may engage in full-time minimum wage work and still be eligible for TANF, depending on the level of the state minimum wage. Overall, the effective marginal tax rates, i.e. the percentage of a family's increase in earned income that is offset by lost benefits, is lower under the new system of cash assistance, which is strongly linked to work requirements.

The elimination of AFDC and the establishment of TANF represent a major change in the logic of the U.S. welfare state. This has led to a shift in federal spending on the means-tested safety net away from the poorest households and toward those with higher incomes, the disabled, and the elderly. At least in part, this has been a relatively regressive shift, with the result that post-transfer deep poverty rates for some groups have increased (Ben-Shalom, Moffitt, and Scholz 2012).

While cash assistance through TANF (and its predecessors) has declined steeply since the mid-1990s, other non-cash (in-kind) transfers have become increasingly important for low-income families' standard of living. Food and nutrition support plays a particularly important role and includes the Supplemental Nutrition Assistance Program (SNAP), often referred to as "food stamps", the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the National School Lunch Program. Housing support includes housing subsidies and the Low Income Home Energy Assistance Program (LIHEAP).

The Supplemental Nutrition Assistance Program (SNAP) provides food-purchasing assistance for people with low or no income. It is a federal aid program, administered by the U.S. Department of Agriculture, which defines the monthly noncash benefits that can be redeemed only for program-eligible foods at program-authorized retailers (Falk, McCarthy, and Aussenberg 2014). The benefits are distributed by each U.S. state's Division of Social Services or Children and Family Services and the eligibility requirements vary somewhat from state to state. Most importantly, individuals and households have to meet income requirements to be eligible for SNAP benefits. They must earn a gross monthly income at or below 130% of the federal poverty level for a given household size, and a net household income at or below 100% of the federal poverty guidelines, and limited liquid assets (Government Accountability Office 2015). If households meet the eligibility requirements for SNAP, they are automatically eligible for other income support programs, such as the Child and Adult Care Food Program, the WIC,

²⁹ Eligibility for noncash assistance may depend on other amounts in earnings or qualifying income. For example, in Wisconsin, families are not eligible for cash assistance if they have earned income. However, they may be eligible for noncash assistance despite relatively high earnings.

National School Lunch Program, the School Breakfast Program, the Summer Food Service Program, and the LIHEAP (Government Accountability Office 2015).

Compared to the TANF program, the SNAP program reaches higher into the income distribution. However, since 1996, (able-bodied) adults without children have been subject to time limits on food assistance if they are not in work. This change worsened the income situation of certain groups among the unemployed. The amount of SNAP benefits received by a household depends on the household's size, income, and expenses. The interaction of SNAP with other sources of income is fairly complex, but overall, the benefit formula phases out benefits rather slowly as earnings rise. On average, SNAP benefits decline 30 cents for every \$1 increase in gross family earnings and phase out entirely at about 130% of the federal poverty level (Center on Budget and Policy Priorities 2022c). However, this has varied over time and across states. For example, the amount of SNAP benefits lost also depends on participation in other welfare programs and their combination. Overall, the SNAP program continues to provide income support even as families earn more and makes it easier for them to afford food. The number of people receiving SNAP benefits and their value have gradually increased since the mid-1990s (Wimer et al. 2020). Caseloads in SNAP increased in the early 1990s, with around 7% to 10% of the population receiving SNAP benefits prior to the welfare reforms in 1996. This share declined somewhat afterwards to about 6% in 2000. With the recession, the share increased strongly to about 13% (U.S. Census Bureau 1996, 2006). For able-bodied working poor and near-poor families, food assistance is the largest transfer program, along with refundable tax credits to which they are eligible based on their earned income (Hardy, Smeeding, and Ziliak 2018).

Inflation-adjusted spending on SNAP grew by 290% from 2000 to 2012 (Hardy, Smeeding, and Ziliak 2018). This was also due to the temporary provision of additional federal funds to the SNAP and a relaxation of SNAP asset eligibility requirements in face of the Great Recession, which helped to abate the impact of the recession on low-income families (Moffitt and Pauley 2018). The federal funds for TANF were temporarily extended as well, but this did not stop the stagnation in low benefit allocations. The trends in benefit allocations in the CPS ASEC by year illustrate that TANF/AFDC declined sharply in the mid-1990s and has stagnated at a relatively low level below 10 million (in 2015 dollars) since around 2000. The amounts in food support increased strongly, from around 30 million to 50 million between the early 1990s and 2015 (Wimer et al. 2020). The amounts of benefit allocations for housing and SSI have increased less sharply, but steadily (Wimer et al. 2020).

The changes in these programs, which target able-bodied working-age adults and which are most likely to impact the target group of minimum wage policies, can be placed within a larger pattern of changes in the U.S. welfare state. From the mid-80s to the mid-2000s, aggregate per capita safety net expenditures rose. However, this increase went disproportionately to disabled and elderly families relative to the nondisabled and nonelderly, who are able and expected to work. This logic of “deservingness” in the support given to different types of households and families. The rise in expenditures went disproportionately to married-parent families and less to single-parent families or single persons. Households with incomes around the poverty line benefitted more from the rising expenditures than did households with incomes far below the poverty line (Moffitt and Pauley 2018).

The largest programs that target the so-called “deserving” (poor) are the U.S. system of Social Security, and the Supplemental Security Income (SSI), which complements the insurance program. The U.S. system of Social Security (OASDI, or the Old-Age, Survivors, and Disability Insurance program) mainly provides income protection for old-age retirees and the disabled. Both of these target groups are characterized by labor market *inactivity*. They receive income from insurance and public income support because they are not employed (anymore). They receive benefits that allow them to maintain a certain standard of living or that secure a minimum income without any working requirements, as these population groups are no longer expected to be working. This also applies to persons with disabilities. These groups mainly receive pensions. They are often based on their previous employment history and contributions to the insurance systems. As the OASDI is a program that targets people who are not in touch with the labor market, the overlap between minimum wage work and income support through OASDI is naturally low and restricted to families and households with (at least) one person receiving benefits from the OASDI program and (at least) another person working in a job paid the minimum wage. OASDI has grown moderately as well considering the per-capita expenditure in the early 1990s and in 2014 (Ben-Shalom, Moffitt, and Scholz 2012). As an additional form of support for this target group, the Supplemental Security Income (SSI) program provides means-tested cash payments to the low-income elderly, the blind and the disabled. In the early 1990s, this program expanded as eligibility criteria were relaxed following a public discourse that prioritized higher transfers for the “deserving poor”. Combined with the increased benefits from Social Security, the incomes of the low-income elderly, blind, and disabled in particular have grown (Ben-Shalom, Moffitt, and Scholz 2012; Moffitt and Scholz 2009).

The Great Recession was the worst economic downturn in the U.S. since the Great Depression. It has led to large reductions in GDP per capita, in income and employment and other measures of well-being, and an increase in the unemployment rate. The impact of these detrimental trends, particularly on low-income families, was mitigated by the relatively favorable response of the social safety net to the downturn. This was due both to automatic increases in benefits from programs that respond to falling incomes (e.g., through loss of employment) and to federally mandated policy changes that expanded benefits and eligibility for a number of programs (Moffitt and Pauley 2018). This was accompanied by large increases in safety net expenditures. However, unlike expenditure before the mid-2000s, these expenditures were more evenly spread across all family types and households with different income levels. As the impact of the Great Recession was greatest on the working age population, rising safety net spending was more likely to fall on the nondisabled and nonelderly. In the years following the recession, trends in support for the disabled and elderly families are no longer significantly different from those for the nonelderly and nondisabled. Likewise, married-parent families no longer benefit disproportionately more than single-parent families. However, the disproportionate support of families and households with incomes just above and below the poverty compared to the poorest has continued after the recession. Support for the poorest has declined markedly since the peak of the recession, returning to pre-recession levels. This illustrates the success of the social safety net in providing financial support during the crisis. However, transfers for households with somewhat higher incomes has declined much less,

which leaves post-recession support above pre-recession levels and has revived the uneven support for households with different income levels (Moffitt and Pauley 2018).

Given the sharp rise in unemployment and poverty during the Great Recession, scholars and politicians argue that the US safety net works best for families in which both parents are working. Earnings, even when low, are then combined with the EITC, and additionally with SNAP and childcare subsidies. Thus, it is much more likely that the safety net provides a way out of poverty in combination with earnings than in circumstances in which families are not in paid employment (Nichols and Zedlewski).

The increasingly importance of in-kind transfers fits well with the importance of work in the redesigned welfare system. SNAP, in particular, plays an essential role and, along with refundable tax credits that act as cash transfers for eligible working families, is the largest transfer program available to low-income able-bodied and working families. In fact, simultaneous participation in these programs has more than doubled since the early 2000s, which illustrates the interrelationship between employment and public support through in-kind transfers in the form of food assistance (Hardy, Smeeding, and Ziliak 2018).

The design of (means-tested) public transfer programs may affect people's decision as to whether or not to work, i.e. their labor force participation decision, and the number of hours people decide to work. Labor force participation decisions depend mostly on the incomes available under each alternative, including income from public assistance, such as means-tested benefits. Decisions on how many hours to work may be influenced by the extent to which an increase in earned income is offset by higher marginal tax rates, either through reduced benefits or through higher income tax or social security tax liabilities. These marginal tax rates may depend on the individual's income only, for example in the case of social security taxes, but they may also depend on the family's or household's total income. Therefore, decisions on participation in the labor market and the number of hours individuals work are likely to be made jointly, based on factors such as the nonparticipation or participation of further working-age adults in a household, their earnings level, and other (rational) trade-offs between the benefits of work resulting from higher earned incomes and the costs that arise with the take-up of such employment, such as the need to care for children or dependents, commuting, or the costs arising from cuts in public transfers.

In summary, changes in various public transfer programs, particularly those targeted at able-bodied working-age individuals and their families, have made the working-age population increasingly dependent on income from work and, consequently, on policies that affect the payoff from employment. Possible cuts in transfers were just one obstacle to increasing labor market participation. The transfer programs most likely to have an unfavorable impact on minimum wage policy have been cut and now include work requirements. The implementation of TANF and the expansion of the EITC over the past two decades have encouraged entry into the labor market by providing more benefits to those who are working and fewer benefits to those who are not (Government Accountability Office 2015). These changes have potentially detrimental consequences for households that have difficulty connecting to the labor market and that are reliant on income support.³⁰ Public transfers are increasingly linked to simultaneous

³⁰ Private transfers from friends or family can be another source of income and may theoretically have increased in importance given the cuts in public income support. Empirically, however, access to social support at the

labor market activity. Greater labor market integration is therefore no longer a factor that prevents the receipt of transfers but is rather a prerequisite for such transfers and in this way also promotes greater labor market activity. This also improves the fit between minimum wage receipt and public income support, suggesting that minimum wages may not be as ineffective in reducing poverty as opponents of minimum wage increases have claimed for years. Income from work and from public income support are no longer as incompatible as they once were. The greatly increased dependence of the working-age population on work underlines the importance of an appropriate level of minimum wage as a policy instrument that must accompany the transition from a welfare to a workfare state in order to promote sufficiently high earned incomes.

3.2.2. Minimum wages and tax policies to support households in low-paid work

Cuts in income support have made low-income households increasingly reliant on income from work and, consequently, on policies that affect the payoff from employment. With the shift from welfare to workfare, the U.S. government stepped up the pressure to take up work and created incentives primarily through income tax credits, which should benefit households with members in low-paying employment in particular. This represents an active approach to addressing activation in times of labor market challenges.

Tax systems, including tax policies such as tax credits and tax breaks, determine the net gains from (increased) earned income. I anticipate that they have a growing impact on the income situation of low-income households in the labor force and of individuals entering the labor market. This emphasizes the relevance of the interplay between minimum wage policy and tax policy.

Several studies have argued that the wage gains from a change in the minimum wage are dissipated through the tax system. Additional wage income is subject to several types of taxation, the most important of which are income tax and social security tax. The additional tax burden imposed by these two types of taxes are particularly important to estimate the effect of a change in the minimum wage on the distribution of the disposable income of households (Johnson and Browning 1983).

Income tax and payroll tax (social security tax) are the most important federal taxes for those in the bottom half of the income distribution. The U.S. government levies social security contributions strictly at the individual level, while income tax is paid by tax units.³¹ Social security contributions – or payroll taxes³² – are only due on labor income, while all income sources are generally subject to income taxation.

population level has hardly changed since the early 1990s. Furthermore, low-income households, which are likely to have a higher need for social support, have less access to social support from family and friends compared to higher-income households. This pattern has not changed over time, as Verdery and Campbell (2019) report.

³¹ Many households consist of only one tax unit (married couples, single persons, each with or without children). When unrelated individuals (including cohabiting couples) or adult children in employment live in one household, they form multiple tax units.

³² In the U.S., the term federal payroll taxes refers to the taxes deducted to fund Medicare and Social Security programs. I will use the terms payroll taxes and social security contributions interchangeably, referring exclusively to tax withholdings to fund the federal social security system.

A household's tax burden is determined by the amount of taxable income from different sources of income and the applicable tax rates. Tax rates vary depending on the progressivity of the respective tax system and possible deductions that apply before income is taxed.

Progressivity is the principle that as income rises, the proportion paid in taxes increases. This is typically achieved through a system of graduated tax rates, where higher income earners face higher tax rates. Tax rates in different income strata under a progressive system typically start at a lower rate for lower income brackets and increase progressively as income rises. This means that higher income earners are subject to higher tax rates on their additional income. The idea behind progressive tax rates is to ensure that those who can afford to contribute more to the functioning of society do so, while also providing a safety net for lower income individuals through exemptions, deductions, and credits.

Regressivity, on the other hand, describes a tax system where the proportion of income paid in taxes decreases as income rises. In such systems, lower income individuals bear a disproportionately higher tax burden compared to higher income individuals. For example, sales taxes can be regressive, as they impose a larger burden on low-income households relative to their income, because they spend a relatively high share of their total income on goods and services.

The way the income tax and social insurance system is structured has an important influence on the shape of the income distribution, as they moderate the relationship between households' total gross income and their total net income (Salverda, Nolan, and Smeeding 2011a). The potential impact of minimum wages on the inequality of households' total net income therefore depends heavily on the tax liability of households with minimum wage earners and their relationship to tax burdens in different income strata. If households with minimum wage earners can particularly likely to benefit from a progressive income tax system with low tax rates, tax breaks or even tax refunds that increase their total income, this may contribute to reducing income inequality.

In moving towards a workfare system, the U.S. government actively used income tax reforms to complement labor market activation programs. Income taxation was part of the 'make-work-pay' strategy meant to support the incomes of households with low-paid work whose incomes would otherwise not keep pace with those of households with higher earnings. The expansion of refundable tax credits in particular was meant to incentivize the take-up of work.

The tax burden on low-income households was significantly reduced by using the income tax system as a means of subsidizing low labor earnings, mainly by extending refundable tax credits and raising the standard deduction.

The standard deduction reduces a taxpayer's taxable income. It ensures that only households with incomes above certain thresholds will owe income tax. Until 2017, taxpayers could claim a personal exemption for themselves and their dependents in addition to the standard deduction. This helped to ensure that the poorest households are not subject to income tax. They linked income tax liability to family size, reducing taxes for families with more dependents. Instead of taking the standard deduction, taxpayers can choose to itemize their deductions. Until 2018, around 70% of taxpayers chose opted for the standard deduction. In most cases, taxpayers chose the standard deduction because it was larger than the itemized deductions they could claim, but some did so because it was easier than identifying and totaling the expenses they could itemize,

or because they did not realize that itemizing would reduce their tax liability (Tax Policy Center 2020b).

Through 2017, standard deductions increased only slightly, from \$6,278 in 1989 (in 2018 dollars) to \$6,505 in 2017 for a single filer. Personal exemptions have been fairly constant, with the personal exemption being \$4,050 in 1989 (in 2018 dollars) and \$4,149 in 2017 (Tax Policy Center 2023b, 2022b).

The Tax Cuts and Jobs Act (TCJA) nearly doubled the standard deduction and eliminated or restricted many itemized deductions in 2018 through 2025. It increased the standard deduction from \$6,500 in 2017 to \$12,000 for individual filers in 2018.³³ The amounts continue to be indexed annually for inflation. The personal exemption amount was set to zero. The net result was a small increase in the taxable income threshold for both singles and couples. For taxpayers with dependents, personal exemptions played a particularly important role in reducing their tax burden. The zero personal exemption amount also applies to the exemptions taxpayers could claim for each of their dependents. However, TCJA also increased the child tax credit, which offset the loss of personal exemptions for many taxpayers with dependents. In many cases, taxpayers with incomes above the taxable income thresholds may still pay no income tax if they qualify for tax credits such as the child tax credit and the earned income tax credit (Tax Policy Center 2020b).

The combination of the elimination and restriction of many itemized deductions and the increased standard deduction significantly reduced the number of taxpayers who itemized deductions. TCJA brought about a huge drop in the number of taxpayers claiming itemized deductions and the average tax saving from claiming them. Only a very small proportion of taxpayers in the lowest deciles have itemized deductions (Tax Policy Center 2022a) The increased standard deduction should significantly reduce their tax burden as nearly twice as much income is exempt from income tax in 2018 than was the case in 1989 (or 2017).

A more progressive income tax system with higher standard deductions could potentially incentivize work by promising lower marginal tax rates for increased labor supply. Households would then have higher labor income. A more progressive income tax system with higher standard deductions that allow households higher non-taxable incomes would also result in a more favorable transmission from households' gross income to their disposable income, which ultimately determines their living standards.

Another feature of the progressive U.S. income tax system is the use of refundable and nonrefundable tax credits. Once the amount of taxable income has been reduced by the standard deduction, nonrefundable tax credits kick in to further reduce tax liability. Refundable tax credits, on the other hand, not only reduce a taxpayer's tax liability, but can also assist taxpayers whose income is so low that they owe little or no (federal) income tax. If the value of the credit exceeds the amount of federal income tax a tax unit owes, the tax unit may receive part or all of the difference in the form of a refund check. While some tax credits are fully refundable, only portions are refundable for others. For low-income households, (partly) refundable tax credits play a particularly meaningful role because they can improve their income situation even

³³ Standard deductions were increased from \$13,000 to \$24,000 for joint returns, and from \$9,550 to \$18,000 for heads of household.

when their income tax liability is already zero due to low income. Depending on the design of the tax credits, they provide different levels of support to households in different income strata.

Multiple tax credits have been expanded or introduced over time. I will discuss the major low-income tax credits that are most likely to interfere with minimum wage receipt in households where minimum wage income plays a meaningful role in total income. These are the Earned Income Tax Credit (EITC) and the Child Tax Credit (CTC), both of which are partially refundable.

The EITC is a refundable tax credit targeted to low- to moderate-income working households, particularly those with children. Today, it is recognized as the most important means-tested transfer program in the United States (Nichols and Rothstein 2016). In 2018, 26.49 million tax filers received about \$64.92 billion in EITC and the average amount of EITC received was \$2,451 (Tax Policy Center 2023a). In 1989, before legislative changes in the Omnibus Reconciliation Act of 1993 (OBRA93) greatly expanded the amount and eligibility for the EITC, the number of returns with an earned income credit was 11.15 million, and the total amount of the credit was about 6.6 billion, with an average credit amount claimed of \$565 (Tax Policy Center 2023a). The amount of the credit a household is eligible for depends on its total earned income, marital status, and the number of children living in the household. The credit amount initially increases for each additional dollar of earnings. This feature distinguishes the credit from other transfer programs that are characterized by a reduction in benefits for additional earnings made. Furthermore, the EITC is a refundable credit. This feature can result in cases in which the government owes households money because their amount of tax credits exceeds their amount of tax liability.

The size of the credit increases with income until a plateau is reached, where the credit size remains constant as income continues to increase, before decreasing with income until it is completely eliminated. Between 1989 and 2018, the credit amounts have been raised, the phase-in and phase-out rates have been adjusted and the income thresholds have been changed. Each of these adjustments has been consciously made to promote work and higher working hours. Prior to 1991, the EITC phase-in rate was set by multiplying an individual's earnings by 14% without taking the family's size into account. Thus, as family size increased, the credit became less effective at helping families meet their needs. A family with two children could therefore receive \$1,186 with earnings of \$8,472 and a maximum credit of \$1,897 was available with earnings between \$13,538 and \$21,315 (all figures in 2018 dollars).

In the 1990s, the credit was expanded by adjusting the credit for family size and extending its availability to childless workers. Beginning with the Omnibus Reconciliation Act of 1990 (OBRA90) and greatly expanded under the Omnibus Reconciliation Act of 1993 (OBRA93) the EITC was restructured to vary according to family size. Since then, the credit has been larger for taxpayers with two or more children. By 1996, the phase-in rate had dramatically increased from 14% to 40% for a family with two children. The abovementioned family would have had \$3,389 compared to only \$1,186 prior to the extensions. The maximum credit amount was \$5,710 with earnings between approximately \$13,400 and \$18,700 (Holtzblatt, McCubbin, and Gillette 1994). Since then, the design or size of the EITC has not changed fundamentally. In the later 1990s, legislation included modifications to the EITC intended to reduce fraud, improved targeting by limiting the availability of the credit for higher-income taxpayers and to

individuals authorized to work in the U.S., and by improving the administration of the credit. In the 2000s, the credit was adjusted for marital status and family size by reducing the “marriage penalty” and by expanding the EITC for families with three or more children. The 2009 American Recovery and Reinvestment Act (ARRA) was designed to provide an economic stimulus by temporarily increasing the EITC marriage penalty relief and the credit amounts for families with three or more children. Ultimately, both modifications were made permanent by the Protecting Americans from Tax Hikes Act (PATH) in 2015. In addition, legislative changes in 2010 addressed administrative and compliance challenges with the EITC. The EITC had been adjusted annually for inflation since 1986, so that credits kept up with the rising cost of living throughout the entire period.

In 2018, families with two children still faced a phase-in rate of 40% up to a threshold of earned income of \$14,290. Above this level, families were entitled to a maximum credit amount of \$5,716 up to a maximum amount of earnings of \$18,660 for unmarried tax filers (\$24,350 for married tax filers filing jointly). The credits phase out at a rate of 21.06% above that point, before the family loses eligibility at an earnings level of \$45,802 (\$51,492 when married and filing jointly). Childless workers face a phase-in rate of only 7.65% up to a threshold of earned income of \$6,780. Above this level, they could receive a maximum credit amount of \$519 up to maximum earnings of \$8,490 for unmarried tax filers (\$14,170 for married tax filers filing jointly). The credits phase out at the same rate that they phase in (7.65%) above that point, before a single worker loses eligibility at an earnings level of \$15,270 (\$20,950 when married and filing jointly) (Congressional Research Service 2018). The adequacy of income support for childless workers is a topic of frequent debate. Under certain circumstances, childless workers can be taxed into poverty under the current rules, which is why calls for adjustments to the EITC have focused on extensions for childless workers in recent years (Center on Budget and Policy Priorities 2020).

The Child Tax Credit (CTS) was established in 1997 as part of the Taxpayer Relief Act. Like the EITC, it was designed to benefit families in employment, as the main eligibility criteria are the amount of earned income and the number of children. The original credit was \$400 per child under age 17 and was nonrefundable for most families. The Child Tax Credit is aimed exclusively at families with children and does not provide any support for people without children. Over time, the CTC was increased, was made refundable in 2001, and its earnings threshold was reduced over time. The American Taxpayer Relief Act of 2012 increased the CTC from \$500 per child to \$1,000 per child and extended the temporarily set refundable thresholds of ARRA which were set at \$3,000 instead of \$10,000. The lower earnings threshold made low-income households more easily eligible for the credit. The Tax Cuts and Jobs Act of 2017, which eliminated personal exemptions, doubled the CTC for children under 17 from \$1,000 per child to \$2,000 per child, effective in 2018. The refundable portion of the credit was limited to \$1,400 per child. Therefore, when families on earnings of over \$3,000 filed their taxes they could receive a refund equal to 15% of their earnings, capped at \$1,400 per child. Dependents who did not qualify for the \$2,000 credit could instead qualify for a nonrefundable credit worth up to \$500. In 2018, the CTC was much more progressive than when it was created in 1997 (Center on Budget and Policy Priorities 2022b; Tax Policy Center 2021).

The CTC's lower refundable portion results in a smaller additional income source for low-income households than the EITC. As a means-tested transfer program it is therefore less

significant than the EITC. Nonetheless, the CTC lifted 4.3 million people above the poverty line in 2018 and is an effective tool for reducing poverty (Center on Budget and Policy Priorities 2022b).

The EITC and the CTC are designed to provide financial assistance to low- to moderate-income households. They are likely to be of benefit to households in which income from minimum wages play a meaningful role in their total income. In combination, this can influence the distribution of household incomes via two main channels. The tax credits set strong work incentives and might therefore increase labor supply, even in low-paid jobs, which can raise the labor income of households with at least one member in minimum wage work. In addition, the credits function like a cash benefit for households by boosting their disposable income via reduced income tax liabilities or tax refunds that they receive after the end of the year.

The impact as a form of a cash benefit on households' total income, conditional on their labor supply, is straightforward: The benefits that flow to households in the form of the tax refund directly raise their income. The size of this income support depends mainly on the amount of earned incomes and the number of children in the tax unit, as well as the presence of a spouse (Meyer 2010; Scott and Crandall-Hollick 2014). The impact that refundable tax credits such as the EITC or the CTC have on income inequality through increased labor supply is more complex. In cases where they lead to higher labor supply, it will result in higher labor income at the household level (Kenworthy 2011). The magnitude of this increase depends on the extent to which household members increase their labor supply, either by taking up work, or by raising their working hours. These decisions depend, among others, on the total amount of earnings in the household, which determine whether their tax credits increase, remain unchanged, or decrease with additional dollars of earned income. When families' labor incomes are in the phase-out range of tax credits, the addition of earned income results in an increase in marginal tax rates and a reduction in potential income rises. However, low-income families in employment who qualify for the EITC or the CTC are more likely to be in the phase-in range of tax credits, meaning that their (refundable) credit increases with labor income. It is possible that overall, some families face incentives to work more, while many families face incentives to work less, for example to meet eligibility criteria for the maximum credit amount (Nichols and Rothstein 2016). The strongest effects can be expected for unmarried persons with children with moderate annual earnings, while secondary earners within households may face work disincentives as they are more likely to be located in its phase-out range. Additionally, households without children can benefit only from low tax credits, which are unlikely to strongly increase their total income or encourage employment. In theory, the clearest incentive to work applies to single parents, who are encouraged to work at least a little each year instead of being inactive. This was indeed the desired effect and motivated the EITC's design (Nichols and Rothstein 2016).

Furthermore, as the EITC and, to a lesser extent, the CTC subsidize low earned income, an unintended effect may be that some of the positive effect of the tax credits goes to employers rather than to employees in form of lower wages (Rothstein 2010; Neumark and Wascher 2001; Hurst et al. 2022).

The increases in the EITC over time explicitly pursued a make-work-pay strategy in combination with a (sufficiently) strong minimum wage policy (Nichols and Rothstein 2016).

The minimum wage and refundable tax credits can be viewed as complementary policies, and their combination can have multiple advantages. A legislated wage floor can prevent earnings subsidies like the EITC or the CTC from driving down wages at the low end (Kenworthy 2015; Nichols and Rothstein 2016; Rothstein and Zipperer 2020). Furthermore, the work incentives provided by tax credits can be even higher when combined with a sufficiently high minimum wage floor. This may lead to a higher labor supply than without a minimum wage floor, as household preferences may shift more towards a substitution effect, where work is associated with higher benefits, making leisure more costly; alternatively, they tend towards the income effect, where the individual or household chooses more leisure due to increased disposable income from the tax credits. In addition, households for whom minimum income plays an important role in their total income are likely to be in the phase-in range of the tax credits. This means that their (refundable) credit increases as their earned income goes up. Raising the minimum wage floor would therefore not only increase income, but also the amounts from refundable tax credits. For families with children, for whom the minimum wage alone is unlikely to be sufficient to lift them above the poverty line, high tax credits and refunds can also be a key measure to prevent poverty (Belman and Wolfson 2014:323; Romich and Hill 2018; Williams, Waxman, and Legendre 2020). The benefits of the combination of higher minimum wages and refundable tax credits vary widely across family types, depending particularly on the number of children. This means that the interaction of minimum wages and refundable tax credits depends on the family structure of minimum wage households (Horrigan and Mincy 1993). In general, the overlap between the minimum wage and the EITC has increased over time because EITC workers are more likely to work for the minimum wage than in the early 1990s. The higher the portion of workers who receive both the EITC and the minimum wage, the more the minimum wage acts to prevent wage declines that might derive from the increases in labor supply through the EITC (Rothstein and Zipperer 2020).

Research shows that the EITC increased labor market participation especially among single mothers with low levels of education, while effects on working hours or effects for men have not been found (Nichols and Rothstein 2016; Schanzenbach and Strain 2021; Meyer 2002). Overall, the research landscape suggests that the various effects of the EITC differ considerably according to target group. The largest positive effects of the EITC are found for lower-educated unmarried women with children. The impact on employment, but also worked weeks and hours, are large and positive. The impact on earnings is also largest for this subgroup (Bastian and Micheltmore 2018; Eissa and Hoynes 2004; Meyer and Rosenbaum 2001; Yang 2018).

The evidence on increases in *total* employment following increases in the EITC is mixed. Some studies suggest that only the EITC expansions enacted in 1993 were associated with clear employment gains, and limited knowledge of or information about the EITC have been identified as one of the key aspects of low responses in the extensive margin (Chetty, Friedman, and Saez 2013; Kleven 2020). In a study that examines the longer-term effects of the EITC, Neumark and colleagues find that there is a positive longer-term relationship between the EITC and employment, using a 10-year period in their analyses. The authors examine and compare the impact of the EITC on employment rates, poverty rates and the proportion of the population receiving public transfers by comparing severely disadvantaged small-scale regions with other regions. They assume that policies that promote increased work lead to more human capital being accumulated in the long term, resulting in higher incomes through work. They find no

evidence of a contemporaneous relationship between the EITC and employment, which differs from the EITC literature that focuses on low-skilled, often single mothers. This may be due to the analyses focusing on disadvantaged places rather than on the individual- or household-level data on the most affected groups.

There is less evidence on the intensive margin of labor supply, but studies point to strategies by workers to maximize the credit along the phase-in region (Chetty, Friedman, and Saez 2013). On average however, the EITC increased the earnings of households (Neumark 2016; Neumark, Asquith, and Bass 2020) and therefore reduced the number of people below the official poverty threshold (Bollinger, Gonzalez, and Ziliak 2009; Grogger 2003; Meyer 2010; Neumark, Asquith, and Bass 2020). It also functioned as a nonstigmatizing source of income for low-income families, underlining the EITC' impact on economic self-sufficiency (Shaefer et al. 2019; Tach and Edin 2017; Sykes et al. 2015; Neumark, Asquith, and Bass 2020). Studies that use broader income definitions have also found positive effects on the post-tax, post-transfer incomes of households (Nichols and Rothstein 2016), particularly for households with children, households in the lower third of the income distribution and for households with children, but less so for the poorest (Hoynes and Patel 2018; Wimer et al. 2020).

The combined effect of the minimum wage and the EITC is frequently only discussed in theoretical terms, based on descriptive analyses of the incidence of EITC eligibility among minimum wage workers. This is done with the objective of deriving policy implications (Rothstein and Zipperer 2020; Williams, Waxman, and Legendre 2020; Romich and Hill 2018). Very few studies examine the combined effect in multivariate analyses. Hurst and colleagues (2022) confirm the intuition that a modest minimum wage is helpful in preventing firms from lowering pre-transfer wages based on simulation studies that assume increases in the federal minimum wage between its current level and a \$15 minimum wage. Most importantly, the estimations show that the minimum wage has the additional local benefit of forcing firms to pay workers more than the monopsony wage, thus stimulating employment. The researchers posit that a higher federal minimum wage would significantly enhance the impact of the EITC relative to the scenario without the minimum wage, provided that the latter is not set excessively high. Therefore, a modest minimum wage would be an effective complement to the EITC policy, raising the welfare of the lowest-income workers to a greater extent than either a minimum wage policy or an EITC policy in isolation. Another simulation that contrasts a progressive tax system (exemplified by the Danish income tax system) with a less progressive system (the U.S. case) confirms that a modest minimum wage is a valuable tool that enhances the efficacy of many progressive tax and transfer policies (Hurst et al. 2022).

The literature points towards positive interaction effects between the EITC and the minimum wage. For the main target group of single mothers with low levels of education, the generosity of the state EITC positively correlates with the level of the minimum wage. For childless men and women with low levels of education however, the two show a small negative correlation (Neumark and Wascher 2011). These patterns are consistent with the empirical evidence on the EITC's effects on the labor market regarding labor supply increases and largely unaffected wages. There positive effects on employment and earnings of single mothers of the minimum wage in combination with the EITC ultimately lead to lower poverty in this group (Neumark and Wascher 2011).

The second significant type of tax impacting households in the lower half of the income distribution is the federal payroll tax. The federal government levies payroll taxes on wages and self-employment income and uses the revenue to fund Social Security, Medicare, unemployment insurance, and other social insurance programs. The two main federal payroll taxes levied on wages are known as Federal Insurance Contributions Act (FICA) taxes. The self-employed pay a self-employment tax, known as the Self Employment Contributions Act (SECA) tax, which are equivalent to FICA taxes. The two FICA taxes are the Social Security tax, also known as the Old-Age, Survivors, and Disability Insurance (OASDI) tax, and the Medicare tax, also known as the Medicare Hospital Insurance (HI) tax. The OASDI tax is levied at a rate of 12.4% (split evenly between employees and employers; self-employed persons pay the total 12.4%) up to a maximum amount of an employee's wages, often referred to as the wage cap. The revenues go toward funding Social Security, which pays benefits to retirees, persons with disabilities, and survivors of deceased workers. The Medicare tax is levied at a rate of 2.9% of wages (split evenly between employees and employers, self-employed persons pay the total 2.9%), and there is no wage cap. Unemployment insurance (UI) is a federal-state program jointly financed through federal and state employer payroll taxes. There is no corresponding payroll tax for employees, which means that households do not bear a direct payroll tax burden for UI (although most economists agree that employers adjust wages downward accordingly, as in case of the employer share of FICA and HI) (Center on Budget and Policy Priorities 2022a).

The system of social security taxes has remained largely untouched during the past 30 years. The OASDI tax rate increased from 12.12% in 1989 to 12.4% in 1990 and has remained constant since then, except for the years 2011 and 2012. For 2011 and 2012, the OASDI tax rate on wages for employees and self-employed individuals was reduced to 4.2%, whereas the employers' rate remained at 6.2%. The Medicare rate was constant throughout the whole period at 2.9%. The maximum of taxable earnings increased over time, from \$97,203 in 1989 (in 2018 dollars) to \$128,400 in 2018 (Tax Policy Center 2024).

Most low-income households do not pay federal income tax, but do typically pay some payroll tax. The average payroll tax rate for households in the lowest income quintile is 6.9%, which is the same percent average as for all households. In terms of what households pay, the payroll tax is by far the most significant federal tax for low-income households (Tax Policy Center 2020a). Overall, payroll taxes are regressive.³⁴ Taxpayers with low and moderate incomes pay on average a higher share of their incomes in payroll taxes than taxpayers with high incomes. The bottom fifth of taxpayers paid an average of 6.1% of their incomes in payroll tax in 2021, while the top fifth paid 5.7% and the top 1% of taxpayers paid just 2.1 percent.

With the shift from a welfare to workfare system, traditional forms of public transfers were cut back. This made low-income households more reliant on earnings. In general, the way in which certain sources of income and certain types of taxes matter, differs between different income strata. Due to the greater relevance of employment in providing welfare for households, tax policy and the way in which it interferes with minimum wage receipt should have a growing

³⁴ This refers to how payroll taxes are levied. The overall programs of Social Security and Medicare, including the benefits they provide, is progressive, because the benefits people receive represent a higher proportion of a worker's previous earnings for workers with lower earnings levels and all Medicare beneficiaries are eligible for the same health care services even if high-income beneficiaries pay more in Medicare taxes.

impact on income inequality. The tax systems, including tax policies such as tax credits and tax breaks determine the net gains from (increased) earned income. I expect that they have a growing impact on the income situation of low-income households in employment and of individuals entering the labor market, which underlines the relevance of the interplay between minimum wage policy and tax policy. All of these measures are embedded in the overall system and are interrelated. In order to investigate whether minimum wages themselves can have a positive impact, their effect must nevertheless be considered in isolation from these other measures. If it turns out that the minimum wage has a positive effect on its own, but that this does not come to fruition in combination with transfer and tax measures, this may be a reason for reconsidering the functioning of these other measures and, if necessary, for coordinating them better with the minimum wage.

While the payroll tax system has remained largely unchanged, the income tax system has changed over time. Standard deductions have been increased substantially to make the income tax system more progressive. Refundable tax credits have been expanded strongly to support low-income households in employment, and the EITC is perceived as the largest means-tested income support program today. In contrast to other welfare benefits, tax credits initially increase with growing labor income and may imply a better fit between growing labor incomes after minimum wage hikes and the “hidden” welfare through the tax system. In contrast, reductions in traditional forms of welfare and increased dependence on employment should also have led to a better match between income support and (low-wage) employment. This should have reduced the potential unfavorable interaction between increasing earnings and rising marginal tax rates, either through losses in income support or through increasing tax burdens. I expect that the better match between income from minimum wage work and other income sources has contributed to an inequality-decreasing impact of the minimum wage.

3.3. Minimum wages in the context of demographic change and changes in household constellations

Changes in the social structure, which are partly due to demographic change and partly due to changes in the composition of households, play an important role in the relevance of the minimum wage. They influence the descriptive picture of how many households are affected by the minimum wage and in how many households income from minimum wage work makes up a large proportion of total income.

A central concern of stratification research is to understand how individuals obtain their resources, be it through their own employment, their partner's employment or other support mechanisms, such as government transfers. Since single persons can share resources within families and households, their individual income situation does not fully determine their position in the stratification system (Goldthorpe 1983, Erikson 1984). Household income is therefore an important dimension of the stratification system. Being a low wage earner does not exclude individual workers from the upper regions of the household income distribution. At the other end of the spectrum, low wage earners who do not have a high earning partner may receive important income support from the state. When measuring inequality at the household level, researchers take into account the fact that the same amount of money has different effects on living conditions depending on the size of the household. An income of \$20,000 dollars means

different living conditions for a single person setting up their own household than for a family of four. However, a family of four does not need four times the income of a single person to achieve the same standard of living. These *economies of scale in consumption* arise when people live together in households. This implies that when two individuals form a household together, the advantages of economies of scale in consumption enable them to maintain a comparable standard of living with less income. Consequently, they are better off with a lower per capita expenditure. Conversely, two people who initially lived together would need higher incomes to maintain their standard of living if they separated and each formed a single-person household. Household constellations and their changes therefore determine whether households tend to need more or less per capita income in order to maintain a certain standard of living or remain above the poverty line.³⁵ In addition to the differences in income requirements resulting from the size of households, their socio-demographic composition is also strongly correlated with income levels. Changing demographic composition and changing demographic behavior are seen as important factors for inequality (Förster and Tóth 2015; Salverda and Checchi 2015). Inequality in the incomes of families with children grew twice as fast as the incomes of full-time, year-round workers or the wages of men and women (Western et al. 2008, Daly and Valletta 2006, Martin 2006). This suggests that changes in labor supply and the pooling of incomes in families have a significant impact on inequality in household income.

In the following, I will discuss developments in the social structure that may change the extent to which minimum wage increases can affect income inequality. Section 2.5.1 discussed changes in demographics *within* the minimum wage workforce that affect the direct beneficiaries of minimum wage increases. However, the impact of the minimum wage on income inequality in the *population as a whole* also depends on how the population as a whole is stratified. In a society in which the proportion of older people is rising, for example, it is possible that the lower income brackets will be increasingly dominated by older people rather than by working-age households, who would benefit from a minimum wage policy.

The consideration of family structures is therefore of interest for two main reasons: First, the incidence of the minimum wage and the resulting potential benefits differ systematically between different family types and population groups. Some groups are more likely to be affected by minimum wage increases than others, and some of them may also be affected by low household income. Therefore, changes in social strata may affect the composition of the minimum wage household group. For example, if the proportion of young adults living alone, who typically have low household incomes and are more likely to work for the minimum wage than adults in other age groups, decreases over time, their share of minimum wage households may also decrease. Within the group of minimum wage households, the importance of a target group therefore decreases, which can change the income distribution within the group of minimum wage households and the strength of the correlation between low hourly wages and low household income. This effect must therefore be eliminated when estimating the impact of minimum wage policy over time. Second, given the changes in family structures, overlapping

³⁵ Measurements of income and living standard take economies of scale into account by deriving needs-adjusted income measures. The total income of a household is not simply divided by the number of people living in the household, but by a smaller divisor according to the assumed economies of scale based on so-called equivalence scales. These income measures are referred to as needs-adjusted or equivalized (household) income.

and opposing trends need to be identified and distinguished so that the impact of minimum wages on income inequality can be assessed while controlling for changes in social structures.

I will look at demographic changes, such as the changing age structure, the effects of immigration and changes in the patterns of household constellations, such as the spread of single living, and changes in family formation, such as the timing of marriage, the timing and number of children born or increasing homogamy in couple households in terms of education, labor market activity and income.

The period between 1989 and 2018 saw significant demographic shifts in the United States, which had a considerable impact on the manner in which minimum wage policies affect household incomes and, subsequently, the distribution of household incomes. The number of households in the USA has increased over the years. In 1989, there were around 93 million households. In 2018, there were around 128 million households (U.S. Census Bureau 2023c). Unlike many other industrialized nations, this was primarily due to population growth. The resident population went up from 247.1 million to 326.2 million between 1989 and 2018 (U.S. Census Bureau 1989, 2018b). In addition to rising life expectancy, this is primarily due to immigration. Changing lifestyles, such as the growing number of single-person households due to factors such as the decline in the formation of unions and rising divorce rates, also contributed to the overall growth in the number of households.

There was a general trend towards decreasing household and family sizes as more people opted for smaller families or lived alone. The average number of people per household declined from 2.62 in 1989 to 2.53 in 2018 (U.S. Census Bureau 2023b). Factors such as delayed marriage, the increasing prevalence of single-parent families and a greater number of people choosing not to marry contributed to this decline.

The proportion of one-person households in the total population has risen significantly, from 24% in 1989 to 28% of all households in 2018. In contrast, the proportion of three- and four-person households fell from 17.5% to 15.1% and from 15.7% to 12.8% respectively (U.S. Census Bureau 2023b). Changing social norms, for example with regard to the desire for and recognition of independence, but also with regard to family constellations, were accompanied by an increasing proportion of single-person households, partly due to delayed marriages and higher divorce rates. In addition, the aging of the population has led to more people living alone. In the period from the 1990s onwards, the demographic profile of single-person households appears to have become more diverse, partly due to the greater likelihood of women setting up their own households (Zagel and Breen 2018).

Across cohorts born between the 1970s and 1990s, people delayed marriage to increasingly older ages. This continued earlier trends of delay in older cohorts, but the upward trend in the typical age of marriage accelerated in the younger cohorts. Non-marital cohabitation has not completely replaced marriage at a young age, i.e. the formation of a partnership is being delayed overall (Bloome and Ang 2020). This means that young people tend to live alone for longer or in other constellations, such as with unrelated adults or with their parents.

The extent and speed of cohort change in partnership formation varies between people of different races and socioeconomic backgrounds. There is a significant racial disparity in the likelihood of being married by the age of 40. In the 1970s cohort, around 85% of White women and men are likely to have married by the age of 40, compared with only 57% of Black women

and men. This racial gap is likely to widen across cohorts. However, these racial differences partly reflect economic differences. The delay and decline in marriages are smaller for people from high-income groups, and the decline in the number of people who have ever married by age 40 is much larger for people from low-income groups. However, racial disparities cannot be reduced to differences in economic background - the majority of racial disparities persist even after accounting for racial inequalities in parental income, wealth, educational attainment or occupational prestige (Bloome and Ang 2020). Young adults tend to remain single for longer, with delays in forming partnerships being particularly high among people in their mid-20s. As well as fewer people marrying at all, marriage stability has also declined, especially among economically disadvantaged groups (Bramlett and Mosher 2002; Goldstein and Kenney 2001).

Living alone is economically risky because there is no one to replace lost income or to supplement a low income. A higher proportion of single-person households has reduced the proportion of households in which partners' individual incomes are pooled. The absence of another person with additional income also means that the income from minimum wage work can have a more direct impact on the household's total income, which can strengthen the relationship between minimum wage work and the household's overall income situation. Therefore, minimum wage policies may be more likely to affect the overall income distribution if a higher proportion of households are one-person households.

When young people live in single-person households, the economic risk increases even further. Young adults, who are usually at the beginning of their professional careers, have lower wages and incomes on average than older adults. This makes them a potential target group for minimum wage policy. However, the proportion of young adults in the overall population has declined, which counteracts the potentially significant impact of minimum wages on their income situation. The share of households headed by young adults has fallen from 16.2% to 12.4% over the long term (U.S. Census Bureau 2023a). Cultural changes, educational aspirations and changing societal expectations have impacted the timing of young adults leaving their parents' households. In addition, economic factors such as job opportunities and affordable housing have influenced the decision of young adults to set up their own households. The share of people living in multigenerational households with at least two generations of adults has risen sharply, from about 9% to more than 16% (Pew Research Center 2022c). This pattern has been particularly pronounced since the Great Recession. More young adults are living with their parents than ever before (Pew Research Center 2015c), which has contributed greatly to the decline in the share of households headed by a young adult. This trend has gone hand in hand with declining employment and marriage rates among young adults and rising college enrollment rates. However, these potential drivers do not fully explain the structural change, and even after the labor market recovered by 2015, the share of young adults heading their own household did not return to its previous level (Fry 2015; U.S. Census Bureau 2023a). Another household constellation that has gained in importance, however, is unrelated adults living together (Bianchi and Casper 2000).

Between 1970 and 1990, the increase in single-mother families drove up the poverty rate (Iceland 2003). The increasing prevalence of family types associated with low incomes, such as unmarried individuals with children, was particularly important in the increasing dispersion of family incomes, in contrast to family types associated with higher incomes, such as married and single individuals without children (Daly and Valletta 2006). However, the number of lone

parents increased, particularly before the 1990s, and paralleled the rise in inequality during this period (Western, Bloome, and Percheski 2008). Since the early 1990s, the proportion of single mothers and fathers has declined (Martin 2006; U.S. Census Bureau 2023c). Higher divorce rates and an increasing number of unmarried couples having children contributed to the rise in single-parent households prior to 1990 (Bianchi and Casper 2000; Martin 2006). Single parents, especially mothers who have never been married, have a relatively high risk of earning a low income. Their average income is also significantly lower than that of their divorced or widowed peers (Martin 2006). Single mothers are widely considered to be at high economic risk (Plotnick 2012; Brady, Finnigan, and Hübgen 2017; Western, Bloome, and Percheski 2008). Even though the proportion of single parents decreased between 1989 and 2018, single-parent households are heavily concentrated at the lower end of the income distribution and are therefore a relevant target group for social policy. Labor market integration is lower in single-parent households than in other households, and their income is lower mainly due to lower working hours and wages. However, even if single mothers are in full-time employment, their risk of poverty is relatively high due to the unfavorable constellation of earners and dependents, as there is only one earner in the household to support one or more children in the household. This makes this group a relevant target group for minimum wage policy.

On average, however, work intensity in single-parent households is relatively low, which means that rising minimum wages are not reflected as smoothly in higher net incomes as is the case in other family constellations.

The proportion of older people, usually defined as people aged 65 and over, in the total population increased. The median age rose from 45.1 years to 52.1 years (U.S. Census Bureau 2023a). This demographic shift is primarily due to the ageing of a large generation born in the 1950s to 1960s. However, longer life expectancy due to better public health and advances in healthcare have also contributed to the increase in the elderly population. The proportion of households in which the head of household was 65 or older rose from 21.2% to 25.8 percent. In contrast to other industrialized nations, where low birth rates have been accompanied by a growing proportion of older people, the ageing of the population in the USA has not been associated with a decline in the proportion of the working-age population. This is due to immigration (Kalleberg 2018). As a result of population ageing, a growing proportion of households consist of just one, often low-income, older person living alone (Zagel and Breen 2018). This can exacerbate income inequality. Minimum wage policy is not directly relevant to most older people. Their active life expectancy, i.e. the number of years they are expected to live beyond the age of 65 without disability, has increased (Cherlin 2010), and older people are spending more years in good health due to improvements in healthcare. These factors may contribute to a higher proportion of older workers who may still be affected by minimum wages. In addition, due to increased life expectancy, there are more and more multi-generational families (Seltzer 2019), so that older people may live in households where income from minimum wages plays an important role. However, in most cases, older people set up their own households, are not employed and are often in the lower reaches of the income distribution (Zagel and Breen 2018). Older people are therefore usually not affected by minimum wages, but they are a significant low-income population group that influences the composition of the overall population, even in the lower income range. In estimating the impact of the minimum wage on the unconditional total population, it is also important to consider where uninvolved

third groups are located in the income distribution alongside households with minimum wage earners and households with higher earners. The sphere of reproduction, i.e. the household, is closely linked to the sphere of production, i.e. the employment relationship and working arrangements. Uncertainties and burdens associated with work are transferred to the household and lead to difficulties in connection with social and economic provision in the household. Who is employed and who is not is central to understanding the relationship between labor market institutions and social protection (Kalleberg 2018). Women's wages and labor force participation have risen with a growing proportion of women with more and higher education (Johnson and Mason 2012: 105). As more women enter the labor force, the demand for public social services that allow women to spend time at work, such as childcare, increases. The expansion of such services in turn creates more jobs, particularly for women who are more likely to be employed in such occupations (Kalleberg 2018). However, these patterns were most meaningful in the US before the 1990s. Thereafter, the share of jobs at the lower end of the scale, driven by strong growth in retail and personal services, was no longer accompanied by an increase in the female labor force participation rate. Instead, it stagnated in the 1990s and has actually declined since 2000, likely due to a comparatively smaller expansion of family-friendly policies, such as parental leave and part-time work entitlements (Blau and Kahn 2013; England 2010; Zagel and Breen 2018). Women's higher education and labor market activity has also been associated with an increasing similarity between spouses with higher education and higher income, which has contributed to an increase in income inequality between households (McCall and Percheski 2010). Educational homogamy as such has not increased during this period, but changes can be observed when looking at different levels of education. In particular, the number of couples in which both partners have a high level of education (i.e. a BA degree or higher) has increased sharply (Zagel and Breen 2018).

At the beginning of this section, I highlighted the particularly important role of immigration in the strong population growth in the USA compared to other wealthy nations. However, immigration played a major role not only in the strong growth of the population, but also in its ethnic composition - both nationally and regionally.

The expansion of globalization and the internationalization of production have accelerated labor mobility and cross-border labor flows. An important aspect of international labor mobility is immigration. Immigration is a source of labor supply and creates challenges for social protection and labor market institutions (Kalleberg 2018).

Certain types of immigration can lead to a greater surplus of low-skilled labor and encourage employers to create low-wage jobs. In the United States, the increase in relatively low-skilled immigrants, for example from Mexico, has created a large supply of workers who have comparatively few alternatives in the labor market and are therefore more willing to work for low wages (Kalleberg 2018). They are also less willing to contradict their employers, are more submissive and compliant and are therefore more likely than domestic workers to accept low-wage jobs that offer no benefits and that are more difficult and dangerous (Waldinger and Lichter 2003). As outlined in section 3.1.2.1 the increase in low-skilled immigrants has been accompanied by the growth and persistence of low-skilled, low-paid jobs in sectors such as agriculture, catering, hotels, day-care centers and construction. In contrast to countries where labor market institutions such as unions have been able to maintain higher wage levels at the lower end of the wage distribution, immigrants in the US have much lower wage rates and much

higher employment rates (Kalleberg 2018). On average, immigrants have lower incomes than non-immigrants (Plotnick 2012)

In recent decades, the United States has experienced a significant influx of immigrants. Hispanics, in particular, have made up a sizable portion of the immigrant population. As described in the section on changing labor market structures and the growing low-wage sector, the growing Hispanic population has had far-reaching effects on labor markets.

The ethnic composition of the population in the United States has changed significantly over the past three decades. One of the most notable changes has been the increase in the Hispanic population, one of the fastest growing groups in the United States. According to decennial census data, the Hispanic population grew by a total of 177% between 1990 and 2020. From 1990 to 2000, their share grew by 58%, from 2000 to 2010 by 43% and from 2010 to 2020 by 23 percent. The U.S. Hispanic population became the largest minority group in the country, making up 19% of the total population in 2020 (Pew Research Center 2022a). In 2018, the Hispanic population of the United States totaled 59.9 million, and Hispanics made up 18.3% of the country's total population. The massive increase in the absolute numbers of people of Hispanic origin, with an increase of more than 38 million people, is remarkable and contrasts with small growth in the absolute numbers of the population of people of White non-Hispanic origin. However, since 2000 (when decennial census data became available for a larger number of ethnic groups), the Asian population has been the fastest growing racial or ethnic group in the country. The Asian population increased from 7.3 million in 1990 to 11.9 million in 2000, and then more than doubled to 24 million by 2020. Thus, the Asian population made up about 2.9% of the population in 1990, compared to 7.2% in 2020 (Pew Research Center 2021a, 2021b; U.S. Census Bureau 2002).

The White non-Hispanic population declined by 10 to 15 percentage points in the USA as a whole and in each region. In 2018, their share was lowest in the West region (where absolute numbers also declined), at under 50 percent. The relative share of Blacks of non-Hispanic origin remained relatively stable both for the USA as a whole and in each region. The share of the population of Hispanic origin more than doubled in percentage points in the US as a whole, in every region except the West, where the share was already high in 1990. The shares increased from 19.1% to 30.2% in the West region, from 7.9% to 18.3% in the South region, from 2.9% to 8.1% in the Midwest region, and from 7.4% to 14.0% in the Northeast region (U.S. Census Bureau 2019a, 1992). The share of Asian Americans in the country's total population rose sharply, from 2.9% in 1990 to 7.2% in 2020. In 2019, almost half of all Asian Americans, 45%, lived in the West, 30% in California alone. In 1990, this share was even higher, and Asian Americans were even more likely to live in the West, at 56 percent. In contrast, Asian Americans made up a larger share of the population in the South region in 2019 than in 1990 (24% compared to 15.2% in 1990). In the Midwest, the share of Asian Americans increased slightly from 10.5% to 12%, while in the Northeast it decreased slightly from 18.3% to 19% (Pew Research Center 2021b; U.S. Census Bureau 1992).

Immigration played a very important role in the growth of the Hispanic and Asian populations. Without immigration, the proportion of Asian Americans and the proportion of people of Hispanic origin would be significantly lower. This is true to a lesser extent for the Black population. Immigrants from Mexico alone accounted for 25% of immigrants living in the U.S.

in 2018, making Mexico the top country of origin for U.S. immigrants, while the next countries have shares of 6% or less. Immigrants from Asia together accounted for 27% of all immigrants. Immigrants from the Caribbean, Central America and South America accounted for 10%, 8%, and 7% respectively. Together with Mexico, the Central American region is the most important region of origin with a share of 33 percent. Immigrants from Europe, Canada and the rest of North America accounted for 13%, while immigrants from the Middle East and North Africa and sub-Saharan Africa accounted for 4% and 5%, respectively (Pew Research Center 2015b, 2020). However, a growing share of the Black population in the U.S. is foreign-born, and new immigrants have also made an important contribution to the growth of the Black population. Black immigrants have also contributed significantly to the growth and diversity of the overall Black population in the United States. The number of Black immigrants increased from 1.4 million in 1990 to 4.6 million in 2019 (Pew Research Center 2022b, 2015a, 2024). The Caribbean remains the largest region of origin, but the number of Black immigrants from Africa living in the USA has risen sharply. Between 2000 and 2019, the number of Black African immigrants grew from 600,000 to 2 million, and people of African descent now make up 42% of the country's foreign-born Black population, up from 23% in 2000. However, 46% of the foreign-born Black population was born in the Caribbean.

Labor force participation rates varied somewhat across racial and ethnic groups. It was highest for Native Hawaiians and other Pacific Islanders (68.5 percent), people of two or more races (66.6 percent) and Hispanics (66.3 percent). The labor force participation rate for Asians was 63.5%, 62.8% for whites and 62.3% for blacks. The percentage of employed persons in these groups ranged from 55.6% for American Indians and Alaska Natives to 64.9% for Native Hawaiians and other Pacific Islanders. The employment-to-population ratio was 58.3% for Blacks, 60.7% for Whites, 61.6% for Asians, 62.9% for individuals of Two or More Races, and 63.2% for Hispanics. Looking at the largest ethnic-racial groups, the range of labor force participation rates and employment-to-population ratios was relatively small, ranging from 62.3% to 66.3% and from 58.3% to 63.2%, respectively (U.S. Bureau of Labor Statistics 2019). In 1990, the labor force participation rate for Blacks was 64%, 66.9% for Whites, and 67.4% for Hispanics. The employment-population ratio was 63.7% for Whites, 56.7% for Blacks and 61.9% for Hispanics (U.S. Census Bureau 1999). Overall, then, there was no systematic change in the likelihood of employment between the different ethnic groups, but due to the general change in the ethnic composition of the population, these figures nevertheless have an impact on the number and distribution of working households that can benefit from minimum wage policies.

At the household level, there was a decline in households with a white, non-Hispanic head of household. Their share of all households decreased from 86% in 1989 to 78% in 2018. The share of households with a Black head of household (non-Hispanic) increased slightly from 11.4% in 1989 to 13.3% in 2018. Households with a head of household who identified as Asian increased from 3.5% to 5.3% between 2003 (no data available for earlier years) and 2018. Households with a householder of Hispanic origin increased from 6.3% in 1989 to 13.6% in 2018.

The median household income of the Asian population is higher than that of any other group, including the white population. In 2018, the median household income for households headed by an Asian person was \$87,000, while the median household income for households headed

by a White non-Hispanic person was \$71,000. The median household income for Hispanic-headed households (regardless of race) was \$51,000, while the median household income for Black-headed households was \$41,000. This ranking remained unchanged over the entire period. The lowest poverty rate was 8.1% for non-Hispanic Whites. It was 10.1% for the Asian population, 17.6% for people of Hispanic origin and 20.8% for the Black population (U.S. Census Bureau 2019c).

In 1989, the median household income was highest for Asian or Pacific Islanders at \$36,000, for Whites it was \$30,000, for persons of other race and ethnicity reported as “Other” it was \$31,000, for persons of Hispanic origin it was \$21,000, and for Blacks it was \$18,000. Poverty rates varied more for people of different race and Hispanic origin in 1989 than in 2018, with the poverty rate highest for the Black population (30.7 percent) and the Hispanic population (26.2 percent). It was significantly lower for people of other races (16.4 percent) and Asians or Pacific Islanders (14.1 percent). It was lowest for the White population (10 percent). Poverty rates have thus converged over time and have declined, especially for the Black population and people of Hispanic origin (U.S. Census Bureau 1991).

As described above, the population of the USA has grown considerably in recent decades. However, this has not been a uniform trend in all regions. In rural areas, the population has declined both in absolute numbers and as a percentage. In contrast, the population in urban areas has increased. There was absolute growth in all major census regions, but it was greater in the Southern and Western regions than in the Northeast and Midwest. This led to a change in the percentage distribution of the US population across cohorts. The percentage of the U.S. population living in the Northeast declined from 20% to 17%, and from 24% to 21% in the Midwest. The share of the US population living in the South rose from 34% to 38%, and in the West from 21% to 24% (U.S. Census Bureau 2019a).

Against the background of the regional distribution of higher minimum wages, it can be said that with the influx into the West region over time, an increasing proportion of the population lives in a region where the statutory minimum wage is higher on average. At the same time, however, there has also been an influx into the South region, where statutory minimum wages are sometimes the lowest and some federal states do not even have their own minimum wage laws but are merely guided by the minimum wages set at federal level. However, it is not possible to deduce from this whether the proportion of the population affected by higher minimum wages has remained constant or has changed. Age structure in particular plays a major role here. It could be that there is a trend towards internal migration to the south, especially among older people, i.e. a population group whose prosperity is not directly determined by the wage level. However, it could also be that the proportion of people of working age in the south has increased, for example due to immigration. Above all, however, the size of the low-wage sector in the respective region determines how large the affected workforce is, and the households in which minimum wage earners pool their income determine the extent to which household incomes and their inequality can be influenced.

Furthermore, certain regions and local labor markets have stood out from others in terms of their economic well-being in recent years. In particular, densely populated cities with high proportions of college-educated workers, companies driving technological innovation, and entrepreneurs have experienced tremendous growth in median income levels, while other

regions or local labor markets, which are often less populated, educated, and developed, have not kept pace with this trend.³⁶ This recent development follows a decades-long trend of income convergence between regions and local labor markets (Baumol 1986; Diamond 2016; Ganong and Shoag 2017; Manduca 2019; Lindert and Williamson 2016).

Not only have average income levels or other macro-aggregates that indicate economic prosperity, such as GDP per capita, risen, so have levels of inequality. Between 1990 and 2019, the level of wage inequality between regions in the US diverged. Local wage differentials are greater today than at any time in the last 80 years. This trend followed a convergence between 1950 and 1990 that was largely a regional phenomenon originating in the U.S. South. Low wages became less and less concentrated in this region. Inequality in the US South approached the median level of inequality, and other regions caught up with the high levels of inequality in the US South.

The divergence since 1990 is characterized by separate developments in highly urban areas, where a high degree of inequality is prevalent. Low-wage earners moved into the large urban areas at the same time that long-term resident high-wage earners saw their wage levels rise considerably. This means that urban agglomerations increasingly became places of extreme wage inequality, as the highest wage earners in the country concentrated there alongside growing numbers of the lowest wage earners in the country (VanHeuvelen 2023). This is despite the fact that more and more cities have introduced nationwide minimum wages, which in turn underlines their relevance. Unlike in the pre-1990 convergence period, no particular region stands out in this trend.

The demographic composition and social structure of the USA have changed in recent decades. This is an important factor in explaining the impact of the minimum wage on overall income inequality. Since my goal is to explain the extent to which a policy that affects only a small portion of the total population affects income inequality in the total population, it is essential to understand the composition of that total population.

I have discussed overall population growth, including the role played by immigration, as well as changes in the composition of the population in different household and family constellations. In cross-national comparisons with other rich democracies, poverty in the US is undoubtedly exceptionally high. The relative poverty rate, which is used in most cross-national poverty research and is itself a measure of income inequality, is particularly high among certain population groups (Brady, Finnigan, and Hübgen 2017; Brady 2023) that tend to have lower labor market attachment than others. These are working-age households in which no one is employed, households in which the top earner has a low level of education or is under 25 years old, and households headed by a single mother (Brady 2023; Brady, Finnigan, and Hübgen 2017). If attachment to the labor market is low, these groups are unlikely to be among the main target groups of minimum wage policies that are designed to increase households' disposable income or lift them out of poverty. However, poverty is unexpectedly high even among groups that “play by the rules” (Brady 2023:3). For example, unemployment is associated with the

³⁶ This underscores that for analyses on trends in income inequality on the federal level, controlling for single states (using state fixed effects) is not superior to control variables that capture the region in which households reside, as states themselves are heterogeneous in terms of more or less densely populated areas, local labor markets, etc.

highest risk of poverty in all countries, which is why households in employment tend to have much lower levels of poverty. In the USA, however, working households also face a relatively high risk of poverty. Most Americans, including a significant proportion of the population affected by poverty, are not in these risk groups. Nor is poverty in the U.S. necessarily concentrated in poor inner-city neighborhoods. Overall, poverty is high because it is high in all population groups and in all places (Brady 2023).

Nevertheless, it remains relevant that ethnic minorities, for example, have a lower income, as do people in certain household constellations, e.g., in households where the main earners are single parents, have a low level of education or are young. If the proportion of such groups in the overall population changes, this has a direct impact on income distribution in the overall population and therefore also on the potential of minimum wage policy to influence income inequality. The decisive factor is the extent to which these households also benefit from the minimum wage and where they stand in the income distribution.

My expectation is that the changes in the population as a whole have also strongly influenced the group of people affected by the minimum wage. I assume that the group of minimum wage households has changed in such a way that they are more strongly represented in the lower income groups overall and that household members working for the minimum wage contribute more to the total income of these households than in 1989. Due in particular to the aforementioned change in the ethnic composition of the overall population and the parallel growth of the low-wage sector, I therefore expect the minimum wage to have a greater impact in 2018 on the income situation of the households concerned than was the case in 1989 and thus also on income inequality in the overall population.

4. Minimum wage research and evidence on the impact of minimum wages on income inequality in the U.S.

Most current minimum wage advocates argue for higher floors because of their antipoverty effects. The scholarly evidence, however, presents mixed results on the minimum wage's effect on poverty rates, the in- and outflows of poverty, or the incomes of families or households or their distribution. Overall, the empirical evidence suggests a modest impact of minimum wages on poverty. Opponents admit that potential effects are likely to depend on the policy environment and the distribution of income and wages (Neumark 2016:26)

The literature on inequality has tended to emphasize certain causes of rising inequality over others. The rise of college premia, the impact of skill-biased technological change, globalization, restructuring and deregulation in the labor market, demographic factors and patterns in family formation have been the most prominent causes researched. The role of institutions has received much less attention as a source of changes in the inequality of wages of individuals or incomes of families or households in research on trends in inequality in the USA (Brady, Baker, and Finnigan 2013). The research that has been undertaken on the impact of *institutions* has looked in particular at the decline in unionization. This is especially true in the USA, where the decline in unionization has been particularly pronounced. Even though cross-country literature has documented the important role of labor market institutions for different levels and trajectories of inequality in international comparison, a) little attention has

been paid in U.S. poverty research to institutional arrangements (Brady, Baker, and Finnigan 2013), and b) less attention has been paid to the minimum wage as a central labor market institution as a factor driving cross-country differences in inequality; in some cases, this has been studied in context of union involvement in minimum wage setting (Alper, Huber, and Stephens 2021).

In this chapter, I summarize the evidence on the effects of the minimum wage on income inequality. I will first discuss the difficulties that have shaped research on the effects of the minimum wage on the most studied outcomes, namely its effects on employment, but also on poverty and inequality. I will provide an overview of the research strategies used and then summarize the empirical evidence on the impact of minimum wages on household income inequality. On this basis, I conclude with what is known and what is not known about the effects of the minimum wage on income inequality.

4.1. Minimum wage research: Difficulties, different research strategies, and different results

Most studies that evaluate the effects of minimum wage policies use quasi-experimental research designs to study how specific outcomes evolve following a change in minimum wage laws. In a quasi-experimental setting, a treatment group, which is affected by an intervention – in this case, the minimum wage change – is compared to a control group, which is unaffected by the policy, but which is otherwise similar to the treatment group.

A major problem in research on effects of the minimum wage is that minimum wages affect a relatively small share of the workforce, which makes it more difficult to plausibly gauge the policy impact on aggregate outcomes, such as economy-wide employment or population-wide poverty (Belman and Wolfson 2014; Dube 2019b; Belman, Wolfson, and Nawakitphaitoon 2015). For this reason, scholars focus on narrow subgroups of workers or jobs when estimating the impact of the minimum wage. The most common approach in the literature to date has been to consider demographic groups that are disproportionately likely to earn the minimum wage, such as teenagers and young workers (Neumark and Wascher 1992; Allegretto et al. 2017; Card 1992b).

However, if the effects of the minimum wage are heterogenous across groups, the results from one narrow group cannot be generalized as an overall effect of the policy. As discussed in section 2.5.1, the subgroups used are rarely identified systematically, and the changing composition of the minimum wage workforce over time is neglected. When minimum wages are high, the affected population is more heterogenous. This implies that inferences based on estimates *within subgroups* are even less accurate when minimum wages are already high.

Another strategy focuses on the minimum wage workforce itself (e.g., Clemens and Wither 2019; Currie and Fallick Bruce C. 1993; Stewart 2004). This approach of identifying incumbent workers whose wages are lower than the new minimum wage has the advantage that outcomes in terms of employment trajectories or changes in earnings or poverty can be directly tracked for affected workers. However, this is only the case for incumbent workers, and not for previously unemployed workers or workers with hourly earnings above the new minimum. This

means that again, results cannot be generalized to the overall population, making it impossible to draw conclusions on overall poverty or income inequality in a population.

Another body of the literature considers the policy effects of minimum wages from the perspective of jobs or firms rather than workers. There is a long history of focusing on low-wage firms and industries; in contrast, more recent studies have looked at the number of jobs paying at or slightly above the new minimum wage. (e.g., Cengiz et al. 2017; Card and Krueger 1994; Katz and Krueger 1992; Harasztosi and Lindner 2019). These approaches do not take into account who is affected by minimum wages and are therefore unable to assess the income situation of affected workers and families or to quantify the impact on poverty and income inequality. Altogether, most research designs that use quasi-experimental settings define the treatment group as the population that could *theoretically*, or potentially be affected by a rise in the minimum wage (e.g., the policy intervention). This could be either the population in a given state in which the state minimum wage is raised, a certain industry with a high share of the labor force working for the minimum wage, or a demographic group that is disproportionately often employed in minimum wage jobs and that resides or works in a state with a minimum wage hike. It is less common to find studies that focus on the minimum wage workforce itself or on households with members who are employed in minimum wage jobs. The argument that this better identifies the targeted workers contrasts with the concern that estimating the impact on wages, earnings or income only for those in the labor force may ignore possible selection bias over time, for example, as the least skilled drop out of the labor market and the observation sample (DiNardo, Fortin, and Lemieux 1996).

Another challenge in minimum wage research besides the small group affected is the construction of the “counterfactual” scenario of the quasi-experimental setting to adequately estimate the effect of the policy intervention. The counterfactual scenario would be outcomes with regard to wages, earnings, incomes, or employment in the same (treated) group, but without the intervention. In the absence of this counterfactual, outcomes must be compared to a control group that is unaffected by the policy but otherwise similar to the treatment group.

A large fraction of modern studies uses a difference-in-difference approach to compare the change in an outcome in a treatment group following a minimum wage increase (i.e. the intervention) with the change in outcome in a control group that is unlikely to be affected by the policy. Depending on the quasi-experimental setting, this control group can be either other jurisdictions where minimum wage policy did not change, higher-wage regions or industries where the minimum wage is less binding, or other groups of workers that are affected significantly less. The jurisdictional variation in minimum wage laws across regions as it can be found across states, counties or cities in the USA, or across provinces as in Canada, has led to an exceptionally large number of studies making use of these designs. In other settings without such jurisdictional variation, research designs often compare changes in outcomes of the treatment group to workers in higher-wage regions or demographic groups that are less likely to be working for very low wages.

The key assumption that must hold for the difference-in-difference approach to be unbiased is the assumption of “common” or “parallel” trends. Much of the scholarly disagreement over the credibility of different research designs and model specifications that have led to different results on the impact of minimum wages on poverty can be traced to this underlying assumption

of the most widely used design in the literature. It requires that the trends in the outcome of interest would be the same in both the treatment and the control setting. This common trends assumption can be investigated using data on multiple periods, particularly pre-treatment periods (Angrist and Pischke 2009). Another strategy for assessing the plausibility of the parallel trends assumption is to test changes in outcomes in the treatment group that should not be plausibly affected by the minimum wage increase. The disagreement among scholars about whether the parallel trends assumption holds in different settings leveraged by empirical work has been particularly evident in studies of the minimum wage's effect on employment, but has also been prominently debated in studies assessing the minimum wage's impact on poverty too (Dube 2019b). If the central assumption of parallel trends does not apply in a particular design, researchers have other options. For example, it is possible to adjust for long-term or short-term trend differences within the model specifications, but this has the disadvantage of making strong parametric assumptions. Another possibility would be to find control groups that are more similar from the outset. This has become increasingly common in recent years, with many studies comparing trends in neighboring areas that are similar but that fall under different minimum wage jurisdictions, or using matching methods and synthetic controls (Allegretto et al. 2017; Dube, Lester, and Reich 2010; Neumark, Salas, and Wascher 2014; Dube and Zipperer).

Section 2.2 highlighted the large differences in statutory minimum wages in the USA, which have increased in recent years in particular. This is one reason why a disproportionate number of studies on the effects of the minimum wage focus on the USA. This applies to the entire field of minimum wage research and also to studies on its impact on poverty (Dube 2019b; Belman and Wolfson 2014; Neumark and Wascher 2008; Dube 2019c).

As described above, the problem of the small proportion of the population actually affected by minimum wages is often solved by estimating the impact on poverty in narrow subgroups of workers or jobs. The number of studies estimating the impact of minimum wage policies on the overall population, overall poverty or overall income distribution is quite limited. There are three comprehensive reviews of the literature on the impact of minimum wages on poverty in the context of "new minimum wage research" (two of which are relatively recent), which indicate that the number of such (peer-reviewed) studies is in the low double digits (Dube 2019b; Belman and Wolfson 2014, chapter 7; Neumark and Wascher 2008, chapter 5).

I will summarize the empirical evidence on the impact of the minimum wage on income inequality. The most commonly estimated outcome related to income inequality is the elasticity of the poverty rate, which indicates the extent to which the share of the population with a monetary income (before taxes) below the applicable poverty threshold changes. In addition to this single measure, studies often provide additional measures in the form of multiples of this poverty threshold to show the impact of the minimum wage on population groups with incomes below or above the official poverty threshold, e.g., families with incomes less than twice the poverty threshold. There are fewer studies on the effects of minimum wage increases on poverty rates or income inequality than on the employment effects of minimum wages, but their number has increased in recent years.

4.2. Evidence on effects of the minimum wage on the inequality of incomes

In industrialized countries, a significant portion of family or household income is derived from employment, as opposed to self-employment. For this reason, the impact of the minimum wage on wage and labor income inequality has been a central focus of research on the role of the minimum wage in income inequality trends. If minimum wages had no effect on wage inequality, it would be reasonable to conclude that minimum wages have no effect on family income at all.

Much of the earlier “new minimum wage research” of the 1990s on the relationship between the minimum wage and income inequality examined whether and to what extent the decline in the real value of the minimum wage contributed to the increase in wage inequality in the 1980s (Fortin and Lemieux 1997; DiNardo, Fortin, and Lemieux 1996; Card and Krueger 1995a; Mishel, Bernstein, and Schmitt 1996). This strand of research suggests that the declining real value of the minimum wage has been responsible for a substantial part of the overall increase in wage inequality. Estimates are somewhat larger for the female wage distribution than for the male wage distribution, and the estimates vary depending on the methodological approach used by the authors. Nevertheless, the overall picture suggests that between 20 and 40% of the increase in wage inequality can be attributed to the decline in the real value of the minimum wage.

The impact of minimum wage policy on the inequality of household incomes can be measured using various outcome variables. The distribution of total post-tax and post-transfer household incomes provides the closest link to the theoretical concept of inequality of (disposable) household income. However, due to limited data availability, especially on household tax liability, this is not the outcome variable that has been regularly used in the literature. Other outcome variables would include the distribution of other income concepts, such as household labor, market, or gross income (with or without cash and non-cash transfer income). An alternative to such distributional income measures are aggregate measures such as the poverty rate. This could be the poverty rate based on the official poverty measure (OPM) and multiples of it, which reflect so-called income-to-poverty ratios. These provide a measure of household income relative to the poverty threshold based on the OPM, which quantifies the impact of the minimum wage on population groups in specific income brackets, such as families in deep poverty with pre-tax cash income below half of the poverty threshold, or families with income above the poverty threshold but less than twice the poverty threshold.

As an alternative to the OPM, one could use the poverty rate based on the supplemental poverty measure (SPM)³⁷, or poverty based on a relative poverty threshold that is often set at 50% of the population’s median household income. Alternative outcome variables would be other proxies for the income situation of households, such as their use of welfare, or aggregate measures such as welfare caseloads, or consumption.

Most research on the impact of minimum wage increases on family and household income has examined the relationship between the minimum wage and poverty (Dube 2019b; Belman and Wolfson 2014). Most studies estimate the impact of minimum wage increases on poverty rates

³⁷ The SPM accounts for taxes paid by families, deducting them from total income and comparing total income to the poverty line, which reflects the minimum level of resources that are adequate to meet basic needs. In contrast to the poverty threshold as defined in the official poverty measure, the poverty threshold of the supplemental poverty measure varies by place of residence and includes information on spending for clothing, shelter, utilities, and telecommunications, in addition to spending on food.

at the aggregate level. Other studies estimate the likelihood of families falling below the poverty line (usually the poverty line of the official poverty measure, OPM) and on transition rates of families in and out of poverty (Belman and Wolfson 2014:309)³⁸. Many of the studies take advantage of the variation in state minimum wages across the USA and estimate changes in the aggregate poverty rate at the state level as a function of the state-level minimum wage. This implies that potential omitted variable bias arises from unobserved variables at the state and year level. As summarized above, the literature has taken several approaches to account for possible bias (Belman and Wolfson 2014; Wolfson and Belman 2019; Dube 2019b; Neumark and Wascher 2002, 2008; Sabia and Burkhauser 2010; Sabia 2008; Neumark and Wascher 2011; Neumark, Schweitzer, and Wascher 2005; Sabia and Nielsen 2015b; Burkhauser and Sabia 2007). The multitude of methods and model specifications is part of the reason why results on effects are inconclusive.

Past and recent work on the impact of minimum wage policy on poverty has yielded inconclusive results. Over time, the official poverty line and outcome measures based on it, such as the poverty rate or transitions in and out of poverty, have been increasingly perceived as inadequate for drawing conclusions about the impact of minimum wage policies on the economic well-being of families. Consequently, research has broadened its scope and expanded its analyses to encompass the low-income population in general. For example, the near-poor, i.e. families with incomes between 100 to 150 percent of the official poverty line, compose one-sixth of the whole U.S. population. This makes it essential to establish whether the minimum wage aids low-income workers more generally rather than just the officially poor (Belman and Wolfson 2014; Neumark and Wascher 2008:139). Moreover, using more refined methods that allow for detailed analyses of the impact of minimum wages across the income distribution enables conclusions to be drawn about which families or households benefit most from minimum wage policy, or which households confront the strongest offsets of these benefits as a result of cuts in transfers. This more expansive perspective on groups that are (deliberately or unintentionally) targeted could also mitigate the challenge posed by the substantial proportion of the officially poor who are not affected by minimum wage policy at all due to their, on average, lower labor force attachment (Belman and Wolfson 2014:312).

The most pertinent study for this thesis is that of Dube (2019b), which employs individual-level data spanning the years 1984 to 2013 from the Current Population Survey. It provides a thorough assessment of how minimum wage policies in the USA have affected the distribution of family incomes. In a manner consistent with other studies, Dube estimates the impact of changes in the minimum wage on the poverty rate. However, this study differs from the majority of existing research in that it also calculates the effect of minimum wage policies on each income percentile, adjusting for family size. Furthermore, Dube uses a broader income measure that includes the amount of tax credits families are eligible for and the value of non-cash transfers. This enables him to quantify the offset effect of higher wages on the use of transfer programs and the actual gains through the minimum wage net of these offsets by income percentiles. This approach facilitates an understanding of the types of families that benefit from

³⁸ Another strand is in how far the minimum wage interacts with other antipoverty policies Belman and Wolfson (2014:309).

the minimum wage and provides a more comprehensive understanding of the impact of minimum wages on income distribution.

Dube finds robust evidence that higher minimum wages lead to income increases for low-income families. Based on a rigorous analysis of the change in proportions below various thresholds along the distribution of families' gross incomes, the study provides estimates of policy effects on the poverty rate (including on the rates of multiples of the poverty threshold) and on the distribution of family incomes. I will first discuss the findings on poverty impacts, as these are the impacts the literature mostly concentrates on. I will then discuss the results on the effects of the minimum wage on income inequality, which are even more closely related to my research question.

Regarding the federal poverty threshold, the overall finding is that a 10% increase in the minimum wage leads to a 5% reduction in the nonelderly poverty rate using the distribution of gross family income. When accounting for tax credits such as the EITC and for the value of non-cash transfers such as the SNAP, the positive impact diminishes, and the income increases are about 70% as large as the increase in the standard pretax income measure that does not account for tax refunds and non-cash transfers. The results vary between 2.1% and 5.3% across the different specifications that are used to measure the long-run effect of minimum wage changes (three or more years after the policy change). Based on the specification with the richest set of controls, including state trends, division-period fixed effects, and state-recession fixed effects, Dube calculates the declines in the shares of the nonelderly population below various multiples of the poverty threshold, which provides a distributional lens on the policy's impact. For example, a 10 percent increase in the minimum wage reduces the share of the population below 75 percent, 100 percent, and 125 percent of the poverty line by 5.6 percent, 5.3 percent, and 3.4 percent, respectively. Even the share of the nonelderly population in deep poverty (below 50% of the poverty threshold) declines by 4.6 percent. Further up the distribution, the effects become smaller: the share with an income below 150 percent of the poverty threshold declines by only 1.6% for a 10% increase in the minimum wage.

This study subsumes most of the approaches used in the (economic) literature on the impact of minimum wages by providing results based on a large set of specifications with alternative controls for state-level differences. As described in section 4.1, a major difficulty in minimum wage research is that minimum wage policies are not randomly assigned across states, and there is strong disagreement about the best way to account for this bias that may result from differences between states that raise the minimum wage and states that do not. Based on a "classic" model that assumes that all states are on parallel trends regarding the evolution of the family income distribution (two-way fixed effects), Dube progressively adds regional controls (division-period effects), state-specific linear trends, and state-specific business cycle effects. As a result, trends in the distribution of family income (both the gross measure and the broader measure that includes tax refunds and non-cash transfers) can differ across states in many ways. A preferred specification is chosen based on falsification tests that ensure that the model does not spuriously suggest I) an effect much earlier than the policy change took effect, or II) an effect much higher up in the income distribution.

The results based on this range of specifications reveal two strengths of this study: a) the poverty rate declines due to increases in the minimum wage in all different specifications, b) the

specification that performs the best across several falsification tests shows sizeable poverty effects.

The paper further reports effect sizes of minimum wage policies across the distribution of (gross) family incomes based on the shift of its cumulative distribution. In general, the study shows that the largest increases in percentile values, i.e. in incomes, occur between the 10th and 15th percentiles. In that income range, a 10% increase in the minimum wage raises pretax cash incomes (the gross family income measure without adjusting for tax refunds and non-cash transfers) between 1.5% and 4.9%, depending on the model specification. Similar to the results for the changing shares below the federal poverty threshold, part of this increase is offset by reduced tax credits and non-cash transfers. Again, the increase in family incomes, including tax refunds and non-cash transfers, is only about 70% as large as the gains in pretax cash income. This is true for the whole bottom quartile, but the offsets are particularly large between the 13th and 17th percentiles of the income distribution. This means that the difference in the effect sizes when comparing the pretax cash income and the broader gross income measure is largest in that area. This is consistent with the income range in which families lose eligibility for SNAP, for example. The largest gains in pretax cash income can be expected around the 15th percentile, whereas the benefits are largest at the 12th percentile for the broader gross measure including tax credits and non-cash transfers.

These effect sizes translate into sizeable impacts for the poverty rate and family incomes. With regard to the 13.5% poverty rate in 2016, Dube shows that his estimates suggest a 2.45 percentage point reduction in the poverty rate if the federal minimum wage is raised to \$12 (from the effective \$7.25). This would translate into 6.6 million fewer (nonelderly) individuals living in poverty. The 10th percentile value of the distribution of family incomes would increase by 14.5%, which means that for an “average” family at the 10th percentile, annual gross incomes would increase by more than \$2,500, or by more than \$2,100 when accounting for offsets due to reduced tax credits and noncash transfers. For the same year, estimates for the poverty reducing effect of other policies suggest that the EITC reduces the nonelderly poverty rate by 1.7 percentage points, cash transfers by around 3.8 percentage points, and noncash transfers by around 0.9 percentage points.³⁹

To sum up, Dube’s study presents robust evidence that the minimum wage raises the incomes of low-income households and reduces poverty, including child poverty (Dube 2019b).

The findings described by Dube (Dube 2019b) are based on data over a long period of almost 30 years. They can therefore be considered preferable to many other studies based on shorter timeframes or studies that do not include data from the years after the last federal minimum wage increase in 2010, when variation in minimum wages increased substantially. In addition, the main results are based on specifications that control for time-varying state-level heterogeneity, which addresses limitations in the existing literature on minimum wage effects on poverty. However, Dube has also shown that his findings are robust for a wide range of specifications with alternative sets of controls for time-varying heterogeneity, including specifications that have been used in the previous literature as well. He also provides estimates for leads and up to three years of lags in the minimum wage, which allows for a delayed impact

³⁹ Robustness checks based on an analysis sample including the elderly population yield similar estimates overall.

of the policy. Furthermore, Dube includes individual controls such as age, gender, race and ethnicity, marital status, family size, number of children, and education level.⁴⁰

He also places his results in the context of estimators from other studies, which he systematically summarizes to give average values of effect sizes. Dube argues that most estimators in these studies show a negative effect on the poverty rate, i.e. they argue for a decline in the poverty rate as a result of increases in the minimum wage. Nonetheless, there is much debate in the literature about whether there is any relationship at all between minimum wages and poverty rates and whether there may not also be an increase in poverty rates. The findings in the literature are definitely mixed, but Dube refers to them as "clouded by serious shortcomings" (Dube 2019b:270).

As noted above, the number of studies that estimate the impact of minimum wage policies on the overall population, overall poverty, or the overall income distribution, is quite limited. There are three comprehensive reviews of the "new minimum wage research" literature on the effects of the minimum wage on poverty (two of which are relatively recent), which show that the number of such (peer-reviewed) studies is in the very low double digits, but provide a broader overview including work less relevant to this thesis (Dube 2019b; Belman and Wolfson 2014, chapter 7; Neumark and Wascher 2008, chapter 5).

In what follows, I will highlight the results of the key papers on the impact of minimum wages on family incomes using U.S. data that are the most relevant to this thesis and that have had a lasting impact on the debate about the effects of minimum wages on poverty and income inequality in the U.S. context. There is also literature based on data from other (high-income) countries.⁴¹ However, the conclusions that can be drawn about the impact of minimum wage policies on income distribution in a given country depend to a large extent on the labor market, the state of the economy, policies and other measures, and the demographic and social structure of that country. Furthermore, the U.S. literature makes use of state-level variations in minimum wages in the US, whereas in most countries there is a single minimum wage that applies across all geographic areas.⁴² For these reasons, I will refer to studies based on U.S. data here. I will partly proceed chronologically, to reflect the development of the scientific discourse over time, and partly by looking at group studies by certain authors together, as they often follow similar approaches in terms of methodology or model specifications, which has an impact on the reported estimates and the conclusions that can be drawn from them.

David Neumark has (co-)authored four papers of particular importance, and his work has strongly shaped the discussion of the effects of minimum wage policy.

Neumark and Wascher (2002) studied movements in and out of poverty based on two-year panels of families with matched March CPS data between 1986 and 1995. They compare rates

⁴⁰ Dube uses individual controls, but his model specification assumes a constant "average" family over the whole time period. I claim that this is empirically not the case, and that the "face" of a typical family has changed over three decades.

⁴¹ Of particular note is research on the impact of the national minimum wage on poverty in the United Kingdom, where the research landscape has been heavily shaped and driven by the Low Pay Commission, an independent body that advises the government on the National Living Wage and the National Minimum Wage. The review by Belman and Wolfson (2014) includes a small number of studies from other countries as well.

⁴² An exception is Canada, where the provinces may differ in the level of minimum wages, similar to state-level variation in the USA. Examples of empirical studies for the Canadian case are Sen, Rybczynski, and van de Waal (2011), and Campolieti, Gunderson, and Lee (2012).

of transitions through groupings of families' income-to-needs ratio, i.e. groups of families formed on the basis of their family income in proportion to the poverty threshold, in states in which the minimum wage has increased in the studied time frame and states in which the minimum wage has not increased. This allows them to report transition rates in and out of poverty across the distribution of family incomes. They include a rich set of control variables, including changes in the wage distribution, changes in welfare programs and state fixed effects. They retrieve data on amount and composition of family income, family size, and the labor market status of family members. They find that increases in the minimum wage boost family's incomes below the poverty line, which reduces the probability of them remaining in poverty and instead increases the probability of them moving into the 1 to 1.5 or even >2 category of income-to-needs ratios. This means that they appear to experience an increase in income from below the poverty line to at least 150 percent of the poverty line. However, their results suggest that families who were initially in the 1.5 to 2 or >2 category are more likely to fall into poverty. They conclude that minimum wage hikes result in a redistribution among low-income households that creates "winners and losers". However, the estimated decline in income-to-needs for families falling into poverty is smaller than the estimated increase in income-to-needs for families moving out of poverty. Furthermore, even for families not above the poverty threshold, the minimum wage significantly increases their income-to-needs ratio by 0.72, which is a substantial amount (given a maximum of 1). Aside from the unclear welfare implications of these findings, since fewer spells of poverty may be a positive outcome overall, the positive impact on the poor appears to outweigh the higher transition probabilities of higher-income families into poverty.

A paper that Neumark co-authored with Schweitzer and Wascher (2005) offers an analysis of the minimum wage across the distribution of family incomes, as the authors conduct a nonparametric analysis to assess the effect of the minimum wage on the family income-to-needs distribution. The findings suggest that increases in the minimum wage result in a higher share of families in poverty and a smaller share of families with incomes between 1.5 and 3 times the poverty line. However, much of the variation in the sample arises from increases in the federal minimum wage in 1991 and 1992, a period of rapidly rising unemployment. The assumptions about changes in the family income distribution are partly restrictive and unrealistic (Dube 2018:58) and the results are also inconsistent with almost all other literature (including the authors' own work).

In a following study, Neumark (2016) studies the effect of minimum wages over the 1997-2006 period, building on an earlier paper by Neumark and Wascher (2011) in which the authors study the joint effect of minimum wages and the Earned Income Tax Credit for the period of 1997 to 2006 and report minimum wage effects on the share of 21 to 44 year olds with incomes below 100% and 50% of the poverty line. The results of the 2016 paper confirm the earlier findings, indicating a moderate impact of the minimum wage in reducing poverty and extreme poverty. Concerning subgroups, the studies provide evidence of a reduction in extreme poverty for single females and single mothers, including those who are Black or Hispanic or without college education. The more recent study includes state and year fixed effects, demographic and state-level controls similar to the Dube (2019b) paper, and reports estimates with and without state-specific trends. Most of the estimates are not significant, which may be partly due to the shorter time period compared to the Dube study.

In a more recent study, Neumark, Asquith and Bass (2020) examine and compare the impact of the EITC on employment rates, poverty rates and the proportion of the population receiving public transfers with those of other welfare programs and the minimum wage by comparing severely disadvantaged small-scale regions with other regions. In contrast to other studies, the authors use a period of 10 years to examine the longer-term effects of the changes in the various policies. The assumed mechanism is that policies that promote increased work lead to more human capital being accumulated in the long term, which results in higher incomes through work. The results for the long-term effects of the minimum wage on poverty are not robust but tend to indicate that higher minimum wages lead to falling poverty rates. There is evidence of a longer-run reduction in the share of households on public assistance, coupled with a contemporaneous negative relationship.

Other significant articles on the impact of minimum wages on poverty have been written by Joseph Sabia, sometimes with co-authors, and have significantly influenced the discourse on the effectiveness of minimum wage increases in reducing poverty.

Burkhauser and Sabia (2007) examine the impact of minimum wages on state-level poverty rates for 16 to 64 year olds and single mothers for a time frame between 1988 and 2003, using two-way fixed effects specifications. Their results vary somewhat with the chosen controls and are not significant, but suggest a small reduction in poverty rates.

Building on their 2007 study, Sabia and Burkhauser (2010) again consider 16 to 64 year olds, but in the period between 2003 and 2007, a relatively short study period. The authors consider income cutoffs of 100, 125, and 150 percent of the federal poverty line, but suffer from large standard errors due to the short sample period and ultimately find no effect on the post-transfer income for families in or near poverty.

Sabia (2008) focuses on the case of single mothers and concludes that the minimum wage does not affect the probability of being in poverty or the income-to-poverty ratio, considering total income including transfer payments. He shows that this is also the case for women with less than a high-school diploma. The results are not statistically significant, but they are mostly negative, and at least some of them are substantial. In another study co-authored with Nielsen (Sabia and Nielsen 2015b), the authors report imprecise estimates, again based on data from the SIPP between 1996-2007.

In response to an earlier version of the Dube paper described above, which summarizes the state of research on the minimum wage, Sabia (2014) reports estimates for the population of 16 to 64 year olds using state-year aggregated data from 1979-2012. He uses similar state-year controls as Dube, and his results on the impact of minimum wages on poverty are smaller in magnitude and nonsignificant. The smaller effect sizes may be driven by the exclusion of children in his study.

Sabia and Nielsen (2015a) use the Survey of Income Program Participation (SIPP) and find little or no evidence of an effect of the minimum wage on family poverty status and income-to-needs ratio using difference-in-difference estimates. In dynamic models exploring flows into and out of poverty they find redistributive effects of the minimum wage among the low-skilled.

Overall, the results of the Burkhauser and/or Sabia and Nielsen papers are mixed and often suffer from imprecise or unrobust estimates, making it difficult to draw conclusions from their results.

An earlier paper that has had a substantial impact on the discussion of the effects of minimum wage policy is that of Card and Krueger (1995a). This study examined the short-term impact of the 1990 increase in the federal minimum wage on the poverty rate for persons 16 years of age and older, based on an analysis that estimated the impact of the change in the proportion earning below the new federal minimum wage in 1989 on the change in the state-level poverty rate between 1989 and 1991. The estimates are negative but not significant, which may be due to the short panel structure. Besides the effect on state poverty rates, they estimate the impact of the changing “fraction affected” on family weekly earnings at specific percentiles. Here, the authors find that the 10th percentile of the (unadjusted) family earnings distribution responds positively to the minimum wage increase. However, the estimates remain relatively imprecise and the measure of family earnings does not include taxes and transfer income and is not adjusted for family size.

Others who have studied the impact of the minimum wage on poverty include (in chronological order) Addison and Blackburn (1999), Stevans and Sessions (2001), Morgan and Kickham (2001), Gundersen and Ziliak (2004), DeFina 2008. The results are generally mixed, often limited to specific subgroups of the population and therefore not generalizable to the population as a whole, or suffer from methodological limitations (for an overview, see Dube 2019b).

Moellmann (2018) examines the interactions of different transfer programs, estimating the joint effect of the minimum wage and public assistance programs on the income to poverty ratio based on the self-reported value of public assistance program benefits of CPS-ASEC respondents for the period between 1995 and 2016. He finds a small, positive effect on the income-to-poverty ratio and highlights the substantial reductions in the value of means-tested benefits that are largest for programs with strong work requirements.

Clemens and Wither (2019) estimate the impact of the increase in the federal minimum wage during the Great Recession on individual-level income and family income of incumbent workers. Based on data from the Survey of Income and Program Participation (SIPP), they follow the employment trajectories of incumbent workers. Their study design is based on the different degrees to which increases in the federal minimum wage were binding across states and on incumbent workers as the treatment group. They show that targeted individuals experienced reductions in average income, which also translated into declines in average family incomes. However, the authors emphasize that they only analyzed the impact of minimum wage increases that took effect during a period of significant labor shedding. The main drivers behind the reductions in income they find are likely to play out in particular during this period: many workers entered the labor force in unpaid internships, and many experienced lower income growth due to reduced experience accumulation. Thus, the results cannot be extrapolated to larger time frames or other economic settings.

Overall, the results in the literature vary and sometimes appear to be contradictory. The variation in time periods, data, populations, methodologies and specifications used make it even more difficult to draw conclusions from the literature to date.

An additional factor is that it is difficult to compare findings from different settings, particularly different countries. The social structures and processes, as well as the distributional contexts in which minimum wages are settled will ultimately affect their potential impact on income inequality. I discussed the minimum wage as a social policy against the background of changing labor markets, social policies, and demographic contexts in chapter 3. In addition, the level of an already existing minimum wage floor itself can be associated with the impact of a minimum wage increase on the income distribution. Cross-country evidence reveals that the relationship between the relative magnitude of the minimum wage and the concentration of minimum wage workers in the poorest households is complex. Some countries with a high concentration of minimum wage workers in poor households had a high ratio of minimum wage to median income, while others had a lower ratio. The same is the case in countries in which the concentration of minimum wage workers in the poorest households is relatively low (Maloney and Pacheco 2012).

It is important to look at larger segments of the income distribution to gain a fuller understanding of the impact of the minimum wage. Households at the bottom of the income distribution may have limited labor force participation, reducing the ability of the minimum wage to directly influence household incomes. Higher-income households are more likely to have at least one person employed. With rising household income, the probability of multiple earners increases, and consequently, the likelihood of being affected by minimum wage policies also rises (Belman and Wolfson 2014). The effects on incomes of low-income families have not been studied sufficiently, meaning that this area presents ample opportunities for research and could yield valuable insights into the broader socioeconomic effects of minimum wage changes.

The Dube (2019b) study offers a comparably long timeframe but does not include data based on the most recent years, in which the standstill in the federal minimum wage has led to increasingly more states adapting their state minimum wages to avoid a decline in its real value (see also section 2.2.2). Another caveat is the non-inclusion of households' tax liability. Dube uses a comprehensive measure of gross income that includes all household income, including the monetary value of in-kind transfers, as well as the amount of tax refunds they receive. This is a major advantage compared to other studies, as it can be assumed that low-income households affected by the minimum wage also receive tax refunds, which may be a significant source of income for them.

Besides the literature on the minimum wage's impact on the distribution of incomes or poverty rates, there is also empirical evidence on other outcomes related to changes in the income situation of households that are affected by minimum wage policy, such as eligibility for certain welfare benefits, health outcomes, crime and public safety, broader measures of well-being such as economic stress, or eviction rates. Such studies can underline the results of the limited studies on poverty rates or income inequality.

For example, studies of trends in the number of recipients of income support from various transfer programs are a helpful addition to the literature, because the goal of reducing poverty is always accompanied by the goal of reducing the number of individuals and families who are dependent on public benefits. Furthermore, such studies also represent a methodological alternative, since entitlement to several welfare state programs is based on income limits that

are directly based on the official poverty limits. Studies of SNAP use suggest that an increase in the minimum wage has an impact on household or family income, but the results of the limited number of studies in this context are mixed. There are results indicating that an increase in the minimum wage by 10% reduces SNAP enrollment by 2.4% to 3.2% and program expenditures by about 1.9% (Reich and West 2015). Other studies find no relationship between the two, while another study, based on earlier data, indicates a positive relationship between minimum wages and welfare caseloads of SNAP, which appears to vary for different sample periods (Page, Spetz, and Millar 2005). Sabia and Nguyen (2017) find that higher minimum wages have no impact on means-tested government programs such as the SNAP, TANF, Housing Assistance or Medicaid based on over 35 years of data. Using another model specification and limiting the sample to households in which only one person works or participating households without any workers, they find large declines in means-tested program participation in the short-term.

A more recent study suggests that this relationship is nonlinear, possibly solving the contradictions: when the minimum wage level is low, increasing it leads to a decrease in SNAP enrollment. When minimum wages are high, which is the case in more than 20 states according to the study and its definitions, a further increase leads to higher SNAP enrollment and benefits (Snyder, Rinkevich, and Yuan 2019).

Research shows that higher minimum wages can lead to increased consumption of non-durable goods and housing (Alonso 2020; Hughes 2020), higher welfare proxied by consumption (Hurst et al. 2022) and to reductions in child poverty (Dube 2019b). Other studies show that rising minimum wages have a positive effect on the time parents spend with their children (Gearhart, Sonchak-Ardan, and Thibault 2022) and that higher minimum wages lead to declines in child maltreatment (Raissian and Bullinger 2017), teen pregnancy (Bullinger 2017), and the share of infants born with low birth-weight (Komro et al. 2016). Further, it reduces criminal recidivism (Agan and Makowsky 2020), and improves (child) health and public safety (Dow et al. 2019; Wehby et al. 2020; Ruffini 2020). Regarding health, evidence suggests that minimum wage increases are associated with declines in smoking prevalence, reduced rates of mortality due to suicides, alcohol, or drugs, declines in the number of days with health limitations among low-wage workers, improvements in health among young children, declines in the prevalence of low birth weight among low-wage workers' newborns (for an overview, see Leigh, Leigh, and Du 2019). Several studies that have estimated the minimum wage's impact on these outcomes identified the improvements in the income situation of families and households as the driver of the positive outcomes.

5. Research gaps and contributions of this dissertation

This section elaborates on the existing research gaps and the contributions of this thesis to the study of the minimum wage's impact on income inequality. Overall, the empirical studies indicate that minimum wages have a modest effect on poverty. However, as previously discussed, the empirical landscape is highly fragmented, and the results are mixed. Nonetheless, scholars who have spoken out loudly against the poverty-preventing effect of the minimum wage in academic and media debate and have substantiated this stance with empirical evidence

also concede that potential outcomes may be contingent upon the political context and the prevailing wage and income distribution.

Although certain claims are often used as arguments in the minimum wage debate, they remain partially unanswered due to the lack of rigorously conducted empirical studies to support them one way or the other.

The translation process between an individual's hourly wage and the total disposable income of households is complex, with numerous confounding factors. Despite extensive research, there remains a significant gap in understanding regarding the point at which the positive wage effects either cease or inadequately contribute to overall household income. This is a critical research gap, as net income at the household level is the primary determinant of households' living standards, poverty status, or need for public assistance.

Additionally, the lack of systematic research on the extent to which minimum wage increases affect subsequent stages of annual earnings, household labor income, gross income, and disposable income, leaves open the question of why the impact of the minimum wage is limited. It remains unclear at what point in this "pipeline" the minimum wage becomes an imprecise tool for raising the incomes of low-income households or for tackling relative income poverty and income inequality.

Another research gap related to the first concerns the potentially unfavorable interactions between rising labor income due to minimum wage increases and the two central systems of redistribution, namely a) the public transfer system and b) the income tax system and the social security system. It is still uncertain whether such interactions pose significant challenges for redistributive efforts. Thus, rather than using potential transfer or tax withdrawal rates as a counterargument, they could be viewed as a methodological problem. They blur the impact of the minimum wage on the total (net) income of households, which calls for an isolated investigation of the effect of the minimum wage on income inequality and the study of how minimum wages interact with the public transfer and tax systems. If redistributive measures are not complementary to a higher wage floor due to the regulations on who is entitled to specific income support measures under what circumstances, then it is a political decision to change these regulations. The impact of rising earnings on eligibility for income support or tax burdens can be adapted by adjusting the withdrawal rates of means-tested transfers or tax rates to adapt to a higher standard of labor income. It is therefore incumbent upon political decision-makers to take steps to avoid the occurrence of unfavorable interaction effects and negative incentives, particularly sharp cut-offs that result in high effective marginal tax rates. Furthermore, it is essential that the labor market and the system of public transfers function in a coherent and mutually reinforcing manner, rather than in opposition to one another. A comprehensive analysis of the interplay and interactions between increased earnings and public transfers and taxes is essential to quantify the unintended policy effects and to assess the isolated impact of minimum wage adjustments. Based on this, the systems of redistribution can also be adjusted to minimize unintended and efficiency-reducing effects and to optimize the overall impact of minimum wage policy on both the individual and the state systems.

Furthermore, researchers have yet to definitively determine the extent to which minimum wage policy has an impact on the population as a whole, or whether it merely affects inequality among households connected to the labor market. Many of the studies examine the development of the

poverty rate at aggregate level only for the part of the population that is of working age, or smaller and more specific population groups. It is also crucial for policy makers to understand whether minimum wage adjustments contribute to changes in income inequality in society as a whole or primarily address inequalities within the working population.

This leaves some questions unanswered and calls for alternative approaches to both conceptual and methodological issues. The current state of research does not allow for a comprehensive understanding of the relationship between minimum wage policy, the income situation of low-income households with minimum wage earners and income inequality.

The current gaps in research on the impact of minimum wages on poverty or income inequality can be divided into four areas.

Firstly, the strategy of looking at individual population groups, which has often been used in the past, is not sufficient to get a full picture of the impact of minimum wages on income inequality. Instead, the entire population should be considered. From a sociological perspective, in order to better understand relative poverty and the gap between low-income and higher-income households, it is essential to consider the situation of the households concerned in relation to all other people in society. It is in this context that perceived realities about belonging or being left behind can best be understood. So far, research on the possible poverty-reducing effects of the minimum wage has mainly focused on individual population groups, while studies on the population as a whole have only been carried out sporadically, which means that the empirical data base is insufficient. Involving the entire population instead of individual population groups also responds to the debate about the inefficient targeting of minimum wage policy. Estimating the impact of minimum wage policy at the population level can help to understand whether the heterogeneous target group of minimum wage policy can ultimately have an impact on household income inequality in the population as a whole. The scant evidence on the effect of the policy on overall income inequality or poverty is a particularly acute shortcoming given the importance policymakers place on understanding overall responses to policies. The results for specific subgroups should not be extrapolated as an overall impact on poverty for the population as a whole and are therefore not sufficient for this purpose.

Secondly, the recent focus on poor households should be broadened in the sense that all parts of the income distribution should be considered, rather than measures that refer to individual points in the overall distribution, as is the case with the poverty rate. The influence of the minimum wage, regardless of how it is measured, can be very heterogeneous along the distribution. It is possible that effects around the poverty threshold are small, while they are larger in other areas, either below the poverty threshold or in income areas above it. Depending on where in the distribution the effects are most pronounced, this has implications for inequality measures such as the 50/10 ratio. It has already been discussed in the literature that it is possible that the so-called near-poor benefit more from increases in the minimum wage than households whose incomes are just below the poverty threshold and may be lifted above it. Near-poor families at 100 percent to 150 percent of the poverty line make up one-sixth of the U.S. population, highlighting the importance of determining whether the minimum wage is helping low-income workers and their families (Belman and Wolfson 2014:336). However, rigorous studies that differentiate in detail between different income ranges or even the individual percentiles of the overall distribution are rare.

Thirdly, a discussion of the impact of minimum wage policy on the actual living conditions of households and the extent of their inequality should not be based on income concepts that do not provide a complete picture of the financial situation of households. Instead, a comprehensive income concept should be considered that also takes into account the tax burden of households in order to address the concern that rising labor income is accompanied by a rising tax burden. Whether rising tax liability due to rising labor income offsets the benefits of rising minimum wages can only be assessed if such negative income sources are explicitly included in the outcome variable of interest. In particular, possible positive interaction effects between minimum wages and (refundable) tax credits need to be examined using information on households' tax liability and the amount of tax credits to which they are entitled. The Dube study takes into account households' tax refunds but not their tax liabilities, including their social security contributions. The near-cash public transfer through SNAP and the (refundable) tax credits through the EITC are the two largest means-tested programs today, and the estimated results must necessarily take these into account in order to consider today's welfare state environment as the context in which minimum wage policy operates.

The fourth point concerns the measurement of treatment, i.e. the measurement of changes in the minimum wage at the level of states or regions. The current state of research does not allow for a comprehensive understanding of the relationship between minimum wage policy, the income situation of low-income households with minimum wage earners and income inequality. Although the approach employed in economic literature may be valid, I wish to contribute to the advancement of research by adopting an alternative methodology. I propose to measure the treatment of being affected by the minimum wage at the household level. Previous studies estimating the impact of minimum wage developments on poverty rates or inequality have measured both the outcome variable of interest and the treatment at the state level. These studies investigated whether poverty rates at the aggregate level have developed more favorably in states where minimum wages have increased than in comparable states where this has not been the case. In most cases, this approach does not take into account how many people and households in a state are affected by the minimum wage, what their income situation is, or how it is changing. The increase in the minimum wage in a state does not determine whether this increases the effectiveness of the minimum wage as a measure to reduce poverty or inequality. For example, only a very small proportion of employees might be affected by the minimum wage at all if the wage level in the respective state is also significantly higher than the previous minimum wage and if the low-wage sector in that state plays only a minor role. Since the household level is relevant for measuring poverty or income inequality, a further question is whether households with low total incomes in the state in question benefit particularly from the observed minimum wage increase. Although such studies use comparable states or compare neighboring regions that are subject to different legislation regarding the statutory minimum wage, it is possible that these factors cannot be taken into account. Other factors such as the age structure or the composition of the population according to ethnic descent can also play a role and influence the way in which benefits from minimum wage increases are distributed across households in addition to the individual impact of the minimum wage. Furthermore, alternative explanations for changing poverty rates or the extent of inequality are also only controlled for at the aggregate level. For example, control variables are added for the level of state-specific tax credits or other income support, or for the level of

unemployment, gross state product or other key figures at the state level. However, this does not allow any conclusions to be drawn as to whether factors such as tax credits or income support interact with rising labor income due to higher minimum wages at the household level. It remains unclear whether such interactions actually take place within households and whether they mitigate the gains from a minimum wage increase.

This thesis aims to contribute to the literature and empirical evidence in multiple ways. The thesis employs a distributional analysis of an analysis sample representing the whole population, in conjunction with a novel approach to defining the impact of minimum wage policy at the household level, rather than at the state level. This thesis uses different income concepts to investigate the point in the "pipeline" from an individual's hourly wage to a household's total net income a positive wage effect does not translate into higher total income or does so only insufficiently. The main focus is on the development of the distribution of households' net incomes, which also takes into account their tax liability. To this end, the thesis also delves into different empirical challenges such as the use of simulated amounts for households' tax liability and received tax refunds and the estimation of interaction effects between minimum wage policy and tax policy.

Investigating the influence on the distribution of different income concepts in the overall population is an approach that has not been pursued to date in order to approach the question of the point at which increases in minimum wages may not continue to translate into improving financial situations at household level. It could be, for example, that there are stronger positive effects on gross incomes than on net incomes, because an increasing tax burden on the increased arbitrage income reduces the benefits to be recorded.

This thesis also highlights the importance of measuring the impact of the minimum wage at the population level, i.e. on overall income inequality or poverty. The highly fragmented empirical evidence makes it difficult to draw conclusions about the population-wide impact of minimum wage policy. To address this issue, this thesis looks at trends in income inequality for the population as a whole. In comparing different income concepts, this paper also takes a critical look at the validity of results based on different population groups. For example, the analysis of the impact of the minimum wage on the development of inequality of households' labor income only allows for the inclusion of households with any labor income at all. These analyses exclude households without such income, e.g., households with pensioners or households that make a living from transfer payments. The informative value of such results in comparison with analyses based on the population as a whole is weighed up and discussed. In addition to the empirical evidence, this also addresses the conceptual issue of the "patchwork" of empirical data and emphasizes the need for a more comprehensive analysis that goes beyond specific subgroups.

Another significant contribution of the thesis is to address the targeting problem associated with minimum wage policy. It suggests moving beyond a narrow focus on the poor and near-poor and advocates distributive analyses that provide a more nuanced understanding of the policy's impact. Furthermore, the research delves into the interaction problem, emphasizing the importance of examining disposable household income. By including tax credits and means-tested programs like SNAP in the analysis, the thesis aims to provide a more accurate representation of the overall impact of the minimum wage.

In summary, this work aims to significantly advance the research agenda by bridging conceptual and empirical gaps. It not only expands the focus to gain a broader picture of the overall development of income inequality in the population as a whole, but also challenges prevailing methodological approaches. The work contributes to a more nuanced understanding of the minimum wage's impact on income inequality and poverty, addressing key research gaps and guiding future investigations in this critical field. In the following, I will explain in more detail the approaches I have chosen and argue why they usefully expand the state of research. I will begin by describing my contribution of a new approach of measuring the impact of the minimum wage at the household level, rather than at the level of states or other regions. The measurement at the household level is also reflected in the other contributions of this thesis to the research landscape, including the method used, the population studied, the time frame, and the outcome variable of interest.

5.1. A novel approach: Identifying households affected by minimum wage policy

The most influential studies on the impact of minimum wages on the poverty rate or on income inequality utilize the varying levels of minimum wages across states and estimate changes in the aggregate poverty rate at the state level. In this approach, both the outcome variable of interest and the treatment are measured at the state level. The objective of this thesis is to make a contribution to the existing body of research by employing an alternative approach. The proposed methodology entails measuring the impact of the minimum wage at the household level. An increase in minimum wages at the state level does not necessarily result in greater significance of the minimum wage in terms of its bite. With regard to the effect of the minimum wage on the inequality of household incomes, a strong bite would express the fact that a sufficient proportion of workers are directly affected by the minimum wage and that the ensuing increase in earned income particularly benefits low-income households. However, this approach does not take account of how many people and households in a state are affected by the minimum wage, what the income situation of these people is or how it is changing. I argue that the effectiveness of the minimum wage as a measure to reduce poverty or inequality should not be judged simply on the basis of a statutory increase in the minimum wage. Thus, based on the current state of research, it is not possible to gain a comprehensive understanding of the relationship between minimum wage policy, the income situation of low-income households with minimum wage earners, and income inequality.

Potential biases in this type of analysis arise from unobserved state-level and year-level variables that may be related to the treatment or the outcome variable of interest. For instance, if a state's wage level is significantly higher than the previous minimum wage and the low-wage sector is minor, only a small portion of employees may be affected by the minimum wage increase. Given the importance of the household-level in the assessment of poverty or income inequality, it is also important to consider whether households with low total incomes benefit notably from the observed minimum wage hike. Studies that compare states or regions with differing minimum wage laws may overlook factors such as age structure and ethnic composition that impact how benefits from minimum wage increases are distributed across households. Alternative explanations for changes in poverty rates or inequality are typically analyzed only at the aggregate level, with control variables for state-specific tax credits, income

support, unemployment rates, and other key state-level figures. However, this approach does not shed light on whether certain policy measures interact with the minimum wage to prevent increases in total household income, because it is unclear whether such interactions occur within households.

Whether families or households are actually affected by an increase in the minimum wage or not is not accounted for in the multivariate analyses in such studies. Instead, the aim is to control for all other factors that could potentially have had an influence on the development of the income distribution or the poverty rate. Ultimately, there is a missing link between minimum wage policy and the estimated changes in poverty rates or income inequality, i.e. the households in which minimum wage earners contribute to the total income that determines the income situation of the household.

To close this research gap, I take a new approach that focuses on the household level. To this end, I use the Annual Social and Economic Supplement of the Census Bureau's Current Population Survey (CPS-ASEC), as distributed by the IPUMS project (Flood et al. 2020). Using this data it is possible to capture the impact of the minimum wage, i.e. the treatment itself, as well as the majority of potentially confounding factors at the household level. The CPS-ASEC is the source of official national poverty estimates used by the Federal Government. These estimates are based on annual figures for all income sources of households for the previous calendar year, often referred to as the income reference year. In the rotational design of the CPS (described in section 7.1) households are interviewed for four consecutive months in a given calendar year and again in the same four months of the subsequent calendar year. This means that a) information on the hourly wages of workers is not obtained for each month of a calendar year, and b) not all households reporting hourly wages are interviewed in the Annual Social and Economic Supplement of the CPS, which includes comprehensive measures of different household income sources for the whole income reference year. These measures serve as the basis for identifying households living in poverty.⁴³

To solve the mismatch between information on hourly wages and all other income components in households' total income, I use information on the wage and salary income of individuals of the previous calendar year, which matches the income reference year and can be used to calculate their average hourly wages using information on the usual hours worked per week in the previous calendar year. On this basis, it is possible to identify households in which at least one person was employed and received an average hourly wage equal to the current minimum wage of the state in which they live for a data set that includes detailed information on all other income sources of households as well as their members' socio-demographics (for details see section 7.5). It is more common to operationalize individuals' wages using the information on their hourly wage, for example in analyses on wage inequality. However, information on the hourly wage is available only for workers paid by the hour and not for all months of a year, making it difficult to match with annual figures for all other sources of household income. One

⁴³ Until the U.S. Department of Labor merged the May supplement of the Current Population Survey and the March supplement of the CPS in 1973, there was no data source covering both the hourly wage rates of individuals and family or household incomes for the same people, see Gramlich, Flanagan, and Wachter (1976). The merged data source also suffered from the fact that the March survey data was merged to the May survey data, even though the income reported in the March ASEC data refers to the previous calendar year. Therefore, it would be more appropriate to merge the May data of survey year t with the March data of survey year $t+1$. However, this means that the sample is only half as large.

option would be to extrapolate from information for just four months to the rest of the year. However, this is an inaccurate method due to changes in the working hours and fluctuations in income of low-income earners. Another option would be to use information on the annual wage and salary income of individuals and then to calculate an hourly wage from this. The difficulty of matching data on all sources of income in households with information on the hourly wage of individuals living in the households is probably one of the reasons why this method has not been used so far.

I proxy the affectedness of households by the minimum wage using the *average* hourly wages of household members who were employed in the previous year. This methodology enables the development of novel research designs for the analysis of the impact of minimum wage policy on household income. Despite the new possibilities for analysis that this opens up, this approach has not yet been employed. This thesis takes advantage of this opportunity and thus offers a new approach to examining the link between minimum wage work and the income situation of households. On this basis, I can map the impact of minimum wage policy on household income inequality in the population as a whole by estimating the contribution of households with minimum wage earners to income changes at different points in the distribution.

Identifying households with minimum wage earners allows me to estimate their contribution to population-wide changes in income inequality. The underlying idea is to estimate the impact of a subgroup of the population on the income distribution of the population as a whole. Unconditional quantile regressions estimate the impact of an observation or a group of observations with a particular characteristic on the (unconditional) overall distribution of the outcome variable of interest compared to the reference group without this characteristic. The characteristic of interest is that at least one household member works for the minimum wage. Since the household characteristics associated with changes in income distribution are most likely correlated, the influence of having a minimum wage earner is separated from the influence of other household characteristics in a multivariate method. Using a decomposition analysis, I estimate the contribution of minimum wage households to changes in income inequality, where the contribution indicates how much of the observed quantile value change can be attributed to a particular household characteristic, such as being affected by the minimum wage.

Thus, I proxy the impact of a policy or labor market institution with a particular household characteristic and its contribution to changes in income inequality. That is, the interpretation of the impact of minimum wage policy on income inequality is based on estimates of the contribution of households with the characteristic of having at least one household member in minimum wage work to changes in unconditional quantile values, controlling for other household characteristics that might influence a household's impact on changes in quantile values. Further details can be found in the methods section in section 7.6.

5.2. Minimum wage households' contribution to population-level income distribution changes: A distributional and decomposition analysis approach

Based on the identification of households with minimum wage earners, I aim to estimate how such households contributed to changes in incomes at different points in the overall income distribution of the whole population. As argued above, by looking at the whole (bottom half)

of the income distribution it is possible to avoid the risk of overlooking or averaging out heterogeneous effects along the income distribution, which might lead to a distorted picture of the actual impact of minimum wage increases on different population groups in different income ranges. To this end, I use a distributional method. The measure for the poverty rate is based on only one point of the income distribution, namely the applicable poverty threshold. Quantile regression is an analytical tool that facilitates the modelling of distributions, while accounting for the continuous nature of the variable of interest, namely income. Quantile regressions work similarly to conventional regression analysis; confounding factors can be held constant by including covariates, and interaction terms work in the same way as in conventional regression.

The aim is to obtain a comprehensive picture of the influence of minimum wages in different income areas. Unconditional quantile regression has already been used for such studies, but my approach, combined with decomposition analysis, adds value and extends the research landscape by allowing compositional effects (the explained part) to be distinguished from income structure effects (the unexplained part).

This means that the subject of the study is not the change in the income of households with minimum wage earners themselves, but the extent to which such changes lead to shifts in certain income areas of the overall distribution and thus to a change in income inequality in the population as a whole. To this end, the change over time is considered at all points in the income distribution and the extent to which households affected by the minimum wage have contributed to these changes is then estimated. For example, as one point among many, I would estimate the extent to which a change in income around the 10th percentile of the population-wide income distribution is attributable to the changing income situation of households with minimum wage earners. The same would be done for all other percentiles in the distribution in order to obtain an overall picture of where in the distribution households with minimum wage earners have contributed to changes in the overall population. My main interest lies in estimating the contribution made by households with minimum wage earners, which is based on a change in the income situation of this group. The question to be answered is to what extent the changing "typical" income situation in the group of households with minimum wage earners has led to various points in the distribution of the entire population developing positively or negatively over time. Therefore, similar to studies that measure the influence of the minimum wage on the poverty rate or income inequality at state level, this design must also control for other factors that can influence the income situation of households with minimum wage earners. Here, unobserved heterogeneity arises at the household level rather than at the aggregate level and poses another challenge. However, a multivariate method and detailed information on all persons living in the household make it possible to control for a variety of factors at the household level that may be relevant. More details on the method used can be found in section 7.6.

5.3. A broad perspective: Studying the population-level influence of the minimum wage on income inequality in the long-term

The summary of the empirical evidence in the previous section shows that it is difficult to quantify the impact of the minimum wage on income inequality in the population as a whole.

The existing evidence is highly fragmented. Meta-analyses provide average effects based on a study landscape with a variety of population groups examined. Decisions about the data used, time frames, and the population groups that a study focuses on will affect the study's results on the impact of the policy intervention.

The literature also uses a variety of (quasi-experimental) settings in terms of time and place, depending on where minimum wage increases took place, while in comparable other settings, usually in other, often neighboring states or regions, no such increases took place at the same time.

If such studies do not control for all contextual factors that may affect the impact of the policy change, the effects found cannot be generalized to other contexts. One such factor is the proportion of households or families affected by the minimum wage. Another factor is the extent to which the total income and thus the poverty status of these households is affected by an increase in the minimum wage. In settings in which, for example, there are many families whose total income is largely dependent on the income of a minimum wage worker, an increase in the minimum wage will have a much stronger effect on income inequality or the poverty rate.

Many studies focus on narrow subgroups of workers who are disproportionately likely to earn minimum wages, because the higher share of minimum wage workers *within* that group makes it easier to detect an impact of the minimum wage on poverty *within* that group. However, the results from one narrow group cannot be generalized to the overall effect of the policy. Obviously, a study that focuses on a population group that is on average less likely to be affected by minimum wage policy, such as middle-aged men, may find a smaller impact than a study that focuses on a population that is more likely to be affected, such as low-educated single mothers. An average of the estimates across different quasi-experimental settings will not yield the population-level influence of the minimum wage on income inequality or poverty. The study by Dube (2019b) offers estimates for the total population, but can be seen as an exception. Thus, one contribution of this thesis is to provide new evidence on the *population-level influence* of the minimum wage, i.e. its impact on the distribution of incomes in the total U.S. population.

To date, research has focused entirely on short-term effects, attempting to exploit quasi-experimental settings by estimating changes in the poverty rate immediately following increases in minimum wages. In contrast, there are virtually no results on long-term changes. The longest time frames are 3-year lags in estimating the effects on the poverty rate and its multiples in the study by Dube (2019b), the consideration of the medium-term development of income trajectories of low-wage workers during the Great Recession covering a time frame of 4 years (Clemens and Wither 2019) and a long-term investigation covering 10 years by Neumark, Asquith and Bass (2020), which compares the longer-term impact of the EITC with that of other welfare programs, including the minimum wage. The results on the minimum wage are not particularly robust, but tend to indicate that higher minimum wages lead to lower poverty rates and lower proportions of families receiving public assistance in the long term.

The research design I apply is therefore intended to expand the state of research by covering the entire variety of settings of minimum wage increases in terms of timing and states and thus to reflect in a larger framework the general long-term change in the (financial) situation of what I define as the “target group” in the population, namely the group of households with at least one minimum wage worker. At the same time, the change in income distribution is also

examined over three decades in order to determine the drivers behind the long-term change. The study therefore examines whether and to what extent the long-term change in the income situation within the group of households with minimum wage employees has affected the long-term development of income inequality in the population as a whole.

However, the main argument for the long timeframe is that it is by no means only increases in the minimum wage that benefit households with minimum wage earners. Shorter timeframes could also be used for this purpose, starting directly before increases in the minimum wage and ending directly afterwards. This is the usual approach and has already been applied to a sufficient extent. In my approach, in contrast, the decisive factor is how the *within-group income situation* changes in the long term, not only because the hourly wage of household members working for the minimum wage increases, but also because the composition of the group of households with minimum wage earners changes over time. For example, this group could increasingly consist of households in which minimum wage workers are the main earners in their households and thus contribute the majority of the total income in these households.

Furthermore, such a long timeframe can also reflect the larger development of the welfare state towards a workfare system, in the context of which the interplay of low-paid employment and tax benefits or employment-related social transfers as support for low-income households play an increasingly important role. This shift from a welfare to a workfare system cannot be traced back to a single reform, even if the reforms in the 1990s were very influential for this development but took place in incremental steps over many years. In combination, these aspects argue for a long period of investigation that can usefully expand the state of research.

Estimating the longer-term effects of measures also presents challenges. It rarely provides the identification strategies that are more readily available if the short-term impacts of measures are estimated. Instead, this approach relies on combining differing strategies with a detailed consideration of the significance of estimation results and the sensitivity of conclusions to changes in the sample, specification, outcome variable of interest, etc. However, even if one is cautious about causal interpretations of the results, the longer-term relationships between minimum wage policy and income inequality presented here represent a valuable extension of the literature and provide at least suggestive evidence of the longer-term effects of the policy in interaction with the setting in terms of the labor market, demographics, and other welfare state policies.

5.4. The outcome variable of interest – Disposable incomes after transfers and taxes

Research on the impact of minimum wage increases on the income situation of families and households has mostly investigated the relationship between the minimum wage and poverty (Dube 2019b; Belman and Wolfson 2014). Most studies estimate the impact that minimum wage increases had on the poverty rate at the aggregate level. Other studies estimate the likelihood of families falling below the poverty line (usually the poverty line of the official poverty measure, OPM) and on transition rates of families in and out of poverty (Belman and Wolfson 2014:309)⁴⁴.

⁴⁴ Another strand is in how far the minimum wage interacts with other antipoverty policies, see Belman and Wolfson (2014:309).

The poverty line can be a misleading guideline for policymakers in the debate on the antipoverty efficiency of the minimum wage. On the one hand, there is broad agreement that the official poverty line is outdated and inadequate to capture the economic neediness of households or the impact of antipoverty programs. On the other, it is not helpful to use an arbitrary line to evaluate the impact of the minimum wage on the financial well-being of households: a poor household that sees their total income rise following a minimum wage increase will be better off financially. This is true even when the household does not move above the poverty threshold. A metric that defines the success of the minimum wage in terms of households moving across the poverty line, however, will evaluate this case as one in which the minimum wage has not helped (Bernstein and Shierholz 2014a). Likewise, households slightly above the poverty line still find themselves under economic stress. Few would argue that a positive impact on their household income is an inefficiency to be avoided by a policy like the minimum wage.

Because of these substantive limitations associated with evaluating the consequences of minimum wage policies using poverty rates, this dissertation takes a different perspective on a desirable outcome of minimum wage policies, namely a reduction in income inequality. In international comparative research and in the U.S. research landscape on income inequality, the most widely used income concepts are household market income, total gross income, and the disposable income of households respectively their net household income. The official poverty rate is based on households' total gross income. It includes all market-based income as well as private and public cash transfers. Studies of the impact of the minimum wage on poverty rates are therefore limited to this income concept. More inclusive measures of household income also take non-cash transfers into account. However, a closer look at living conditions, which people also use to make comparisons with others in society, requires an examination of the total net income of households, i.e. their disposable income. The concept of disposable household income is also used in cross-national research on income inequality, but not in the context of minimum wage policy. In such cases, households' (simulated or estimated) direct taxes must be deducted from their total gross income (Atkinson and Bourguignon 2015; Morelli, Smeeding, and Thompson 2015).

To my knowledge, there are no studies on the impact of the minimum wage on the distribution of household (or family) disposable income after taking cash and noncash transfers and taxes into account.⁴⁵ An alternative to the distribution of disposable incomes would be studies estimating the impact of minimum wage policy on trends in the poverty rate based on the supplemental poverty measure (SPM), which accounts for taxes paid by families, deducts them from their total income⁴⁶ and compares it to the poverty line, which reflects the minimum level of resources that are adequate to meet basic needs.⁴⁷ This could shed light on the impact of policies on the distribution of net family incomes that also reflect their interrelationship with other sources of and deductions from family incomes, including taxes (payroll taxes, refundable tax credits such as the earned income tax credits and the additional federal childcare tax credit,

⁴⁵ There are studies which measure household income after the inclusion of cash and noncash transfers such as the study by Dube (2019b), and there are studies which measure household income after taxes, using tax simulation programs, e.g., by MaCurdy (2015).

⁴⁶ The SPM relies on simulated figures regarding income tax and payroll tax liabilities and credits, see Bridges and Gesumaria (2015).

⁴⁷ As opposed to the poverty threshold as defined in the official poverty measure, the poverty threshold of the supplemental poverty measure varies by place of residence and includes information on spending for clothing, shelter, utilities, and telecommunications, in addition to spending on food.

and income taxes) as well as in-kind government benefits (food stamps, housing subsidies, and so forth).

However, studies estimating the poverty-reducing effect of minimum wages use the poverty rates based on the official poverty measure (OPM), and as to my knowledge, there are no studies using the SPM instead.

A limited number of studies estimate the impact of minimum wage policy on aggregate measures that go beyond households' gross income. First, there are studies that use a broader measure of gross income, which includes noncash transfers in addition to cash transfers, and which include the amount of tax refunds families are eligible for, as they function as an additional income source which, by design, are comparable to other public cash transfers. Second, there are studies that incorporate the tax liability of families based on tax simulations, but ignore (cash or in-kind) welfare benefits. Third, some studies that estimate the policy's impact on the distribution of incomes do not take into account family size and therefore do not yield the same conclusions as an equivalized estimate that incorporates the size and composition of families or households.

The lack of evidence on the impact of minimum wages after accounting for income taxes and payroll taxes paid by families is a significant limitation. The offset effects of higher taxes are often used as a counterargument against minimum wage policies, but are rarely studied empirically. Some studies include the relationship between minimum wages and tax refunds, but do not cover households' (or families') overall income tax liability. Payroll taxes (social security contributions) may increase as labor income rises in a household, and this may also offset some of the benefits derived from a minimum wage policy. However, no studies incorporate this important factor. This is a large limitation, as comparisons between levels of poverty in the USA show that payroll taxes are one of the factors that produce the largest increases in the poverty rate, by 1.6 percentage points (Bridges and Gesumaria 2015). Moreover, the amount of taxes and social security contributions paid by families varies across the income distribution. Tax systems are often designed to be progressive, so that households with lower incomes pay lower tax rates. This means that they pay a lower percentage of their tax-relevant income as taxes. This is particularly true of households' income tax liability. Other taxes may be designed as a flat tax, meaning that tax rates are independent of the income levels, or even regressive, meaning that tax units with higher incomes benefit from lower tax rates compared to tax units with lower incomes. Social security taxes are an example of a regressive tax policy. For example, they account for 8.8% of the income of people with annual earnings between \$30,000 and \$40,000 per year, but only 5% for people with earnings between \$500,000 and \$1 million due to the \$142,800 cap on income that is subject to the OASDI tax. The central determinant of a household's tax liability is initially the total taxable income of all household members. The tax burden can vary greatly depending on the composition of total income from different sources. For example, households at the bottom of the distribution may have a lower tax burden, because their total income consists to a lesser extent of taxable earned income and to a greater extent of public transfers that are not subject to direct taxation.

In addition to unfavorable interaction effects with public transfers, the possible increase in the tax burden in households with higher incomes as a result of higher minimum wages also plays a role in the debate on the efficiency of minimum wages. An increase in earned income can

lead to an increase in the tax burden. In the case of social security contributions, this connection is simple, as these are due at a fixed rate as long as earned income is below the contribution assessment threshold. However, this relationship is complex as the income tax system creates income bands, for example through tax credits, where an increase in earned income does not lead to a higher income tax liability, but may even lead to higher tax refunds. In the case of tax credits, the number of children living in the household also plays a role. In order to be able to determine the possible losses in the event of rising earned income following minimum wage increases, detailed information on household composition and the composition of total household income is therefore required in addition to information on the tax burden.

These complex interrelationships can only be studied with an outcome variable that takes into account the tax liability of households; this has not yet been done. From a conceptual perspective, such a multi-layered study would also help to determine whether different income concepts are appropriate for different research questions in order to draw relevant conclusions.

6. Analysis strategy and hypotheses

The objective of this dissertation is to examine whether the increase in the minimum wage has been associated with a decline in income inequality between 1989 and 2018.

Looking at the evolution of income inequality involves more than studying trends in poverty rates because it takes into account trends in income across the whole distribution. From a sociological or sociopolitical point of view, what matters is not only whether a subsistence level, such as the one defined by the official poverty measure, is guaranteed, but also how the households affected by a social policy compare with others in society. In addition to ensuring a minimum subsistence level, social policy can also be designed to facilitate social participation, improve well-being, promote satisfaction, and foster social peace and cohesion. Perceptions of changes in inequality have a stronger influence on the attitudes and satisfaction of populations than their absolute magnitude. Therefore, changes in the absolute level of living standards may affect people's satisfaction less than how their living standards compare with those of other people in society or their peers. For this reason, I consider the impact of changes in the level of the minimum wage on the evolution of income inequality over three decades.

Even if the decision has been made to study changes in income inequality - as distinct from other concepts of economic inequality such as wealth inequality or consumption inequality - the choice of the precise measure remains open. To draw meaningful conclusions from changes in the extent of income inequality, one must decide what exactly one wants to measure.

I consider an increase in inequality to be an increasing distance between two points in the income distribution, which is based on the fact that the lower of these two points develops less positively in percentage terms than the higher of the two.⁴⁸ Conversely, a decrease in inequality would be observed when two such points converge. If such a convergence occurs in the lower half of the income distribution, the difference in incomes between relatively poorer households and better-off ones decreases.

⁴⁸ Greater distances between households with different rankings in the overall income distribution can, but do not have to, include the concept of growing polarization. Polarization broadly refers to the (growing) concentration of people at the top and bottom of the distribution, i.e. the state or the tendency of a growth of groups at the extremes of the distribution and the parallel shrinking of a 'middle class' as defined by an intermediate range of incomes located between the extremes.

In the case of a policy designed to support lower-income households, one could further narrow down the desired outcome to a decrease in inequality based on a positive change in the lower income range, which is not paralleled by a positive change of the same size at the median. In the case of minimum wage policy, this would be based on a contribution of households with minimum wage earners to increasing percentile values in lower income strata, which is based on their relative advantage over households in which nobody works for the minimum wage but for higher wages instead. If this is also the case, albeit to a lesser extent, around the median, inequality in the lower half of the income distribution would decline.⁴⁹

Households in the lower income range experience a stronger positive income trend in percentage terms than households that are not in the lower income strata, such as households with median incomes.

To this end, I aim to estimate the contribution of minimum wage households (i.e. households with minimum wage earners) to changes in percentile values in the lower half of the income distribution. The goal is therefore to determine whether changes in minimum wage policy have had a population-level impact on income inequality. For example, if households with minimum wage earners contribute to increases in income, and thus percentile values, at the lower end of the income distribution, and less so at the higher end, then these households contribute to a narrowing of the gap between the lower and higher ends of the income distribution, and thus to decreasing inequality.

Obviously, such contributions can be based on a variety of factors. For example, households with minimum wage earners could have higher earnings in 2018 than they had in 1989 because a typical minimum wage worker in 2018 tends to work higher number of hours per week than the typical minimum wage worker in 1989, which ultimately leads to higher labor income and higher total household income. Likewise, it may be that other household types, for example the unemployed, have experienced significant income losses due to declining income support through the welfare state. For this reason, a suitable research design needs to account for other possible factors which may affect the contribution a household type has on specific areas of the income distribution.

A change in overall income inequality between two points in time depends on a broad set of factors that affect the socio-structural composition or that affect the income situation of specific groups which in turn lead to changes in the income distribution. The variety of possible factors can affect the income distribution at the same time – they can reinforce each other or cancel each other out. A multivariate method in which possible intervening factors are controlled for is therefore a necessity to narrow down the background of an estimated effect of households with minimum wage workers on the income distribution.

Today's high level of inequality in the USA, particularly in the lower half of the income distribution, is the result of a period of strong inequality growth during the 1980s. The level and

⁴⁹ An uneven development in the lower and middle ranges of the income distribution could also include the case where the percentile values in the lower range develop positively, while the value of the median declines due to the influence of minimum wage households. This suggests that the development of the incomes of households affected by the minimum wage at the median is unfavorable compared to the reference group. If the focus of a measure is to improve the situation of low-income households, the development at the median is of secondary concern. Households with incomes in the median range of the overall income distribution necessarily have other sources of income anyway, with incomes significantly higher than those from minimum wage employment. Such households are not the target group of social policy anyway, but rather a socio-politically inefficient side effect of a measure.

trends in the distribution of income is in particular influenced by earnings from work accruing to the members of households (Salverda, Nolan, and Smeeding 2011a). Thus, it appears reasonable to presume that one of the most significant labor market institutions, the regulation of minimum wages, can affect the extent of income inequality. Although there is a lack of analyses of the impact of minimum wages on the growth of income inequality, scholars argue that some of the increase in income inequality can be attributed to the declining real value of the minimum wage, which is the result of political processes that increasingly favor pro-inequality forces (Morris and Western 2008; Grusky and Ku 2008). Workers have historically been able to capture rents through institutions that have weakened in the past 40 years. This applies particularly to the decline in the real value of the minimum wage during the 1980s and the decline in the proportion of the labor force that is unionized (Weeden and Grusky 2014). This destruction in rent is concentrated in the bottom of the income distribution, and thus contributed to an increase in income inequality in general as well as within the lower half of the income distribution (Morgan and Cha 2007; Weeden and Grusky 2014; Grusky and MacLean 2016). This assumption is strengthened also by evidence that today's level of income inequality is a consequence of strong growth in wage inequality in the lower half of the wage distribution during the 1980s (Blackburn and Bloom 1991). This growth in wage inequality, further, was to a large part caused by the decreasing real value of the minimum wage during the 1980s. Even though scholars still debate the extent to which the increase in inequality was related to minimum wages, they agree that this was one of the crucial drivers (Autor, Manning, and Smith 2016; DiNardo, Fortin, and Lemieux 1996; Fortin and Lemieux 1997; Western and Rosenfeld 2011). Following the same argumentation, I argue that the rising real levels of statutory minimum wages across states and their growing bite could potentially combat income inequality and that they should have an inequality-reducing effect.

To this end, I use a repeated cross-sectional design and estimate the contribution of households with minimum wage earners to changes in all quantile values in the lower half of the income distribution using unconditional quantile regression. Using an Oaxaca-Blinder decomposition, I distinguish income structure effects from composition effects. I assume that the changes in minimum wage policy and the changing social and tax policy landscape were associated with an improvement in the income situation of households with minimum wage earners and that this contributed to a decline in income inequality in the lower half of the income distribution. Such income structure effects must be distinguished from composition effects that result from a change in the mere proportion of households with minimum wage earners.

I hypothesize that the within-group income situation of households with minimum wage earners changed in the long term in a way that led to rising incomes in the lower area of the income distribution, which reduced the income gap between low-income households and households at the median and ultimately had an inequality-decreasing effect in the lower half of the income distribution. I assume that the income situation among households with minimum wage earners has improved not only due to rising hourly wages of the household members working for the minimum wage, but also due to the composition of the group of households with minimum wage earners, which has changed over time: The group increasingly consists of households in which minimum wage workers are the main earners in their households and thus contribute the majority of the total income in these households.

Furthermore, I assume that this effect is more pronounced for the narrower definitions of income than the broader definitions. The narrower definition of households' labor or market income disregards households' transfer receipts, so that unfavorable interaction effects with the transfer system do not diminish the positive impact of rising minimum wages. Among the broader definitions of gross and net household income I assume that the effect is more pronounced for the income concepts that include tax refunds as an income component.

Changes in the tax system increasingly support low-income households in employment, and tax refunds play a particularly prominent role as one of the largest cash income support programs today. Therefore, I expect that the traditional definition of gross household income, which does not account for tax refunds as an additional income source, will be less affected than the distribution of the broader definition of gross household income, including tax refunds, or the income concept of disposable household income, which includes tax refunds as an income source and also accounts for households' income tax and social security tax liability. Due to the changes in the income tax system, which is increasingly used as a form of public income support, I expect the relationship between higher labor income through minimum wages and households' tax liability to be more favorable in 2018 than in 1989. Because of this, I hypothesize that model specifications that control for changes in the income tax system will lead to smaller estimates regarding the contribution of minimum wage households to lower quantile values.

I further assume that the interplay of minimum wages and progressive tax policy is particularly beneficial for low-income households. Based on interaction effects, I will investigate whether this has contributed to a reduction in income inequality. Furthermore, on this basis, I will discuss whether the positive effects on the lower quantiles of households with minimum wage earners depend more on progressive tax policy than that the positive effect of progressive tax policy depends on the fact that households benefiting from it also belong to the target group of minimum wage policy.

H1. Households with a minimum wage earner have contributed to positive changes in lower percentile values, which in turn have contributed to a decline in income inequality.

H1a. The inequality-decreasing impact is more pronounced for the distribution of narrower definitions of household income than for the distribution of households' gross or disposable income.

H1b. The inequality-decreasing impact is more pronounced for income measures that include tax refunds as a source of income compared to those that do not account for income support through tax refunds.

H2. The contribution of households with minimum wage earners to lower percentile values is more positive when considered in the setting of the changed income tax system than when these changes are controlled for.

H3. Households with a minimum wage earner who also receive tax refunds have contributed more to positive changes in lower percentile values of the distribution of net household income than households with minimum wage earners who do not receive tax refunds.

7. Data and methods

My objective is to investigate the impact of income changes of households with members who work for hourly wage rates at the prevailing statutory minimum wage on income inequality over time. I focus on the bottom half of the distribution to determine whether changes in minimum wage levels supported low-income households and to estimate the contribution of affected households to changes in the income distribution.

All variables relate to household-level characteristics and are measured at the household level. I estimate their contributions to changes in income inequality between 1989 and 2018 by decomposing multivariate unconditional quantile regressions over time. This timeframe allows me to study the long-term growth in the bite of the minimum wage with incremental adjustments in minimum wage policy. Moreover, I am able to control for changes in the composition of households over time due to migration, up-skilling, increased labor-force participation of women and disadvantaged ethnic groups and the ageing of the population.

7.1. The CPS ASEC data

I use the 1990-2019 Annual Social and Economic Supplement of the Census Bureau's Current Population Survey (CPS), as distributed by the IPUMS project (Flood et al. 2020). This means that my analysis refers to the income reporting years 1989-2018, covering a time period with four increases in the level of the federal minimum wage (subsuming stepwise increases), and a total of 532 minimum wage hikes across states.

The IPUMS-CPS is an integrated set of data of all waves of the Current Population Survey (CPS) starting in 1962. The CPS is conducted jointly by the US Census Bureau and the Bureau of Labor Statistics and collects nationally representative data on the non-institutionalized US civilian population (Flood et al. 2020). It is a monthly survey of around 90,000 households per year (around 70,000 in the early 1990s, around 100,000 in the 2000s), which was originally designed to measure unemployment. The CPS is one of the oldest, largest, and most well recognized surveys in the United States. Its Annual Social and Economic Supplement (ASEC) provides the most timely and accurate national data on income for the USA and therefore serves as a premier source of national estimates on income and earnings. It is the sole source of historical U.S. poverty estimates and the official national poverty estimates for use by the Federal Government (Edwards and Creamer 2019).

The CPS is primarily a labor force survey and not an income survey. It is conducted every month by the Census Bureau for the Bureau of Labor Statistics using Computer-Assisted Telephone Interviewing (CATI) and Computer-Assisted Personal Interviewing (CAPI). Today, the CPS includes a core questionnaire for labor force and demographic questions, known as the "basic monthly survey", which is asked responding households every month. The monthly Basic CPS is used for unemployment rate estimates on a monthly basis. While the CPS initially was a labor force survey, over time, supplemental inquiries on special topics have been added for particular months. Today, in most of the months, additional Supplements are added to the Basic CPS. The Annual Social and Economic Supplement (ASEC) was implemented back in 1959 and is today conducted in February, March, and April with a sample of about 90,000 addresses per year. It collects data on more than 50 income sources of households and records

up to 27 different income amounts, including receipt of numerous in-kind benefits, such as Supplemental Nutrition Assistance (formerly known as the food stamp program), subsidized school lunches, and housing assistance. The rich details on family and household incomes makes the CPS ASEC the source for the calculation of official poverty rates by the US Census Bureau (U.S. Census Bureau 2019e).

The CPS sample is a probability sample designed primarily to produce national and state estimates of labor force characteristics of the civilian non-institutional population 16 years of age and older. It consists of independent samples for all 50 states and the District of Columbia, which makes it possible to tailor the state samples specifically to the demographic and labor market conditions that prevail in that particular state. It has a rotational design referred to as a 4-8-4 sampling scheme, which means that households are in the survey for four consecutive months, out for eight months, before returning for another four months. Afterwards, these households leave the sample permanently. Individuals who are 15 years and older and who are not in the Armed Forces are eligible to participate. People in institutions, such as prisons, long-term care hospitals, and nursing homes are ineligible to be interviewed in the CPS. One person generally responds for all eligible members of the household. This “reference person” is usually the person who owns or rents the housing unit (U.S. Census Bureau 2018a).

Over time, supplemental inquiries on special topics have been added for particular months. Among these supplemental surveys, the Annual Social and Economic Supplement (hereafter referred to as the ASEC) is the most widely used by social scientists and policymakers. The ASEC along with basic monthly data from the CPS provides the data for IPUMS-CPS. To make cross-time comparisons using the CPS data more feasible, variables in IPUMS-CPS are harmonized through identical coding for 1962 forward.

I extracted both the monthly core CPS as well as the ASEC from the Integrated Public Use Microdata Series (IPUMS), which is a dataset produced by the Minnesota Population Center. IPUMS-CPS contains harmonized data from every Annual Social and Economic Supplement (ASEC) supplement and all other supplements from 1976 to present (Flood et al. 2018).

In addition to the variables described above that are included in the Census data, the IPUMS-CPS ASEC includes additional information on work and income, such as participation in welfare programs, job search, union membership, hourly wages, health insurance, and tax liability.

7.1.1. CPS ASEC: Comparability over time

I use the 1990 and 2019 CPS ASEC waves for the analyses, but I use the whole timeframe for a descriptive overview of the policy context regarding minimum wage levels, the income situation of households with minimum wage workers, and their demographics. This timeframe reflects the income reporting years from 1989 to 2018. It begins with the incremental increase in the federal minimum wage from 1989 to 1991 and concludes just before the onset of the coronavirus pandemic. It covers a period that reflects the increasing variance in minimum wage levels, the shift from a welfare to a workfare system including major changes in income tax and transfer policies, and profound social structural changes in the population.

I do not consider more recent years, as the ASEC 2020 was in the field during the coronavirus pandemic. Although the income reference year itself is not affected by the pandemic, the survey

itself was affected to an extent that had strong consequences for the response rates, the selectivity of the sample and subsequently also for the updating of the time series of the income data. The comparability of the income data between 2018 and 2019 is limited despite additional weighting procedures.⁵⁰

The coronavirus pandemic heavily affected interviewing and response rates. The ASEC supplement of the CPS is collected yearly in March. In 2020, interviewing for the “March CPS” began on March 15th. To protect the health and safety of Census Bureau staff and respondents, in-person interviewing was halted, and the two Computer-Assisted Telephone Interviewing (CATI) contact centers were closed on March 20th. Therefore, no CATI follow-up occurred after March 20th, which resulted in higher nonresponse for both the basic CPS and the ASEC Supplement. For the remainder of March and into April, the Census Bureau continued to attempt to conduct all interviews by telephone (U.S. Census Bureau 2020).

The response rate of the CPS basic household survey in March 2020 was 10 percentage points lower than in the same period in 2019. In addition, the response rate for households entering the sample for their first month of interviewing, who would normally have been interviewed in person, was especially low (30 percentage points lower than the average for the prior 12 months). As the ASEC selects households only from those in their first or fifth contact, the lower response rates among households contacted first translates directly into fewer potential ASEC households (U.S. Census Bureau 2020). In addition to the unique increase in survey nonresponse during the pandemic, nonresponse was more strongly associated with income than in prior years. Nonresponse biased income estimates up substantially, which was not the case in other years. Real median household income increased to \$68,700 in 2019 (based on the 2020 ASEC), up by 6.8% from 2018 using the delivered survey weights. As Rothbaum and Bee (2021) show in a Census Bureau working paper, adjusting for nonresponse bias leads to median household incomes of 66,790, 2.8 lower compared to the unadjusted estimates. Nonresponse bias was associated with educational levels of respondents, Hispanic origin, citizenship and nativity.

With regard to the monthly CPS, there is evidence of non-random attrition since the beginning of the coronavirus pandemic. For example, persons who responded in the CPS in February 2020, but were not present in the March 2020 sample were on average younger, more diverse, and less educated than those who continued to respond in March (Montenovo et al. 2021). For these reasons, in addition to the generally lower number of cases, I will use the 2019 ASEC for the analyses, i.e. the income reference year 2018 as the last year of the observation period.

Due to revised weighting procedures, revised demographic and family edits, revised imputation procedures, and more detailed income information in the new rewrite system from March 1989 forward, comparisons cannot be made between years before and after 1988. My analyses are based on CPS ASEC data from 1990 to 2019 and are thus not affected by the rewritten system.

In 2019, a redesigned processing system for the ASEC supplement was implemented, which took advantage of the redesigned questions for income and health insurance coverage. The

⁵⁰ I did descriptive analyses based on the 2020 ASEC with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse during the coronavirus pandemic, which show that the bias can be reduced. However, there is still a break in the time series with a sudden change in income (several income sources are affected) from ASEC 2019 to ASEC 2020.

redesigned income questions were introduced in 2014, together with redesigned questions on relationships within households that divides spouse and unmarried categories into opposite and same-sex groups, which also affected the parent pointers of children living in a household (U.S. Census Bureau 2020).⁵¹

Same-sex survey respondents have always had the ability to report themselves as married in the CPS ASEC, but prior to 2010, these responses were edited to convert the sex of one of the respondents so that they were classified as opposite-sex married couples (Edwards and Lindstrom 2017). In the 2019 data, same-sex married couples are identified as such. This change does not affect my analyses comparing 1989 and 2019, as variables generated on basis of partners in households are independent of their sex (e.g., a dual-earner household is a dual-earner household irrespective of the sex of respondents).

The 2014 CPS ASEC questionnaire redesign was implemented as a break-in series. The Census Bureau split the panel samples in a way that one sample received the old questions while the other received the redesigned income questions. The redesigned questions incorporated recommendations on new question wording, order, skip patterns, and data editing techniques to improve data quality by limiting the misreporting of income amounts and reducing item nonresponse rates and respondent fatigue (Edwards and Creamer 2019).

The Census Bureau then published dual estimates of income and poverty for 2013 across the split panel samples to allow comparisons backwards and forwards for data users (Edwards and Creamer 2019). On basis of the redesigned income questions, overall median household income was 3.2% higher compared to the sample receiving the old income questions, but these differences varied across demographic groups. There was no statistically significant impact on poverty rates for 2013 across the split panel design (DeNavas-Walt and Proctor 2015).

7.1.2. Advantages and limitations of the CPS ASEC

The Current Population Survey (CPS) is one of the oldest, largest, and most well recognized surveys in the United States. The CPS Annual Social and Economic Supplement (ASEC) serves as a premier source of national estimates on income and earnings and offers historical time series. It is the sole source of historical U.S. poverty estimates and the official national poverty estimates for use by the Federal Government (Edwards and Creamer 2019).

The U.S. Census Bureau reports income and poverty estimates from several major national household surveys and programs, such as the American Community Survey (ACS), the Survey of Income and Program Participation (SIPP), the Census 2000 long form, or the Small Area Income and Poverty Estimates Program (SAIPE), the CPS ASEC provides the most timely and accurate national data on income for the USA and is thus the preferred source for national analysis. It is smaller in sample size than the ACS, which has sample sizes of approximately 3.5 million addresses compared to the 90,000 addresses in the CPS ASEC. For subnational data on income and poverty by detailed demographic characteristics the ACS is therefore the preferable data source. However, the U.S. Census Bureau recommends users looking for consistent and most accurate data to use CPS ASEC data. In case of state-level analyses, the

⁵¹ While data collection methods reflected the changes immediately in 2014 (regarding the income questions) and 2015 (regarding the partner pointers for opposite- and same-sex couples), data processing changes were finalized only in 2019.

Census Bureau recommends using 2-year or 3-year averages for state-level trends and state to state comparisons, respectively (U.S. Census Bureau 2019e). Annual ACS data is available back to 2005 only, but its historic decennial estimates for available also for 1989 and 1999. Annual CPS ASEC data is available back to 1959. As the goal in this thesis is to explain changes in national income inequality, and not state-level changes, CPS ASEC data fits its needs best with most accurate and timely data on income (see below on the level of detail in income questions). In addition, the CPS is an employment survey in the first place and therefore offers the best combination on accurate information on income on the one hand and employment on the other. The Panel Study of Income Dynamics (PSID) offers an alternative data source on basis of a longitudinal panel survey of American families, conducted by the Survey Research Center at the University of Michigan. It offers an over-sample of low-income families, but overall case numbers lie between 7,100 and 9,600 cases for the time period of interest (Institute for Social Research 2023).

Besides the large sample sizes from year to year, the main advantage of the CPS ASEC data is its highly accurate way of income data collection. It collects more than fifty sources of money income and both cash and noncash transfer programs. This is the major advantage of the CPS ASEC over the ACS which includes only eight questions collecting money income and only the largest type of noncash benefit program (SNAP). The SIPP would offer even more detailed questions on income and program participation, with reporting at the monthly level for most income and program sources but offers to small sample sizes. Besides income sources, the CPS ASEC also offers simulated federal and state taxes and credits through an in-house simulation program from the Census Bureau (see also section 7.2). In addition to the more detailed income data, the distinction of families and subfamilies within households is not possible with the ACS, which is necessary to identify unique tax units and the family units for the official poverty estimates.

Together, the CPS ASEC the best combination among the other surveys: its sample sizes are large, and its income data is highly accurate and detailed. While the ACS offers larger sample sizes, but only very limited data on income and noncash benefit programs, the SIPP offers the most detailed questions on income and program participation, but limited sample sizes. The research design and analyses of this thesis rely both on high-quality information on income and large sample sizes. For a comprehensive look on changes in the income distribution, estimations are performed for a large number of percentiles and their accuracy relies on the density of household incomes in the lower tail of the distribution as well. Given its large sample size, the CPS “is able to capture distributional characteristics of the whole population relatively accurately” (Gouskova, Andreski, and Schoeni 2010:2). One main contribution of the research design of this thesis to the literature on possible effects of minimum wages on income inequality is the assessment of the impact of households directly affected by the minimum wage on income inequality. This means that, unlike in other research designs, I estimate the impact of a subgroup of the population on the income distribution of the total population. However, this advancement comes at a cost: While other studies examine the impact on aggregate measures in the total population or the whole working-age populations, this work relies on identifying a relatively small target group, i.e. households with at least one person working on minimum wage level over the year. These households represent a relatively small proportion of the total population, which makes a sufficient sample even more relevant. Precise estimates in the multivariate

analyses, detailed descriptive analyses, and disaggregated analyses of the income situation of minimum-wage households with different employment patterns or other demographic characteristics require sufficiently large sample sizes.

The ASEC further facilitates the analysis of certain household types on overall income inequality in an annual time frame. Respondents are interviewed February to April answering questions about the previous calendar year. This makes information across households more comparable than in case of the ACS, where respondents are interviewed throughout the year referencing the 12-month period prior to the period (U.S. Census Bureau 2019e). The consistent annual time frame for data collection is preferred to shorter time periods, such as monthly data on incomes. Annual data on the income situation of affected households better captures the more permanent economic resources and well-being of households (Brady et al. 2018).

As with all surveys, self-reporting total income or the amount of single income components can be biased. In the context of poverty measurement, research suggests that there can be errors in the reporting of income in surveys. For example, people may not report income earned from informal sources or criminal activity (Edin and Lein 1997) and transfer income may be underreported (Meyer, Mok, and Sullivan 2015; Meyer and Sullivan 2012). However, the CPS is considered highly reliable and has been used to generate the official employment and poverty estimates for decades. The CPS ASEC is the basis for the calculation of data on income, earnings, income inequality, and of official poverty rates by the US Census Bureau. Nonresponse bias in US surveys is generally concentrated in the highest income rungs, meaning that analyses on the lower half of the income distribution as in this thesis are affected only to a limited amount. However, research using administrative data on recipients in welfare programs to compare CPS ASEC survey data with official numbers suggests that the ASEC underreports the value of means-tested transfers. This means that the income of low-income households is underestimated and thus the incidence of poverty is being overestimated. Parolin (2019b) states that more than a third of the total cash or near-cash transfers in 2015 from SNAP, TANF, and SSI remains unmeasured in the CPS ASEC. However, administrative records for certain programs are only available for a subset of states and thus, corrections for data rely on simulation models which lead to imperfect results (Parolin 2019b; Stevens, Fox, and Heggeness 2018).

As with other income components, nonresponse and bias can be a problem in earnings data as well. Earnings are not missing at random, which means that measures of earnings gaps and distributions can be biased. Nonresponse across the earnings distribution is U-shaped and highest in the lowest and highest tails across a wide range of characteristics such as gender, race, ethnicity, employment status (Bollinger et al. 2019). In comparison with administrative tax data from the Social Security Detailed Earnings Record (DER), it appears that – on average – female nonrespondents have slightly lower earnings than respondents, and that male nonrespondents have slightly higher earnings than respondents. On average, the impact of nonresponse bias is small, but it is crucial for (non-)respondents with very high or low earnings. Moreover, nonresponse in the left tail is associated primarily with low hourly wages, and not low earnings resulting from low hours worked. The highest nonresponse rates with regard to average hourly earnings are for men through the lowest 30 centiles and women through the lowest 25 centiles. Thus, both women and men earning low hourly wages have high probabilities to not respond to earnings questions in the ASEC (Bollinger et al. 2019). In

addition, when respondents give information on earnings, individuals with low earnings tend to overreport their earnings, while individuals with higher earnings tend to underreport. Both these patterns add up to data produced by “noncooperative” survey respondents with low wages (Bollinger et al. 2019:2164), who either do not respond or who overreport their earnings. Altogether, these problems with earnings data suggest that when identifying minimum wage earners, using a bandwidth allowing for slightly lower and higher hourly earnings can be useful (see section 7.5.2 for a detailed description of the variables and their definitions).

In the ASEC, the Census Bureau imputes missing earnings values with those of other individuals with similar characteristics.⁵² In addition, Census imputes (whole-supplement) information for households that participate and respond in the monthly CPS but refuse to participate in the ASEC. These imputation procedures became increasingly important over time as total nonresponse (item nonresponse and whole-supplement nonresponse) increased strongly, from below 20% at the end of the 1980s to more than 40% in 2015 (Bollinger et al. 2019). Nonresponse across the *earnings* distribution is U-shaped and highest in the lowest and highest tails across a wide range of characteristics such as gender, race, ethnicity, employment status (Bollinger et al. 2019). However, administrative tax data from the Social Security Detailed Earnings Record (DER), which offers most detailed data on wages and earnings, does not contain information on other household members of a given worker.

Many studies on income inequality use individual tax return data, especially for the estimation of top income shares in the USA. Tax data provide better measures of top incomes than surveys as nonresponse bias in US surveys is generally concentrated in the highest income rungs. As described above, the lower bottom of the income distribution is less affected by nonresponse but by errors in the reporting of income from different sources. Transfer income may be underreported (Meyer, Mok, and Sullivan 2015; Meyer and Sullivan 2012) and income earned from informal sources or criminal activity may not be reported at all (Edin and Lein 1997). However, important income sources are missing in tax data, and they might miss substantial proportions of personal income, with estimates suggesting up to 40% in recent years, including underreported incomes and, e.g., employer-provided insurance benefits (Auten and Splinter 2019). Moreover, tax filers have a financial incentive to report their income in ways that limit their tax liabilities or that maximize their tax credits. This makes filing behavior sensitive to changes in the personal income tax rate and the rules of different tax credits and breaks (Burkhauser et al. 2012). In addition, studies relying on tax data rely on the definition of tax units as the observation units instead of adults. This may be inappropriate for long-term analyses, as marriage rates have declined over time and differently in different income areas, which may systematically bias estimations of income distributions. Detailed information besides earnings and income is very limited in tax data for the tax unit as well as other household members (respectively dependents) of the tax filing person.

Given the sample size, timeliness, and availability of annual data over many years, as well as the high level of detail in the information on income, earnings, and employment status of individuals and households, the CPS ASEC is the best choice among other survey data for this work. Moreover, despite the limitation of survey data in general that they suffer from potential nonresponse bias and income underreporting, they provide the level of detail of other

⁵² For a documentation of the Census hot-deck methods for imputation for the CPS ASEC, see Welniak (1990).

information on individuals and households, such as demographic information, relationships among household members, their educational attainment, which data from tax authorities cannot provide.

7.2. Augmenting the survey data with aggregate data and tax simulations

I augment the CPS data with information on federal and state minimum wages and other macro data such as population estimates, employment and unemployment estimates, figures on gross state product and annual personal income, and state EITC rate from the UKCPR National Welfare Data, provided by the University of Kentucky Center for Poverty Research. It is a publicly available state-level panel data series covering population, employment, unemployment, welfare, poverty, and politics, which is updated annually (University of Kentucky Center for Poverty Research 2021). Data on federal and state minimum wages are derived from the Department of Labor Wage and Hour Division (U.S. Department of Labor Wage and Hour Division 2021). In addition, I augment data on union density and union coverage for all years and states (Hirsch, Macpherson, and Vroman 2001). The survey data is augmented with macro data of the previous year, so that aggregate figures match the respective income reference year.

Given that the reference period of all income questions is the past 12 months in CPS ASEC, the matching of macro data on minimum wages as well as unemployment rates or union density and coverage must take into account relocations of households across states. I match the households' state of residency of the previous year on which information on incomes is collected with the respective macro data of that state in the previous. If a household stated to have lived in Colorado in the last year, for example the income reference year 2018, then the macro data for year 2018 of Colorado is matched to that family's survey data, and not that of the state they currently reside in. I create a variable that shows a households' state of residence in the previous year, which I use to merge data. For households with missing information on the state of residence one year ago in the CPS ASEC, I use their current state of residency. Relocations across states are considered and the state of residency of the previous year is matched to the respective statutory minimum wage of that state in the previous year to the data. For example, if in survey year 2019 a household reports to have resided in Colorado in the last year, I match this household's data with Colorado's 2018 statutory minimum wage.⁵³

The goal is to estimate the impact of households affected by minimum wages on changes in the income distribution over time. Different income concepts will be used to study changes in their distribution, enabling a comparison between the potential contribution of households with minimum wage earners to the inequality of broader income concepts such as disposable and gross incomes as well as narrower concepts such as market and labor incomes. The investigation of the distribution of disposable household income (i.e., net household income) extends beyond the more commonly used measure of gross household income in empirical studies in this field. This approach provides a deeper understanding of the impact on household-level income concepts and contributes to the research landscape on the effects of the minimum

⁵³ Households that report having lived abroad last year are excluded from the analyses. This applies to approximately 7,100 households out of a total of 2.2 million households for all years, or approximately 261 (households out of a total of 68,000 (59,804) households in survey year 2019 (1990)).

wage. However, the IPUMS-CPS data does not include information on disposable household income. Federal and state income tax liabilities, social security contributions, or refundable tax credits are not directly reported in the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) or in any other microdata source that enables the analysis of households' income situation and other socio-economic information in detail (e.g., the Survey of Income and Program Participation (SIPP) or the American Community Survey (ACS)). The Census Bureau calculates payroll taxes and federal and state income taxes with a tax simulation model developed in-house. However, estimates provided by TAXSIM, the tax simulation model from the National Bureau of Economic Research (NBER), offer a higher quality, while the Census Bureau's in-house calculations are likely to be discontinued (Wheaton and Stevens 2016). I therefore make use of the TAXSIM simulation model and provide information on the identification of tax units and tax data augmentation below.

7.2.1. Identification of tax units and augmentation of their information in the simulation program

For the identification of tax units, I follow Piketty and Saez (2007) and define potential tax units as a married couple of any age, a divorced or widowed individual of any age, or a single individual over the age of 20. The dataset used in the tax simulation program must include only one observation per tax unit, providing information for the entire tax unit. This means that the single observation is augmented with data on: the tax year, the state they live in, their marital status, the age of the primary taxpayer and their spouse (if any), the number of dependents, the number of children under 13 and under 17 for the calculation of Dependent Care Credit and Child Credit, and the number of qualifying children for the EITC, the wage and salary income of the primary taxpayer and their spouse, including self-employment, dividend income, income from interest, rent, and alimonies, imputed rent for an owned home other property income, taxable pensions, gross social security benefits, unemployment compensation received, other non-taxable transfer income like from welfare, worker's compensation, income from veteran's benefits and from Social security Income, and property taxes paid.

The simulation returns around forty columns of data of which for our analyses, estimates of the federal income tax liability (including refundable and non-refundable credits), state income tax liability, FICA (sum of employee and employer), and tax credits are relevant. I add up the simulated tax liabilities of all tax units in a household, resulting in three major figures at the household level: households' federal tax liabilities, state tax liabilities, and employees' share in payroll deductions. Furthermore, I can distinguish between different types of tax credits.

Further information on the TAXSIM simulation program is provided by Feenberg (2019) and Feenberg and Coutts (1993).

7.2.2. Social security contributions

FICA tax liabilities are simulated based on incomes from salary and wages of primary and secondary earners of the tax unit, without considering the industry of their workplace. This means that workers who are exempt from social security taxes, like some state and local government workers, are assigned a simulated FICA tax rate according to their earned income,

even though they might be covered only by their public pension coverage, by Social Security only (and not Medicare), or a mix of both.

I use these figures on social security liabilities of individuals to calculate household-level liabilities, which are a sum of the liability of all working household members. A household's social security tax liability can be zero when no one in the household is working.

7.2.3. Income tax liability of households

To calculate the income tax liability of households, I sum up households' simulated federal and state income tax liabilities from TAXSIM, excluding refundable tax credits. I use the figures on federal and state tax credits (general tax credits, Child Tax Credit, Additional Child Tax Credit, Child Care Credit, and Earned Income Tax Credit) and use them for the calculations as follows: I subtract them from the total federal and state income tax liability to calculate the effective tax liability of households. In case of refundable credits (Additional Child Tax Credit and Earned Income Tax Credit, refundable state EITC), a surplus can result in negative income tax liabilities as families receive a lump-sum refund of credits exceeding their payable tax after filing their taxes. Because of this, I add a tax unit's surplus of refundable tax credits to their gross income, as the benefits through tax credits are an additional income source for these families. This is a common procedure also in literature studying poverty on basis of more comprehensive measures than the official poverty indicator. I include both federal and state-level refundable credits. In 2019, 23 states had refundable state EITCs. In 1989, this applied to only two states, namely Vermont and Wisconsin (University of Kentucky Center for Poverty Research 2021). In states in which the state EITC is non-refundable, the credit amount is not added to households' total gross income as an additional income source.

Interpretations regarding the amount of payable income taxes or tax refunds must be made with caution because the simulations cannot account for variations in households' uptake of tax credits or claims for itemized deductions, such as those due to income-related expenses. The amount of tax credits, respectively the additional income from tax refunds, only reflect what families would theoretically be eligible for if they filed their taxes and claimed their tax credits. This is not to be confused with actual take-up. Specific subgroups such as unauthorized immigrants, are unlikely to file their taxes and hence do not receive tax credits. This may explain differences between simulated payable taxes and tax refunds and the reported values from the survey. However, on average, the differences are small.

7.3. Time frame

Before presenting the descriptive and multivariate results, I will outline the time period in which the analyses are situated. Chapter 8 is dedicated to the broader context of the observed policy changes and trends in the distribution of various household income concepts. I will illustrate trends in income and wage inequalities and present trends in minimum wages over a broader period, from 1987 – the first year that allows the simulation of households' tax liability – through 2019, based on ASEC 2020 data, which already reflects the impact of the coronavirus pandemic. Thus, the sources of these illustrated trends are CPS ASEC survey years 1988 to 2020, and macro data from 1987 to 2019. The analysis period for the descriptive and multivariate analyses begins in 1989, prior to the incremental federal minimum wage increase

from 1989 to 1991, and concludes in 2018, before data collection experienced difficulties and biased nonresponse.

The unique identification of single tax units within households in the dataset is possible through the delivered variables on family interrelationships. Family type reports the Census family type of each person in a household and enables grouping primary families and related subfamilies and which is also used for the official poverty statistics. The IPUMS-delivered variable for family unit membership identifies each person's family within a housing unit, enabling the distinction between multiple unrelated subfamilies. Additionally, the relationship to family variable specifies a person's relationship to their Census-defined subfamily unit, available from ASEC 1988 onwards. Therefore, merging simulated tax data is adequately feasible starting from the tax year 1987.

The value of received food stamps, respectively benefits from the Supplemental Nutrition Assistance Program, and the value of energy subsidies has been available since ASEC 1980 and 1982, respectively. This enables a consistent measurement of gross household incomes including the amount of tax refunds through the Earned Income Tax Credit as well as meaningful in-kind benefits.

Information on additional near-cash income components, i.e. the value of public housing subsidies and school lunches, and returns to home equity, is available only starting in ASEC 1992. These income sources are therefore not included in the analyses to make comparisons over time possible for the whole analysis period based on survey years 1990 and 2019.⁵⁴

The long time frame allows to monitor the long-term trend of economic well-being of households in which persons work for wages at the level of the prevailing statutory minimum wage.

7.4. Analytic sample

The analytic sample is limited to the non-institutionalized population living in civilian households. As described in section 7.2, the reference period of all income questions is the past 12 months in CPS ASEC. As I investigate the effect of minimum wage policy in the USA on the income situation of households and income inequality in the total population, only households with income information in the USA is relevant. Households that report having lived abroad in the income reference year are thus excluded from the analyses.⁵⁵

The analyses are performed based on household-level information, using households as the analysis units. Measures of income inequality are based on the distribution of household incomes for all income concepts used (net, gross, market, and labor household income). I generate all household-level variables on basis of information from all household members and

⁵⁴ As a robustness check, I ran analyses using ASEC 1992 data to compare the results with and without the inclusion of the additional income information. The inclusion of these additional income sources does not substantially alter the results of the multivariate analyses for the period of 1991 to 2018. However, the choice of the later starting year based on ASEC 1992 instead of ASEC 1990 makes a difference, which seems plausible due to the increases in the federal minimum wage from 1989 to 1991.

⁵⁵ This applies to approximately 7,100 households out of a total of 2.2 million households for all years, or 177 (261) households out of a total of 68,345 (59,804) households in survey year 2019 (1990).

then keep only one record per household for the analyses.⁵⁶ This results in an analysis sample based on households instead of individuals as units of analysis. This is consistent with the research design based on the idea of measuring the impact of households with minimum wage workers on overall income inequality over time. The choice of the household as the unit of analysis is common and assumes that income is aggregated or shared among all persons living in a household. While a considerable part of income comes from earnings of different persons living in a household, total income is also significantly influenced by the overall composition of the household members. For example, entitlements to transfer receipt and the assessment of payable income taxes are often based on all income sources of all persons living in a household (or family, depending on definitions of different transfer programs and tax policy).⁵⁷ Research on poverty, in particular, is centered on the household utility function as developed by Becker (1974). He argues that poverty can be measured by summing all the resources of the family or household unit, which household members are presumed to have in common and share equally in practice. Therefore, each household member's circumstances are considered the same in relation to poverty. This assumption on equally shared resources still dominates, even though inequalities within households are discussed increasingly more. Therefore, individual welfare depends on the economic situation, settings, and belongings of the entire household. The household is the “ultimate destination of welfare consumption and allocation” (Esping-Andersen 2011).

Finally, the analysis sample is limited to households that have valid information on all used variables in the multivariate analyses, but this reduces the number of cases only marginally⁵⁸. In addition, households with zero gross or net incomes are excluded from the analyses, which accounts to approximately 0.6% of the sample with valid data on all other variables.⁵⁹

Both descriptive and multivariate analyses are based on this analysis sample (referred to as the “full analysis sample” from now on). Within this sample, approximately 20% have no income from labor, and about 6.5% have zero market income. Market income is defined as the sum of income from earnings and other income sources that are not considered as public transfers, such as income from interest, dividends, rents, non-government retirement pension incomes and annuities, child support, alimonies and other private transfers. When estimating the impact of

⁵⁶ I keep the Census-defined “householder”, which refers to the person in whose name the housing unit is owned or rented (maintained) or, in cases in which no such person exists, any adult member (excluding roomers, boarders, or paid employees). If the house, respectively the housing unit is owned or rented jointly by a married couple, the household may be either of the two partners. The person designated as the householder is then defined as the so-called “reference person” to whom the relationship of all other household members is recorded. There is strictly only one householder defined per household, which means that the number of householders is equal to the number of households (U.S. Census Bureau 2020b).

⁵⁷ Besides considerations of income sources based on the whole family respectively household constellation, studies may also be based on household-level analyses due to constraints imposed by non-individualized datasets, which do not allow to clearly distinguish available incomes to different household members Jantti, Sierminska, and Smeeding (2008).

⁵⁸ The proportion of missing values is below 0.2% for the variables on socio-demographics of households, and highest at around 1.4% in case of the variable for households’ disposable income.

⁵⁹ Zero-income households are likely to differ qualitatively from households with negative incomes, following work by Hlasny and colleagues (2021). Poverty and inequality measures can be altered by these households and when considering societies in which this group makes up a notable share in the population, such measures should be adjusted. The special treatment of such cases is beyond the scope of this work, and since the number of households and their share in the used sample would be very small, they are dropped from the analyses technically by taking the logarithm of households’ income. In total, less than 1% of all households have zero incomes regarding households’ total net or gross income.

households affected by minimum wage on the distribution of labor or market incomes, the analyses samples are accordingly more limited. Analyses on the impact on the distribution of gross and disposable household incomes includes households with zero incomes from labor or zero market incomes, as the goal is to estimate the impact of minimum wage policy on trends in inequality in the total population.

7.5. Variables: Description of income measures, covariates, and control variables

My aim is to investigate the impact of households targeted by minimum wage policy on income inequality over time. I will focus on the contribution of the changing income situation of households with minimum wage earners (income structure effects) to changes in percentile values across the distribution of different income concepts. This will be distinguished from the contribution of their changing proportion in the total population to changes in percentile values (composition effects). In addition to the stand-alone contribution of households with minimum wage earners, I will discuss their interrelationship with changing tax and transfer policies. This section provides a detailed description of these main covariates and all other control variables.

All variables relate to household-level characteristics and are measured at the household level. I generate all household-level variables on basis of information from all household members and then keep only one record per household for the analyses. Each household in the CPS has one person designated as the householder, who is the person in whose name the housing unit is rented or owned (U.S. Census Bureau 2019b).⁶⁰

All variables are defined as for the previous year to ensure consistency with the income reference year. For the household income variables, this means that the age of the respondents is defined as that of the previous year in order to ensure the consistency of the resulting equivalence scales. The same is done for the explanatory variables, which means that age of respondents of the previous year is used to identify household composition, and that respondents' labor force status and work intensity of the last year are used to identify households' labor force activity. To simulate households' tax liability, incomes on individual and household level of the income reference year are used. The calculated sum of transfers received in a household are based on reported incomes and near-cash social assistance of the previous year as well.

All variables are dummy coded to ease the interpretation of decomposition results. All covariates are measured at the household level. Descriptive statistics for all variables can be found in section 9.

7.5.1. Household income

The main goal is to estimate in how far minimum wages have the potential to reduce inequality in disposable incomes in the total population. It is the net disposable income of households that determines their standard of living and their opportunities, after their payable income and social

⁶⁰ If there is no person in whose name the housing unit is owned or rented, the householder refers to any adult member (excluding roomers, boards, or paid employees). If the housing unit is owned or rented jointly by a married couple, the householder may be either the husband or the wife. In all cases, the person designated as the householder on the file is the "reference person" on the control card to whom the relationship of all other household members, if any, is recorded.

security taxes, which can make up significant shares in total gross income, have been deducted. However, due to possible interaction effects with the public transfer and tax systems, the influence of minimum wage policy on income inequality might differ depending on the income concept used. For this reason, I compare the impact of households with at least one member working for the minimum wage on the distribution of various income types, ranging from disposable household income (the broadest and most comprehensive income concept) to gross household income, total market income, and finally to households' total labor income. In what follows, I will describe the different types of income and their operationalization. All income concepts used refer to the entire household, which serves as the income unit. This approach is common in income inequality research, even though some types of income actually flow to individuals, families, or tax-paying units. The underlying assumption for drawing meaningful conclusions from these measures is that income is fairly shared within the household (Morelli, Smeeding, and Thompson 2015).

Households' total labor income includes all income from labor of all household members, including salary, wages, and self-employment income from business or farming.

Households' market income, or factor income, refers to households' total income before public transfers and taxes (pre-transfer and pre-tax income), defined in accordance with standard literature (e.g., Kakwani 1977; Solt 2020) and major organizations (e.g., OECD or LIS). It includes all sorts of "market-produced" income: non-government retirement pensions, survivor pensions, disability pensions, retirement income from annuities, income from worker's compensation and unemployment benefits, interest, dividends, capital gains, income from rent. Market income includes private transfers, including income from child support or alimonies, other contributions from persons not living in the household. In addition, market income includes imputed return to home equity on owner-occupied housing (when available) and money not elsewhere classified.

Gross household income, often simply referred to as total household income, refers to the sum of all income sources of all household members living together. Compared to market income, gross household income additionally includes income from public transfers (and other income sources that potentially include both private and public sources). The additional income components of gross household income compared to total household market income are income from Social Security, income from welfare respectively public assistance, income from supplemental security income (SSI), income from educational assistance, income from veteran's benefits. Besides income from public transfers in the form of cash benefits, gross household income includes the value of near-cash in-kind transfers. I include the total value of food stamps (from the Supplemental Nutrition Assistance Program, or SNAP), the value of received energy subsidies, the family market value of school lunches and public housing subsidies received by the household during the previous calendar year. I generate two versions of the gross household income variable, one that includes the components listed above, and one that additionally includes the sum of tax refunds a household received at the end of the year. When the amount of tax credits a family is eligible for exceeds its tax liability, and at least part of these tax credits is refundable (such as the Additional Child Tax Credit and Earned Income Tax Credit), families can receive a tax refund after the end of the year. Since these tax refunds can constitute significant portions of total income, I account for them by creating two versions of gross household income: one excluding tax refunds and one including tax refunds received

by the household (more detail on the operationalization of the levels of tax liability of households can be found in section 7.5.3.1).

Finally, the disposable household income goes one step further from gross income and considers income taxes and social security taxes to be paid in sum by one household. When one household includes more than one tax unit, the tax liability of all tax units is summed up and then deducted from total gross household income (more detail on the operationalization of the levels of tax liability of households can be found in section 7.5.3.1).

IPUMS-CPS data does not include information on disposable household incomes because income tax liabilities at the federal and state levels, social security contributions, and refundable tax credits are not directly reported. To address this, I use the tax simulation program TAXSIM to simulate income tax and social security liabilities for all tax units in the data.⁶¹ TAXSIM simulates three key metrics required to generate post-tax household income information: federal tax liabilities, state tax liabilities, and FICA tax liabilities. The simulated income tax liability accounts for refundable and non-refundable tax credits that the tax unit is eligible for. If the sum of refundable tax credits exceeds the total tax liability, households have negative income tax liabilities. The FICA (Federal Insurance Contributions Act) tax liability is the sum of employer and employee shares. The simulated tax liabilities of all tax units in a household are then combined, resulting in three main metrics at the household level: federal tax liabilities, state tax liabilities, and employees' share in payroll deductions. Furthermore, different types of tax credits can be distinguished. This allows for the explicit estimation of the effect of (refundable) tax credits as a redistributive tool. Despite the shortcomings of simulations, they provide the ability to analyze the entire population, not just income tax units, as is the case with administrative data from tax authorities.⁶²

Post-tax household income is calculated by subtracting the total tax charge for federal and state tax liabilities and social security tax liabilities from total household pre-tax income.

The cash value of employer or government-provided health insurance, such as Medicare and Medicaid benefits, is not estimated or included in households' total income. This exclusion is common in income measurements⁶³ due to the substantial difficulties involved in accurately valuing and incorporating these benefits. First, benefits from medical insurance and aid do not make recipients better off than others with otherwise same amounts of income. Payments to cover expensive but necessary treatments do not result in any financial advantage over someone without similar payments and without the need for treatment. Second, medical insurance offsets medical expenses, which are unevenly distributed. This could mean that households with medical problems may look financially worse off than households with the same amount of income but without medical conditions (Wimer et al. 2020; Burkhauser and Simon 2008).

⁶¹ For the identification of tax units, I follow Piketty and Saez (2007) and define potential tax units as a married couple of any age, a divorced or widowed individual of any age, or a single individual over the age of 20 (for details see section 7.2.1). Further information on the TAXSIM simulation program is provided by the Feenberg (2019) and Feenberg and Coutts (1993).

⁶² Please note that these are simulated tax liabilities and that the tax credits are only the amounts tax units would be theoretically eligible for if they filed their taxes. They are not to be confused with actual take-up.

⁶³ For example, the measure of disposable net household incomes available in the harmonized data set of the Luxembourg Income Study or the measurement of income with the Supplemental Poverty Measure do not account for the cash value of benefits through employer or government-provided health insurance such as Medicare and Medicaid benefits.

Further, I do not account for other types of taxes besides income and payroll taxes (i.e. social security contributions) such as sales taxes, property taxes, corporate profits taxes, or excise taxes. Such taxes also affect the economic situation of households (Newman and O'Brien 2011), but data or simulations of their levels in individual households are generally rare and, in the case of the CPS ASEC, unavailable.

To account for the fact that larger households face greater costs, and that cohabitation generates economies of scale in consumption, different equivalence scales can be applied to income measures. These scales adjust household income to reflect that needs rise less than proportionately with household size. For example, a couple does not need to spend twice as much as a single person to achieve the same standard of living. I use all five income concepts in equivalized form using the modified OECD equivalence scale, which, along with the square root scale, is the most commonly used in inequality research (Atkinson and Bourguignon 2015; Morelli, Smeeding, and Thompson 2015; Atkinson 2015). To account for household size and economies of scale in consumption, equivalence scales adjust income measures by assigning weights to household members. The modified OECD equivalence scale assigns a value of 1 to the householder, 0.5 to each additional adult, and 0.3 to each child. This method ensures that income needs rise less than proportionately with household size. For consistency, equivalized measures are based on household composition during the income reference year.

Besides defining what is meant by income, it is also necessary to specify its reference period and the relevant income units, i.e., the group of people who are assumed to share that income. Income is a flow of resources received by people over a given period. As is common in research on income inequality, I will refer to annual data, meaning the reference period is a whole calendar year. In the case of the CPS-ASEC, this refers to the prior calendar year. This means that volatilities in income over the year are averaged out, and people with medium-level, stable incomes might have annual incomes similar to those with low incomes in the first half of the year and high incomes in the second half of the year. Income can fluctuate due to seasonal factors, movements in and out of jobs, changes in pay, or different timings of payments (e.g., the receipt of tax refunds once a year). More importantly, some income components, such as the level of tax refunds a household receives, are dependent on total income over the entire year.

For comparability over time, all aggregate income measures are inflated using the Consumer Price Index for 2018. For the analyses, the logged values of the figures of the different income types are used. This excludes households with zero income from the analysis sample. Households with zero gross or net incomes are excluded from the analysis sample in any case (see also section 7.3) which again only marginally reduces the sample (approximately 0.6% of the sample with valid data on all other variables). For the analysis of changes in the distribution of households' total market or total labor income, this exclusion affects a higher share of households. Specifically, the sample with households having positive market incomes represents 93% of the full analysis sample, while the sample with positive labor incomes constitutes 79% of the full analysis sample.

The equivalized figures of households' labor, market, gross or disposable income are bottom coded since it is unclear if extremely low annual incomes are measurement errors or if they reflect severe economic hardship (or in case of households' labor income, extremely low

income from work). In a first step, I estimate the variance of equivalized incomes below the first percentile for each income concept, for example, the variance of net equivalized household income below the first percentile of its distribution. Then, I bottom code households' income data if they are located below one standard deviation below the first percentile of the total distribution, using the before-estimated variance. The bottom coding is performed by assigning a new random value between the used threshold of one standard deviation below the first percentile and the second percentile of the total distribution. Figure 14 illustrates the distribution of logged equivalized household income up to the second percentile prior and after bottom coding, i.e. the original and the bottom coded lower end of the distribution for 1989 and 2018.

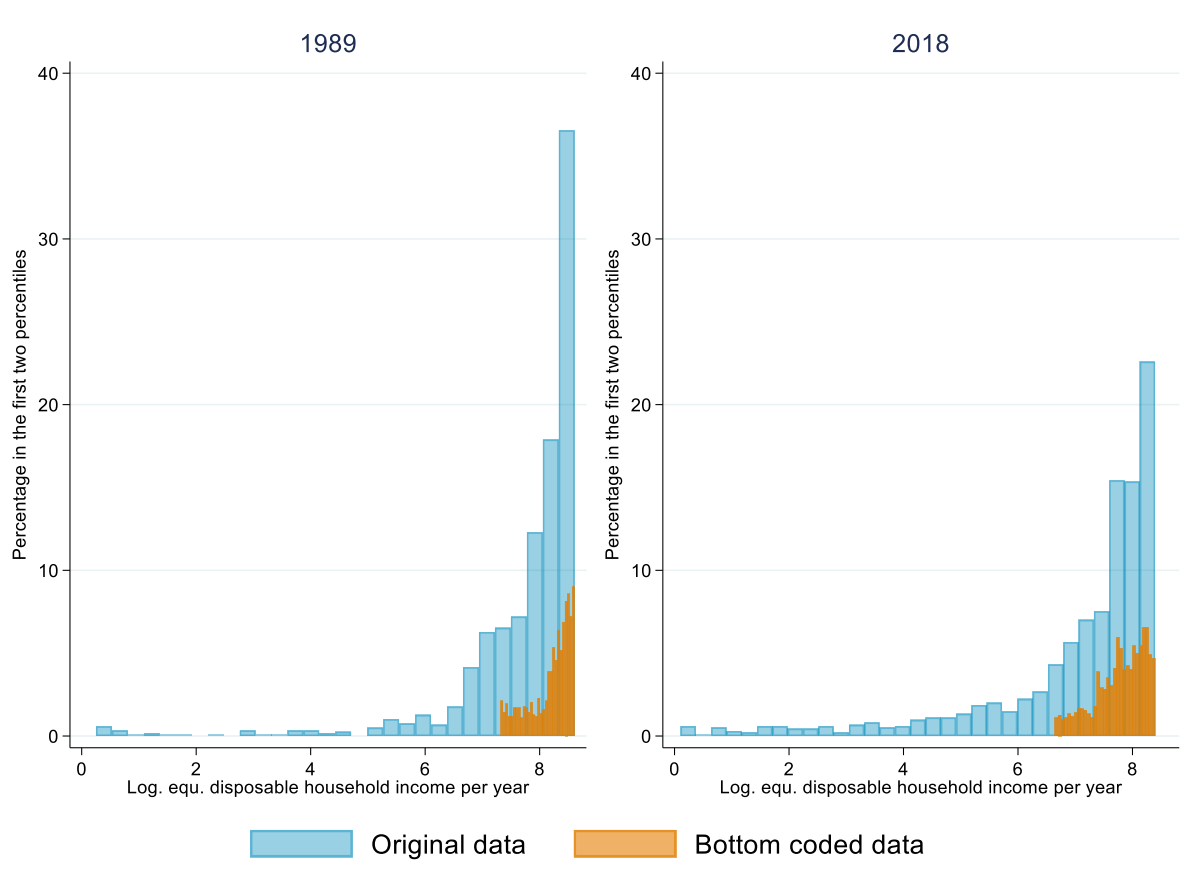


Figure 14: Histograms of the log. equivalized household income prior and after bottom coding, showing the distribution up to the second percentile for the original and the bottom coded distribution for 1989 and 2018.

Note: IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

7.5.2. Individuals and households affected by minimum wages

I identify households directly affected by minimum wage policy as those with at least one household member who has worked in the previous year for an hourly wage at the level of the prevailing statutory minimum wage in the given state and year. The CPS does not include questions on whether workers are covered by the minimum wage provisions of the federal Fair Labor Standards Act (FLSA) or by individual state or local minimum wage laws.

In a first step, I calculate the *average* hourly wages of individuals who have been in employment last year. For this, I take the respondent's total pre-tax wage and salary income, i.e. money

received as an employee, for the previous calendar year.⁶⁴ For all respondents who reported to have worked any time in the previous calendar year, I use the number of weeks that the respondent worked for profit, pay, or as an unpaid family worker during the preceding calendar year and the number of hours per week that respondents usually worked to calculate their average hourly wage. Individuals who report that they were mainly self-employed or family workers are excluded in this hourly wage calculation.

Minimum wage earners are defined as respondents with average hourly wages within a bandwidth of 20% of the legal minimum wage in effect in the state in which they reside in a given year. The bandwidth allows computed average hourly wages to be slightly below and above the statutory minimum wage. This ensures that respondents whose average hourly wages deviate slightly from the minimum wage over the year can also be defined as minimum wage earners. In addition, minimum wages are often also increased during the calendar year, which means that respondents may receive a lower hourly wage in the first months of the year than in the following months. The defined range solves this problem, allowing respondents to still be defined as minimum wage workers even if, for example, they were still receiving a slightly lower hourly wage through April.

However, the bandwidth excludes individuals with hourly wages *substantially* lower than the statutory minimum wage, for whom it is not possible to distinguish between noncompliance, sub-minimum wages, or noncoverage by the FLSA.⁶⁵ Individuals with hourly wages that are substantially higher than the prevailing minimum wage are distinguished from minimum wage workers, but the bandwidth allows workers with wages somewhat above the legal minimum wage to be defined as minimum wage workers. This complies with my analysis strategy: the goal is to investigate the long-term trend in the economic well-being of households affected by minimum wages and their impact on income inequality. I refer to households that are ‘affected’ as the ones directly affected. These households have at least one household member that worked for an hourly wage rate at the level of the prevailing minimum wage. I acknowledge that other households can be affected by minimum wage policy, too. For example, members of other households may lose their job after a minimum wage increase, or others may find it harder to find employment after the minimum wage has been raised in their state. More generally, households may be affected by price changes for certain products or be affected by increasing costs of labor if they have an own business. However, these points touch other research questions, and I will refer to affected households only as the ones directly affected to be able to estimate their economic situation over time.

Additionally, this measurement also excludes the individuals with hourly wages substantially higher than the statutory minimum wage in the measurement of a policy effect of the minimum wage. This means that spillover effects that reach higher than the bandwidth’s upper limit are excluded from the estimation of beneficial effects of the minimum wage.⁶⁶ As I laid out in the theoretical part, the highest spillover effects (for women, in the context of relatively high wage

⁶⁴ As a robustness check, I performed the same procedure identifying affected households on basis of calculating the average hourly pay of individuals using all income from labor, i.e. income received as an employee, income received from non-farm business and/or professional practice, and earnings as a tenant farmer, sharecropper, or operator of an own farm.

⁶⁵ Card and Krueger (1995a) found that in case of the 1990 and 1991 increases in the federal minimum wage, subminimum wage earners were unlikely to receive pay raises and concluded that they should be treated separately.

⁶⁶ For estimates on spillover effects, see recent studies by Cengiz et al. (2019); Autor, Manning, and Smith (2016).

floors) have been estimated at 20%, but the clearest supporting evidence suggests that spillover respectively ripple effects mostly reach up 10% to 15% above the prevailing minimum wage. Therefore, a bandwidth of 20% should be able to capture not only households with members paid the minimum hourly wage with slight measurement errors, but also households affected by minimum wage policy through ripple effects.

Based on CPS survey data, it is not possible to identify if workers are employed in jobs for which sub-minimum wages, like the tipped minimum wage, apply, or if they are covered by the FLSA to distinguish noncompliance with the minimum wage law from non-coverage. However, the goal is to estimate the impact of households where at least one member works for an hourly wage rate that equals (or that is sufficiently close to) the prevailing statutory minimum wage on income inequality. In this sense, the variable that measures the ‘affectedness’ of households by the minimum wage is a proxy. I do not restrict its definition to persons who are under FLSA law or who are actually paid by the hour. Instead, I study all households with members who have – on average – been paid hourly wages at the level of the statutory minimum wage over the previous year. This makes it necessary to consider the minimum wage levels on both the federal and the state level. In states with state minimum wages that are higher than the federally mandated minimum wage, the number of households with members who are paid the federal minimum wage will be negligible. With an increasing number of states legislating their own minimum wages, an increasingly smaller subset of states would have households affected by the federally mandated minimum wage at all.

All households with at least one member working for an average hourly wage close enough to the applicable minimum wage are defined as a “minimum wage household”, i.e. a household (directly) affected by minimum wage policy. For descriptive analyses, I construct an additional variable that distinguishes three different "degrees of affectedness" among the previously defined minimum wage households. It refers to the extent to which the total income of households depends on income from minimum wage work, i.e. income from the earnings of a household member with an average annual hourly wage equal to the applicable minimum wage of the state in which they live. The more a household's total income depends on earnings from minimum wage jobs, the more I consider it to be "dependent" on minimum wage policies. If at least half of a household's total gross income comes from earnings at an hourly rate equal to the applicable minimum wage, it is categorized as a "strongly affected household". "Moderately affected households" are households where these earnings account for between 15% and less than 50% of total gross income, while "little affected households" are households where minimum wage earnings account for less than 15% of total gross income.

7.5.3. Additional covariates and control variables

7.5.3.1. Variables for redistribution by the state: Tax liability of households and public transfers

When I estimate the impact of households affected by the minimum wage on the inequality of disposable incomes, as opposed to the inequality of market incomes, I need to account for other factors that have an impact on the distribution of net household incomes. Primarily, these are redistributive measures such as income taxes, social security taxes, and public transfers. Thus,

to weigh the effect of changing minimum wage policy with the effect of changing redistributive policies on the part of the government and their interrelationship, I include covariates on the income tax and social security tax liability of households and their received public transfers.

To estimate the contribution of households targeted by changing income tax and payroll tax policy as well as changes in social assistance (transfers), I differentiate between households with varying tax liabilities and varying “dependence” on social transfers.

I use the simulated figures from TAXSIM to sum up households’ federal and state income tax liabilities and subtract refundable tax credits. Interpretations regarding the income tax variable must be made with caution, as the simulations cannot account for whether households claim different tax credits or itemized deductions.

I categorize the continuous metrics of payable income taxes and social security taxes because the associations between taxes and their contributions on income distributions are nonlinear. The value zero is a substantive own category for households’ income and payroll tax liability by itself, indicating a specific labor market status which implies zero tax liability or indicating that a household has no income sources that would imply income tax liability.

For the variable categorizing households according to their income tax liability, I differentiate between households with zero income tax liability, households with positive tax liabilities, and households eligible for tax credits that are higher than their tax liability, which results in an own category of households receiving tax refunds. Among households with positive income tax liabilities, I distinguish between households with low, medium, and high income tax liability. I compute the share of payable income and payroll taxes in total gross household income for all households with positive income and form the following categories: Households with a payable income tax up to 10% of their total gross household income are referred to as household with “low” income tax liability. Household with “medium” tax liability pay 10% to 15% of their gross household income as income tax. When more than 15% in total gross household income are paid as income tax, households’ tax liability is defined as “high”.

Given the changes to the income tax system, I expect that a larger proportion of households will pay a lower percentage of their total income in income taxes in 2018 compared to 1989. This is likely due to the changes in income tax policy. However, part of this may be driven by changes in the importance of income sources on which taxes are levied on. For example, if more households rely on income from public transfers, which are not subject to taxation, then an increasing number of households will have lower tax liabilities as a proportion of their total income. If labor income or other income sources which are subject to income tax become increasingly important as an income source across households, then an increasing number of households will fall into categories representing higher tax liabilities.

For households’ social security taxes, I use the employees’ shares of the simulated FICA tax liability and aggregate their total at the household level. I differentiate between households with zero social security tax liabilities and between households with low and high payable payroll taxes. Households are defined as having ‘low’ social security tax liability when the share of social security taxes to be paid as a proportion of total gross household incomes is 6% maximum. Households with ‘high’ payable payroll taxes are the ones in which payroll taxes make up more than 6% in total gross household income. These are households in which almost the entire amount of total gross household income stems from labor income, which is taxed at

7.65% (considering the employees' share only).⁶⁷ Given the relatively low variation in the share of payable social security taxes, I only distinguish between 'low' and 'high' tax liabilities.⁶⁸

Changes in tax policy can be distinguished from 'automatic' adaptations in tax liability following changing labor market activity of households due to the inclusion of the covariates that measure a household's labor market integration.

Higher incomes through labor, for example due to increasing minimum wages, can lead to reductions in the level of public transfers that a family is eligible for. To investigate the interaction effects of rising labor incomes in households and their received public transfers and to contrast the newly used channel of redistribution via taxation with the more traditional forms of efforts of social protection through public income support, I include a variable for the amount of public transfers a household receives, excluding incomes from public and private pensions. Since an increasingly large proportion of public income support is supplied through in-kind transfers such as the Supplemental Nutrition Assistance Program (SNAP, commonly still referred to as the Food Stamp Program), I include the value of in-kind transfers to be able to account for changes in the overall level of public income support. I differentiate between households that receive no transfers at all, and between households that receive low, medium, or high public transfers relative to their total income.

First, I sum up public transfers received by all individuals in the household: I include income from welfare (mostly TANF), Supplemental Security Income (SSI), income from unemployment benefits and income from educational assistance. Additionally, I include the total value of near-cash transfers like the Supplemental Nutrition Assistance Program (SNAP, often referred to as „Food Stamps"), subsidized housing, energy subsidies and school lunches received by the household during the previous calendar year. I compute the share of total public transfers received in the household in their total gross household income, for all households with positive incomes and form the following categories: Low public income support refers to households in which up to 10% of total income stems from public income support. The medium category includes households in which more than 10% and up to 50% stem from public transfers. Households in which more than 50% stem from public income support are defined as households with 'high' public transfers. The distribution of the transfer to household income ratio is highly skewed, with most households receiving no or a very small share in their total household income in form of public transfers (pensions excluded).⁶⁹

⁶⁷ The rate for social security is 6.2% for the employer and 6.2% for the employee, or 12.4% total. The current rate for Medicare is 1.45% for the employer and 1.45% for the employee, or 2.9% total Internal Revenue Service (2021).

⁶⁸ I ran the analyses using three categories ('low', 'medium, and 'high') as well as a robustness check. In this case, households that pay up to 5% in their total gross income as social security taxes are defined as households with a low tax liability, those between 5 and 7% as the ones with medium tax liability, and households with a high tax liability are defined as the ones that pay more than 7% of their total gross income as social security taxes.

⁶⁹ Due to the highly skewed distribution, an alternative categorization based on the quartiles of the distribution of the share of public transfers in total household income was tested. However, this leads to categories which are not preferable from a substantive perspective. For example, this would result in a scenario in which households in which about 3% of household income comes from public transfers would already count in the 'medium' category. Moreover, this would place households in which about 20% of income comes from public transfers in the highest category, together with those that live entirely on public transfers.

7.5.3.2. *Households' labor market integration*

To be able to account for varying levels of labor market integration of households and distinguish the role of changing tax policy from the „automatic" adaptations in tax liability following changing labor market activity of households, I construct a variable that measures a household's labor market integration. It is essential to control for different employment constellations across households as they may systematically correlate with the affectedness by minimum wages.

I construct the variable on the labor market integration of households on basis of their labor market activity over the last year. A household is defined as a pensioner household when incomes from all pension payments make up more than half of the household's total income from pensions and labor incomes. I consider incomes received from Social Security, company or union pensions, U.S. military retirement payments, federal government employee pensions, state or local government employee pensions, U.S. Railroad Retirement payments, regular payments from annuities or paid-up insurance policies. Pensioners contributing a minor (i.e. less than half) share of total income from pensions and wages in the household are referred to as "top-up pensioners". The households they live in are coded according to the work intensity of their partners, either as top-up earner households, households in part-time employment, or in precarious employment (see below).

The rest of the households are categorized depending on the labor market integration of their household members. For this determination, every individual's working hours are set in relation to the maximum number of full-time working hours for a full year (2,080 hours, assuming 40 working hours per week, 52 weeks a year), resulting in an indicator ranging between 0 and 1.

The usual hours worked per week are multiplied by weeks worked in the previous year. Usual hours worked are preferred over actual hours worked in the week before the survey. The latter can be retrieved from the monthly CPS surveys, but only for 4 months of the year due to the rotational design of the CPS. Thus, self-reported usual hours worked in all jobs in the last year appears a better solution than actual hours worked in the week prior to four monthly surveys. Over time, increasingly more workers, and in particular minimum wage and low-wage workers, work on demand or irregular hours. On basis of the usual hours worked per week multiplied by the weeks worked in the previous year, I generate a variable depicting the work intensity at the household level that captures the labor force status of the (working-age) householder and his or her (working-age) partner.

Jobless households are defined as households where no one is employed for more than 100 hours a year (i.e. less than 3 weeks full-time). Double-earner households are defined as those in which both partners are in full-time employment (both with values of at least .95). Households with one partner in full-time employment and a partner who is either not working or in marginal employment only are referred to as traditional breadwinner households. If the latter has part-time employment instead, I refer to this type of household as a modified breadwinner household. Furthermore, I distinguish between households where both partners are in part-time employment (values between .45 and .95) and households with precarious labor market integration, where both are only marginally employed or only one of them is in part-time employment (values between .1 and .45). Singles can accordingly be in full-time, part-time, or precarious (marginal) employment.

7.5.3.3. *Variables to account for households' educational composition, demographics, and family constellations*

To account for the strong relationship between education and the likelihood of earning minimum wage on the individual level and its change over time, I construct a variable on the educational composition on household level.

In a first step, I use information on the educational level of individuals living in a household. Individuals' educational attainment is measured by the highest year of school or degree completed. Respondents who have not finished high school are coded as having a primary-level education, those with a high school degree or an associate's degree are defined as having a secondary-level education, and those with at least a bachelor's degree are coded as having a tertiary education. On this basis, I generate a variable at the household level that captures the educational composition of the householder and his or her partner.

To be able to account for changes in demographics and family constellations, I include a set of variables on demographics at the household level. I include a variable that captures if a household is headed by a young adult below the age of 30. Young households are therefore households in which the maximum age among household members is 29 years. Further, I differentiate between different family forms which have undergone significant changes regarding their proportion in the total population and their group composition, i.e. large families with three or more children, single-mother households, and couple households without children.

Households with one or more adults and at least three children (biological, foster, or adopted children) below the age of 18 are identified as large families. For the other variables on family forms, I first construct a variable identifying couples in households using pointers of married and cohabiting partners. On this basis, I define households in which a single woman lives without a partner as single-woman households and use this to identify single-mother households living together with children under the age of 18 years. Further, I identify couples without children as couples in which at least one person is up to 45 years old. In opposite-sex couples, I use this age range for the woman, in same-sex couples for either of the women respectively either of the men.⁷⁰ This variable therefore captures young to mid-aged couples without children as opposed to couples with children in the household, excluding older couples who do not have children living in the household (independent from the fact if they ever had children or not).

I differentiate households headed by a young adult below the age of 30, large households with three or more children (biological, foster, or adopted children) and different family constellations. I construct a variable identifying couples in households using pointers of married and cohabiting partners. On this basis, I define households in which a single woman lives without a partner as single-woman households and use this to identify single-mother households living together with children under the age of 18 years. Further, I identify couples without children including only couples in which the woman (or in case of same-sex couples either of the women) is up to 45 years old, therefore excluding the elderly.

⁷⁰ Note that in the CPS, respondents are categorized as either male or female.

To account for race and ethnicity of a household, I use the provided variables from IPUMS CPS, which are based on the U.S. Census Bureau’s definitions of race and ethnicity (U.S. Census Bureau 2017).⁷¹

Race and ethnicity are salient factors determining disadvantages besides ‘traditional’ risks such as unemployment, low education, single parenthood or young headship (Brady, Finnigan, and Hübgen 2017). Disadvantages can be lower pay, lower probability to find (secure) employment, lower chances to higher education, and systematically lower cash assistance when, for example, states with larger percentages of Black residents have lower average levels of benefit generosity and are less likely to prioritize the provision of cash assistance (Brown and Best 2017; Johnson 2001; Parolin 2019a). In addition, as outlined in section 3.3, demographic shifts, such as the influx of immigrants with varying degrees of labor market participation, significantly influence the potential impact of the minimum wage floor on income inequality. Due to these reasons, particularly persons who self-identify as Black or of Hispanic or Latino origin need to be distinguished from persons who self-identify as White alone without Hispanic, Latino, or Spanish origin or descent.

I use information on respondents’ self-identified race and their ethnic origin or descent to create a variable that captures both race and ethnicity in one variable. From 1988 to 2002, the ASEC samples of Current Population Survey distinguished only a few race categories (White, Black, American Indian/Eskimo/Aleut, Asian or Pacific Islander). Beginning in 2003, respondents could report more than one race, and the number of codes rose to 21, and then up to 26 codes in 2013.

In addition, I use the variable that identifies if a person states to be of Hispanic, Latino, or Spanish origin or descent. I integrate this information with the information on self-identified race into a single variable that captures self-identified race and ethnic origin of the respondent.⁷² I distinguish between persons who self-identify as White alone, as Black (alone or in combination with one or more other races), but not as Hispanic, Latino, or Spanish (“non-Hispanic Black”), those who state to be of Hispanic, Latino, or Spanish origin or descent (“Hispanic”), and a category referred to as “Other” for persons who self-identify as another race than White alone and Black alone, possibly in combination with one or other races who do not report to be of Hispanic, Latino, or Spanish origin or descent.⁷³

⁷¹ The U.S. Census Bureau considers race and ethnicity to be two separate and distinct concepts. Race is defined as a person’s self-identification with one or more social groups. Respondents can accordingly report multiple races, choosing from White, Black, or African American, Asian, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, or some other race. Ethnicity denotes whether a person is of Hispanic or Latino origin or if they are not. Hispanics or Latinos may report as any race U.S. Census Bureau (2017).

⁷² In the federal statistical system, Race and Hispanic origin are two separate concepts, and each person has two attributes, their race (or races) and whether they are Hispanic. People who are Hispanic may be of any race, and people in each race group may be either Hispanic or Non-Hispanic. In Census Bureau data, Black Hispanics, respectively Hispanic Blacks, are included in both the number of Blacks and in the number of Hispanics (Census Bureau 2021). For the presented analyses, I use a single variable that captures both ethnicity and race, and therefore individuals are sorted into one of the created categories.

⁷³ An alternative would be to categorize persons who identify as Black (alone or in combination with other races) and who state to be of Hispanic, Latino, or Spanish origin or descent as Black persons (i.e. technically using “Black” as the dominant indicator), and therefore distinguishing between White alone, Black, Hispanic, Latino, or Spanish (and not Black), and other persons. I use this variable for robustness checks only. Black Hispanics make up a growing proportion among Blacks in the USA. Compared to Non-Hispanic Blacks, they are more likely to be foreign born. They are a substantially younger population group compared to Non-Hispanic Blacks and are

As the analyses are performed at the household level, I construct a variable on the composition of a household regarding its race and ethnicity. This variable indicates if all of the household members are White (alone), or if one or more of the members in a household self-identify as non-Hispanic Black, Hispanic, or another race or ethnicity. When members of different race or ethnicity live together in the household, I use the householder's self-identified race and ethnicity. In any case, households are only identified as White when there is no member who self-identified with another race or ethnicity.

To control for the region in which respondents live, I distinguish between the four Census regions: Northeast, Midwest, South, and West. The Northeast region includes the New England Division and the Middle Atlantic Division, the Midwest region includes the East North Central Division and the West North Central Division, the South Region includes the South Atlantic Division, the East South Central Division, and the West South Central Division, and the West region includes the Mountain and Pacific Division. These regions are defined by the U.S. Census Bureau and are commonly used in statistical models and studies to examine data across different parts of the country. The census regions help to capture and control for regional effects that may influence the dependent variable of interest, in this case, changes in the distribution of household income. These regional effects could be related to factors such as economic conditions, population structure, political differences, cultural differences, etc. Including the region in which respondents live controls for such factors and helps isolate the impact of minimum wage policy on trends in income inequality from systematic differences that may exist across regions. This approach ensures that the observed relationship between minimum wage policy and income inequality is not confounded by these regional variations.⁷⁴

7.6. Method: Decompositions of unconditional quantile regressions

The goal of this thesis is to study if the rising level of the minimum wage over time was associated with a decline in income inequality. For this purpose, I want to estimate the contribution of households with minimum wage earners to changes in percentile values across the lower half of the income distribution. When such contributions are positive in the lower area of the income distribution and less so in higher income strata, then these households contribute to a declining gap between lower and higher income rungs and therefore to declining inequality.

To this end, I use a repeated cross-sectional design and estimate unconditional quantile values of the income distribution in 1989, the starting year of my analyses, and 2018, the ending year of my analyses.

relatively similar with regard to educational attainment. However, their labor market integration and their household income are more strongly correlated with that of Hispanics, see Pew Research Center (2021c). Therefore, for the research question at hand, I decided to use the first described categorization.

⁷⁴ Using state dummy variables instead does not lead to large or systematic differences in results. In addition, robustness checks were made using macro-level indicators, which capture the level of economic development and the existence and strength of labor market institutions across states. These characteristics could affect wages and incomes in a state, so I included the state's unemployment rate, the gross state product, annual personal income, and information on state-level union density and coverage in robustness checks. Again, this did not to systematically different results, which is reassuring that controlling for the census regions is a suitable option when combined with clustered standard errors to adjust for intragroup correlation by state.

Unconditional quantile regressions allow the estimation of shifts in any of the quantiles across the unconditional, i.e. the overall income distribution. This circumvents the problem of a large fraction of minimum wage research that suffered from the weakness that an effect of the minimum wage on macro-level indicators like the poverty rate is hard to detect as the number of individuals and households affected by minimum wage is fairly small and unevenly distributed in the overall population. The impact of minimum wages on the incomes of households is likely to be heterogenous and vary along the income distribution. If the effect of minimum wage policy differs at different points in the income distribution, this will be difficult to detect with a linear specification across all income deciles. Unconditional quantile regressions can account for this, and their estimates may show that the contribution of minimum wage households to changes in quantile values in lower income strata may be more pronounced than changes in percentile values in higher income strata. This may be because the households whose income situation is most affected are concentrated in that income area.

I add to the commonly used difference-in-difference approach, which exploits the increasing variance of state minimum wages and compares changes in aggregate-level measures such as poverty rates in states that had minimum wage increases with changes in such measures in states that did not have minimum wage increases. In contrast to the federal minimum wage, the context of state minimum wages provides a setting with an improvement of minimum wage policy. The median state minimum wage has increased from less than \$7 per hour in 1989 to more than \$10 per hour in 2018. In addition, the variance of state minimum wages has grown over time as well, which means that the inequality of the minimum hourly wage rate among minimum wage workers has increased over time. Only a small number of states had state minimum wages higher than the federal level in 1989 and until 2005, most states' statutory minimum wage was determined by the federal minimum wage law, which is why the median state minimum wage corresponded to the real value of the federal minimum wage until 2005. Since then, the nominal and real values of state minimum wages have diverged strongly. I exploit the overall increase in the real value of state minimum wages, which might have contributed to an improvement in living standards among households with minimum wage workers. From this starting point, the aim is to investigate if overall income inequality has declined by estimating the contribution of households with minimum wage workers to changes in income inequality over time. Assuming that the contribution of such households is heterogenous across different income strata, I estimate changes of each percentile's value in the lower half of the income distribution and how households affected by minimum wage policy have contributed to this change. This yields a picture on the income areas in which households with minimum wage workers could benefit from minimum wage policy and contribute to increases in percentile values and on the income ranges in which this was not the case. When minimum wage households' contribution was more positive in the lower area of the income distribution than in the upper range, then this stand-alone factor has technically contributed to a decline in income inequality in the lower half of the income distribution. This extends the literature on the impact of policies on single aggregate figures such as the poverty rate and explicitly accommodates heterogenous impacts along the income distribution. Oaxaca-Blinder decompositions are used to account for different factors that might influence the income distribution very differently:

- a. The level of the (real) minimum wage could lead to relative improvements in the income situation of affected households,
- b. The within-group income dispersion of “minimum wage households” could change over time, for example, because the “typical” of the minimum wage worker has changed and it is more and more main earners in families who make minimum wage and not just teenagers, possibly improving its targeting, and
- c. The sheer proportion of minimum wage workers could increase over time, either due to structural changes in the labor market that result in an increasing proportion of workers receiving minimum wages, or due to rising minimum wages that result in a larger proportion of workers falling under the minimum wage law with their current hourly wages. Although the income situation of the households in which such employees live does not change, they are now part of the currently affected “target group” because the hourly wage of at least one of their members corresponds to the (new) minimum wage rate.

As described above in the variables section, all variables relate to household-level characteristics and are measured at the household level. This aligns with the fact that inequality figures are based on the measurement of the income of households and not individuals. The income situation (and poverty status) of individuals and households affected by the minimum wage combines the concepts of being in work and being paid at minimum wage level, which is assessed at the individual level, and belonging to a certain income bracket in the distribution of household incomes. Thus, this construct is similar to the measurement of in-work poverty, (i.e. working poverty), except that a special case of being in work, namely being in minimum wage work, is the indicator of interest on the individuals’ level. To measure an individual’s belonging to a certain income group, all income components of all members living in a household are summed up. Similar to the measurement of income poverty, the measurement of income inequality assumes that all incomes in a household are pooled and shared within households. Therefore, I measure the treatment of minimum wages on household level, corresponding to all other variables of interest.

Income inequality *within the lower half* of the income distribution increases when the income gap between households in the lower end of the distribution and households around the median increases. This happens when more households have (very) low incomes and the lower quantile values decline consequently, when households at the lower end of the distribution experience declining incomes, or when households at the median experience income growth which is higher than that in the lower end of the distribution. Conversely, inequality *within the lower half* decreases when the income gap between households in the lower end and those further up in the distribution decreases. This happens when incomes of households at the lower end of the distribution increase more than that of households higher up the income distribution (or when they decrease less than those at the median). Corresponding to the scenario that leads to increasing inequality, a declining proportion of households that has low incomes results in increasing quantile values, as the threshold between, for example, the poorest 10 percent of households and the other 90% moves further up and represents a higher income value. In any case, changes in income inequality are based on changes in unconditional quantile values: For example, if the incomes of households at the 10th percentile increase more than the incomes of households at the 3rd percentile, this can be observed as a larger (positive) change in the 10th

percentile value compared to the change in the third percentile value. Together, this is reflected as an increase in income dispersion in the first decile of the overall (unconditional) income distribution.

I want to investigate how much a certain population group respectively household type, i.e. households in which at least one person works for the prevailing minimum wage, contributed to different percentile value changes. If certain groups in the population change their proportion over time, they change the shape of the overall distribution – if everything else remained constant. Consequently, the growth of the group changes the unconditional quantile values in the data. The top panel in Figure 15 depicts this line of reasoning using simulated data for two time points. At t_1 , the group represents 10% of all households and is overrepresented in the lower rungs of the income distribution. Everything else is held equal at t_2 , except the share of the group, which is now 30%. Changing the proportion of the group changed the shape of the lower half of the distribution and decreased the 5th percentile by 0.68 points. In line with Fortin and colleagues (2011), I refer to such changes as composition effects. The growth of a group changes the composition of all groups in the data and thus the shape of the distribution, resulting in percentile value changes.

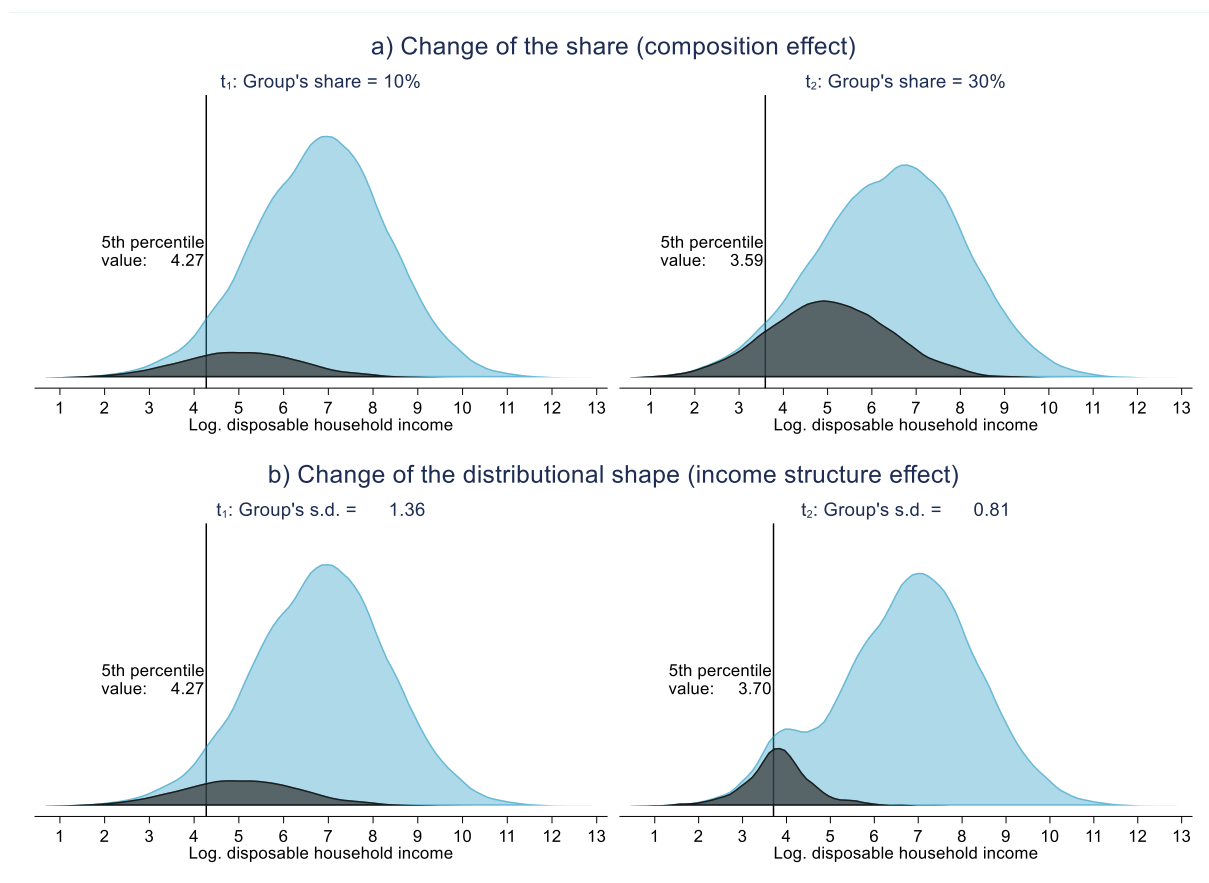


Figure 15: Consequences of changes of a group's share (upper panel) and the group specific income distribution on the shape of the overall distribution and the unconditional 5th percentile value.

Note: The group's distribution (black) is rescaled such that it visualizes the share of the group within the sample. The y-axis (not shown) of the graphs therefore does not refer to the density, but to the rescaled density for all distributions. The graphs are based on simulated data using 20.000 cases each.

Composition effects need to be distinguished from income structure effects. A group cannot only change its share but also the shape of its group-specific income distribution. The lower panel of Figure 15 shows such a case. The simulation starts with the same setting at t1 as the previous case. For t2, the group's share remains unchanged but the dispersion of income within the group is changed. Again, this group-specific change disperses the lower tail of the unconditional distribution and decreases the 5th percentile value by 0.57 points.

Both processes lead to comparable changes in the 5th quantile value. However, the processes underlying these changes are fundamentally different and would have very different implications for hypothesis testing. It is therefore necessary to distinguish the two.

Multivariate decompositions allow for the distinction between income structure effects and composition effects by holding one of the two constant and estimating the other, and vice versa. The estimated quantities are thus changes that can be expected if everything else stayed constant and only one aspect changed, such as the income situation of households with minimum wage workers, or, alternatively, this group's share in the total population. Income structure effects capture changes in the income situation of a population group, in this case a type of household, namely households with at least one minimum wage earner. Changes in their income situation can be based either on the fact that these households earn higher incomes from work as a result of rising minimum wages, or on the fact that this group is composed differently by which its within-group dispersion changes. This can happen for example if it becomes more common within this group over time to receive significant sums from another source of income, such as a public transfer. The changing 'face' of households with minimum wage earners could affect the within-group income dispersion, too. In an increasing number of households, earnings from minimum-wage work are the main source of income, whereas in the late 1980s they were more likely to be an additional, minor source of income in households, such as the earnings of a teenager or a second earner.

The coefficients of the models add up to the total change of the unconditional quantile value, which means that each contribution can be expressed as a percentage of the total change. The following section describes the procedure to estimate contributions to unconditional quantile values in more detail.

7.6.1. Estimation procedure for contributions to unconditional quantile value changes

In the empirical data, it is typically the case that composition and income structure change take place simultaneously. Furthermore, the household characteristics associated with changes in income dispersion are very likely correlated. Therefore, I estimate a multivariate unconditional quantile regression (UQR) to separate influences of single household characteristics on the distribution of incomes in a first step and decompose the results to separate composition from income structure effects in a second step.

One of the breakthroughs of the UQR approach by Firpo, Fortin, and Lemieux (2009) is that the difference of two unconditional quantile values over time is equal to the difference in the expected RIF-values between both time points (equation 1). Furthermore, each expected RIF can be expressed as an iterated conditional expectation over all covariates X (equation 2). The prediction of each multivariate RIF model is equal to each conditional expectation given a

single time point (equation 3). Taking expectations from a multivariate model is to weight the slope coefficients with the expected value of its covariate, which is the average for metric covariates and the probability for categorical covariates (equation 4).

$$Q_{\tau,t_1} - Q_{\tau,t_0} = E[RIF(y, Q_{\tau}) | t_1] - E[RIF(y, Q_{\tau}) | t_0] \quad (1)$$

$$= E_X[E[RIF(y, Q_{\tau}) | t_1, X]] - E_X[E[RIF(y, Q_{\tau}) | t_0, X]] \quad (2)$$

$$= E_X[\alpha_{t_1} + \beta_{t_1}X_{t_1}] - E_X[\alpha_{t_0} + \beta_{t_0}X_{t_0}] \quad (3)$$

$$= [\alpha_{t_1} + \beta_{t_1}\bar{X}_{t_1}] - [\alpha_{t_0} + \beta_{t_0}\bar{X}_{t_0}] \quad (4)$$

Estimates as in equation 4 are not plain regression coefficients but weighted coefficients. I refer to them as contributions. A contribution indicates how much of the observed quantile value change can be attributed to a specific covariate, or, as in the analyses conducted, to a specific household characteristic like the affectedness by the minimum wage.

Equation 4 also shows that such contributions are always a product of changes in the slopes and changes in the expected covariates. The first refers to an income structure effect, while the second refers to a composition effect. To separate these two types of contributions, I follow Fortin, Lemieux, and Firpo (2011) and rearrange equation 4 by introducing $-\alpha_{t_1} + \beta_{t_1}\bar{X}_{t_0} + \alpha_{t_0} - \beta_{t_0}\bar{X}_{t_0}$ into the equation:

$$\Delta_{Q_{\tau,t_1-t_0}} = [\alpha_{t_1} + \beta_{t_1}\bar{X}_{t_1}] - [\alpha_{t_1} + \beta_{t_1}\bar{X}_{t_0}] + [\alpha_{t_1} + \beta_{t_1}\bar{X}_{t_0}] - [\alpha_{t_0} + \beta_{t_0}\bar{X}_{t_0}] \quad (5)$$

$$= \underbrace{[\alpha_{t_1} - \alpha_{t_0}]}_{\Delta\alpha} + \underbrace{[\beta_{t_1} - \beta_{t_0}]\bar{X}_{t_1}}_{\Delta\beta} + \underbrace{[\bar{X}_{t_1} - \bar{X}_{t_0}]\beta_{t_0}}_{\Delta X} \quad (6)$$

Rearranging equation 5 to 6 leads to an expression with three components.

The first, subsumed as $\Delta\alpha$, is the difference of unconditional quantile values over time for a distribution consisting of the reference group and observed heterogeneity, or, more technically, the difference in the constant values. It is not a contribution but a difference in unconditional quantile values, because the difference is *not* weighted with an expected value.

The second component, $\Delta\beta$ refers to the counterfactual contribution to quantile value changes if only the influence of the group had changed relative to the reference group had changed. They thus represent income structure effects. If, for instance, the distribution of household income disperses over time conditional on households' affectedness by minimum wages, this would be reflected in an estimated change in the β coefficients. The change in β -coefficients alone would rest on the predicted, changed probability of households to be located above a quantile value conditional on them having one or more household members working for the minimum wage. The weighted difference of the coefficients as expressed in $\Delta\beta$ is an estimation of how much a given quantile value would have changed if everything else had remained constant and only the influence of households affected by the minimum wage (compared to households with members earning higher wages) had changed.

The third component ΔX refers to counterfactual contributions to quantile value changes if only the share or average values of covariates remained constant. Thus, it refers to composition effects, assuming a constant likelihood of households being located above a given quantile value conditional on a certain household characteristic over time. If, for example, the share of jobless households grows over time, so does its share in lower parts of the distribution, which

would alter the lower quantiles' values. This would be independent of an asymmetrical increase in jobless low-income households in contrast to jobless middle-income households.

7.6.2. Model specification and interpretation of changes in quantile values

My expectations regarding the impact of changing minimum wage policy relate mainly to income structure effects. I assume that the changes in minimum wage policy were associated with improvements in the income situation of households with minimum wage earners and that this contributed to a decline in income inequality in the lower half of the income distribution (as in the lower panel of Figure 15).

Another path by which minimum wage policy may lead to changes in income inequality is that the group of households with minimum wage workers grows as a proportion in the total population (as in the top panel of Figure 15). This mechanism of a change in the sheer proportion of households with minimum wage workers must be viewed as isolated from within-group changes in inequality, i.e. the mechanism of changes in the group composition regarding the income situation of households in which minimum wage earners lived in 2018 compared to 1989. However, the proportion of households with minimum wage earners has not increased over the analyzed time period.⁷⁵ Therefore, I do not expect significant composition effects, but I will show and briefly discuss the results of the composition effects from the decomposition analyses.

Standard errors are clustered by state to adjust for intragroup correlation, as incomes of households residing in the same state are correlated. This correlation violates the assumption of independent and identically distributed observations. This may lead to error terms which are more similar within states than across different states. Clustering for state takes into account this within-group correlation and dependence of observations within states and produces more accurate standard errors, since certain regions and local labor markets have grown apart from others with regard to their economic fortunes.⁷⁶

State dummies must not be included to produce results mimicking estimations with state fixed effects. State fixed effects are used to control for unobserved, time-invariant omitted variables, thereby avoiding omitted variable bias. It is likely that states differ from each other regarding certain unobserved characteristics, which may be associated with state-level differences in income inequality. Consequently, differences in income inequality between states are not necessarily due to variations in minimum wage levels. The goal is to examine the impact of changing minimum wage policies on the nationwide trend in income inequality. State-level analyses are therefore not suitable for addressing this question. However, robustness checks, where regional control variables are replaced with state dummies, indicate that the differences in results are negligible. This suggests that the impact of state-specific factors on the overall

⁷⁵ The descriptive results show that among households in the lower half of the distribution of disposable household incomes, the share of households with minimum wage earners declined slightly from 14.9% in 1989 to 14% in 2018.

⁷⁶ It was less a growing divergence between states than a growing divergence between metropolitan areas and cities on the one side and less populous and rural areas on the other, e.g., due to technological innovation and entrepreneurship driven by firms located in large cities. This underpins that state fixed effects are not superior to control variables that capture the region in which households reside, since states themselves are again heterogeneous regarding more and less densely populated areas, local labor markets, etc.

findings is minimal. This suggests that the results are due to differences *within states* rather than differences between states. In other words, the observed results are not influenced by a pattern where minimum wages increased disproportionately in states with higher or more unequal incomes.

The likelihood of detecting an effect of the minimum wage on income inequality will depend on the decision about how to measure inequality and the income concept used in doing so. The choice of income concept used in the analysis can have implications for the estimators in both directions: On the one hand, the broader the income concept considered, the more the effects of an increase in an individual's hourly wage become blurred. On the other hand, the positive overall effect of a minimum wage increase may be reinforced in interplay with other income sources (cash and near-cash), with favorable interactions with the tax structure, or family constellations.

Potential transfer cuts or rising tax liabilities of low-income households with members in minimum wage work should not necessarily serve as a counterargument against minimum wage increases. Instead, a better understanding of the interactions between the gains through minimum wage increases and rising marginal tax rates through cuts in public transfers or rising tax liabilities is needed. The analysis strategy of this paper addresses this need by using different outcome variables to measure income inequality that differ by the sources of income covered and by using different model specifications that gradually incorporate covariates for the transfer and tax systems into the model. The impact of the minimum wage is examined by estimating the contribution of households with minimum wage recipients to changes in the percentile values of the overall income distribution. For the outcome variable, changes in the income distribution, I use different income concepts. A common way to measure income inequality, especially in the U.S. context, is to study the level or trends of the distribution of total gross household income. To broaden this perspective, I use both narrower definitions of household income and broader ones. Narrower definitions allow me to consider the contribution of households with minimum wage recipients independently of their connection to their incomes through the transfer system or to their tax burden, i.e. without possible interaction effects between rising incomes from increases in the minimum wage. The annual labor income of a household describes the sum of all earnings (including income from self-employment) of all household members and disregards their interplay with other income sources such as income from public assistance or social security income, but also private transfers or income from capital. Adding these sources of income to a household's income yields the often-used concept of gross annual household income. If I take into account the tax liability of households, I obtain the total (disposable) net income of households. This enables me to study if households targeted by minimum wage policy have impacted the distribution of these different income concepts differently. For example, it may be possible that households with minimum wage earners could benefit from minimum wage policy particularly regarding their total labor income, which, however, did not translate to an improvement in their total gross income. In this case, households with minimum wage earners could contribute to increasing percentile values in lower income strata and potentially to declining inequality of labor income (similar to the inequality-decreasing effect of minimum wages on the distribution of individual hourly wages).

To be able to distinguish the impact of minimum wage policy in different scenarios regarding the tax and transfer system, I use different model specifications. Broader income concepts used

for the dependent variable allow the inclusion of more control variables to account for other factors besides rising minimum wages that have an impact on the variety of income sources in households. For example, when regarding the inequality of net household incomes, the full model includes variables for the amount of public transfers families receive, and their income tax and social security tax liabilities to control for the impact of the redistributive systems on changes in income inequality and allow for an interpretation of the contribution of households with minimum wage earners on inequality independent of the role of the transfer and tax systems played for the income situation of households.

The less specified base models omit variables on transfer receipt and tax liabilities and therefore, the estimation of the effects of the minimum wage are not independent of the impact of redistributive system on income inequality. Both the transfer and tax system have a strong impact on the distribution of net household incomes. When omitting them from the estimations, they are part of the residual and thus interfere with the impact of the minimum wage. Including these factors controls for the impact of the redistributive system, which, considering the system of public transfers and the income tax system, changed substantially during the last three decades. Including the degree to which households' total income depends on public transfers, and their tax burden as measured by the share of the tax liability in total household income creates counterfactual scenarios. They show the changes in the distribution of net household incomes, assuming that the system of public transfers and income taxation and their changes did not have an impact on the evolution of the income distribution since 1989, the start of the observation period. In additional models, I include interaction terms between households' receipt of minimum wages and tax refunds, and interaction terms between households' affectedness by minimum wages and low tax liability, since the literature suggests that particularly the expanded system of (refundable) tax credits may interact with rising minimum wages in a particularly beneficial way for low-income households.

Table 2 shows an overview of the different model specifications used for the different income concepts used as dependent variables.

Table 2: Overview of used income concepts (i.e. their distribution) as dependent variables and used model specifications

		Total disposable income	Total gross income	Total gross income, excl. tax refunds	Total market income	Total labor income
1	Base model specification including households' demographics, family status, ethnicity, educational composition, labor market activity	X	X	X	X	X
2	Model specification including base model and variables for transfer receipt	X	X	X		
3	Model specification including base model and variables for transfer receipt and receipt of tax refunds	X	X			
4	Full model specification including base model and variables for transfer	X				

	receipt and households' income tax and social security tax liability					
3.1	Full model specification + interaction between minimum wage and tax refund receipt	X	X			
4.1	Full model specification + interaction terms between minimum wage and tax refund receipt, and interaction term between minimum wage receipt and low tax liability	X				

Note: X indicates which model specification was performed on which income concept used as a dependent variable in form of its distribution.

I estimate the contribution of households affected by the minimum wage (i.e. who have at least one person in the household who works for an hourly wage rate at the level of the prevailing minimum wage) on the lower half of the overall distribution of household incomes. Thus, I proxy the impact of a policy respectively a labor market institution with a specific household characteristic and their contribution to changes in income inequality. That is, interpretations regarding the impact of minimum wage policy on income inequality are based on estimations of the contribution of households with the characteristic of having at least one household member in minimum wage work to changes in unconditional quantile values, under control of other characteristics of the household that might influence a household's impact on changes in quantile values. Residuals that cannot be otherwise explained must not be attributed to changes in minimum wage policy.

To conclude on changes in inequality in the lower half of the income distribution, it is necessary to interpret minimum wage households' contribution to percentile value changes in the lower end of the income distribution and around the median simultaneously.

Income inequality *in the lower half* of the income distribution increases when the difference between the value of a quantile in the lower income range and the value of the median increases. Considering a distribution that consists of all households in a society ranked by their total household income, inequality in the lower half of the income distribution increases when the income gap between households in the lower end of the distribution and households around the median increases. This happens when a) an increasing share of households has low incomes and the lower quantile values decline consequently (e.g., due to immigration of low-income households) or when an increasing number of households has incomes in the mid-range of the distribution, which leads to an increasing value of the median, or b) when low-income households experience lower income growth than households at the median (or larger declines in incomes). Conversely, inequality in the lower half decreases when the income gap between households in the lower end and those further up in the distribution declines. This happens when incomes of households at the lower end of the distribution increase more than that of households higher up the income distribution (or when they decrease less than those at the median), or when a declining proportion of households with low incomes results in increasing quantile values, as the threshold between, for example, the poorest 10 percent of households and the other 90 percent moves further up and represents a higher income value.

The relative income situation, respectively the positioning of certain households or certain groups of households improves when their situation improves *more* in comparison to a reference group of households. Thus, they move up in the income distribution because their incomes rise more (or decrease less) than the incomes of households located further up the income distribution over time.

Changes in income dispersion are based on changes of the percentile values. If the 10th percentile's value increases more than the value of the percentiles below that, or if it declines less than the percentile values at the very bottom, then incomes within the lowest decile (i.e. within the bottom 10 percent of all households) disperse over time. This leads to a growing distance between the 10th percentile's value and the values of the percentiles below. For example, a representative household with an income that equals the 5th percentile value over time would show lower income growth in comparison to a representative household located at the 10th percentile.

An increase in percentile values in a specific income range represents increasing incomes of households that are typically located in that income range. When the median (the 50th percentile) increases between 1989 and 2018 (accounting for price changes over time), this means that the “middlemost” unit in 2018 has a higher income than a household located at the 1989 median. This happens when a higher share of households in the population is located above the 1989 median level, which results in an upward shift of the median.

When interpreting the results, I will examine the contributions of minimum wage households to the lower percentiles alongside their contributions to the percentiles around the median. If their impact is disproportionately more positive in the lower income range compared to the middle, this suggests that these households are contributing to narrowing the income gap between different income brackets, leading to a reduction in income inequality within the lower half of the income distribution.

8. Minimum wages and the affected population: An empirical overview

8.1. Trends in minimum wages and their bite

Figure 1Figure 16 illustrates the development of the nominal and real value of the federal minimum wage. The trend in its nominal value represents three federally mandated increases in the observed time period, 1990 to 1991, 1996 to 1998, and from 2007 to 2009 (subsuming the incremental steps). In the first stepwise increase, the federal minimum wage rose from \$3.35 to \$3.80 an hour beginning April 1, 1990, and to \$4.25 an hour beginning April 1, 1991. In the second, it rose from \$4.25 to \$4.75 an hour on October 1, 1996, and to \$5.15 an hour on September 1, 1997. With the third increase, the minimum wage rose from \$5.15 to \$5.85 per hour effective July 24, 2007, to \$6.55 per hour effective July 24, 2008, and to today's \$7.25 per hour effective July 24, 2009 (note that slightly diverging values in the figure may result from annualizing wage levels when minimum wages change throughout the year instead of January). Since then, the nominal federal minimum wage stagnates on the same level. The real value of the minimum wage shows a cyclical pattern, increasing when the nominal value rises, and continuously decreasing during periods of inactivity in the federally mandated wage floor. As described above, the real value of the minimum wage fell strongly during the 1980s. Thus, the

increase after 1989, constituting the starting point of the observed time frame in this thesis, depicted a turning point: the real value prior to the first observed increase in 1990 stood at \$6.62. After cyclical movements the following years, the real value dropped lower until the point when the minimum wage level rose again in 2007. The lowest point was at \$6.26 in 2006, before it rose to \$8.29 in 2009. Due to the standstill on the federal level, the real value dropped again and stands at its nominal value at the end of the observation period. However, given that increasingly more states have passed bills to increase wages, the real value of the “effective” minimum wage is likely to be higher today.

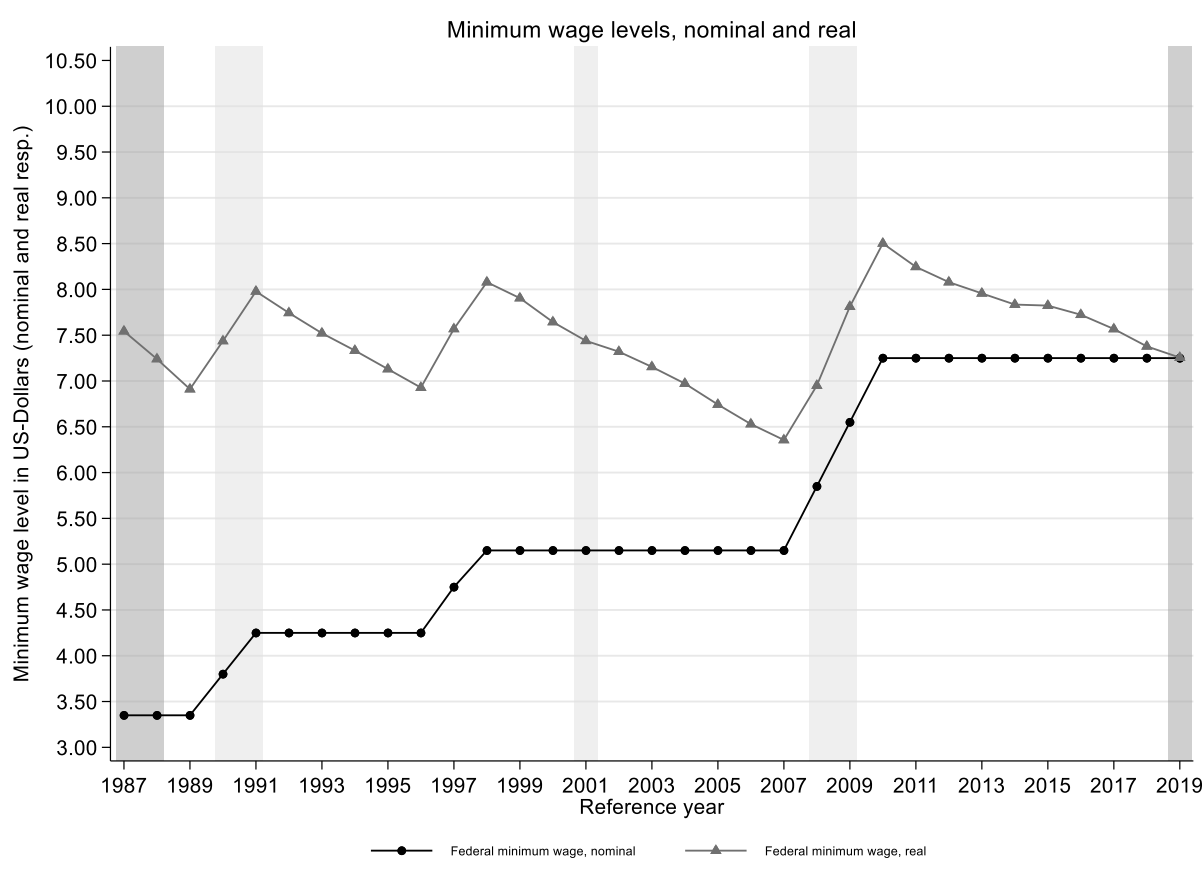


Figure 16: Trends in nominal and real federal minimum wage levels, 1987 to 2019.

Note: Annualized minimum wages are constructed by averaging the nominal federal minimum wage during the twelve months in a given year. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . For the real value of the federal minimum wage in a given year, that year's nominal federal minimum wage is inflated to 2018 dollars using the consumer price index (CPI-U). Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

Figure 17 illustrates the variation in nominal minimum wages over the 30-year period studied in this thesis. For each year between 1987 and 2017, the figure plots the nominal federal minimum wage, as well as the 50th, 75th, and 90th percentiles of the nominal statutory minimum wages across states (resp., their distribution), weighted by population. Additionally, the grey dots represent the annualized statutory minimum wages in each state. As can be seen, there is substantial variation in statutory minimum wages, especially in the 2000s and in the most recent years. The population-weighted median of statutory minimum wages is essentially congruent with the federal minimum wage level, except immediately before increases in the federal level. This changes however in the most recent period, where the median departs from the stagnant federal level.

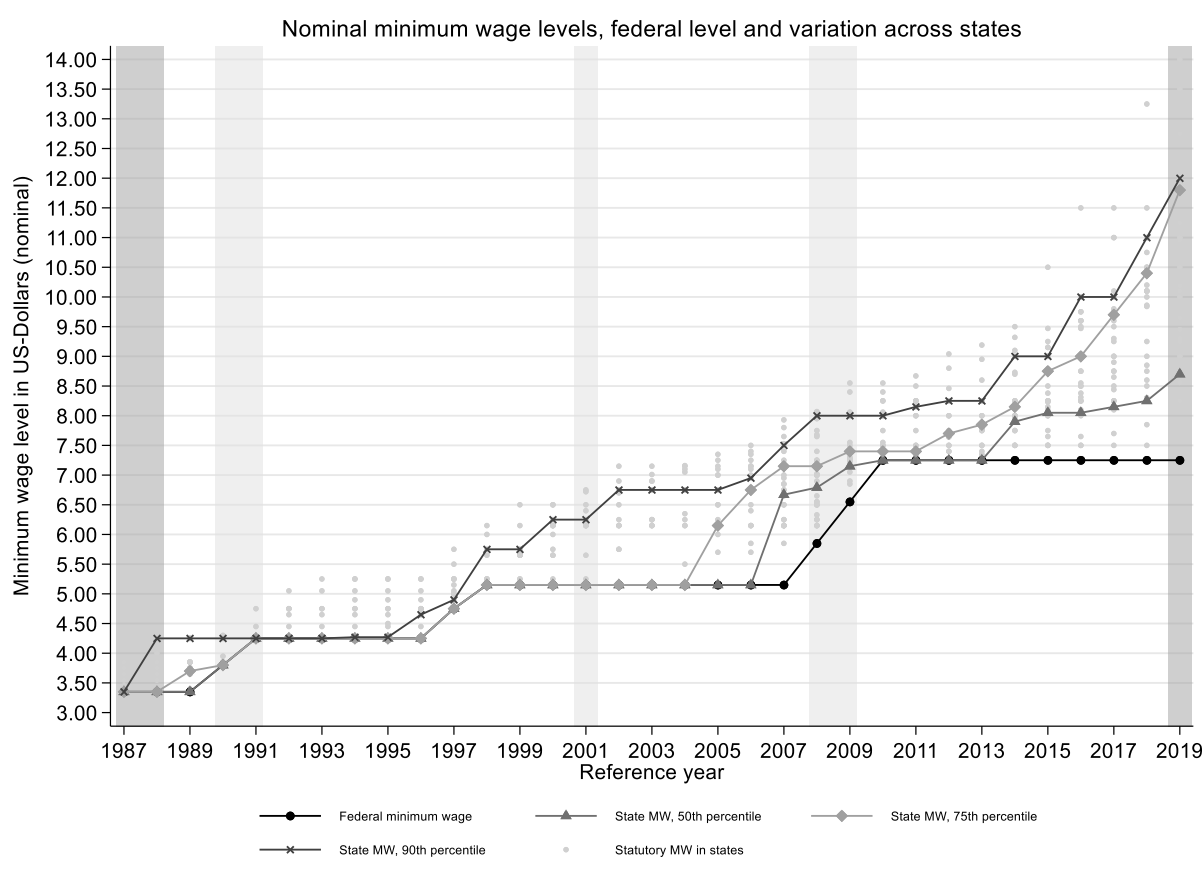


Figure 17: Variation in statutory minimum wages, 1987 to 2019.

Note: Annualized minimum wages are constructed by averaging the nominal statutory minimum wage on the federal level respectively on the state levels during the twelve months in a given year. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. The light gray dots in the scatter plot represent annualized statutory minimum wages in each state. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement weights.

Corresponding to the illustration above, Figure 18 presents the variation in statutory minimum wages but based on the real values of wage floors. It plots the real value of the federal minimum wage (as presented in Figure 16) and the real value of 50th, 75th, and 90th percentiles of statutory minimum wages across states (resp., their distribution), weighted by population. After the 75th percentile of real statutory minimum wages has been congruent with the real value of the federal minimum wage until 2004, it started to diverge. It increased sharply a few years prior to the federal minimum wage hike, which then caught up with it in 2010. Since 2012, the 75th percentile diverges strongly and approximates the 90th percentile, indicating that a growing share of the US population lives in states that more and more pass bills setting minimum wages decisively higher than the federal level. Even the median, which corresponds to the real value of the federal minimum wage throughout most of the time as many states' statutory minimum wage is determined by the federal minimum wage law, diverges starting in 2013. Therefore, the majority of the US population lives in states where the real value of the statutory minimum wage has increased since the end of the 1980s.

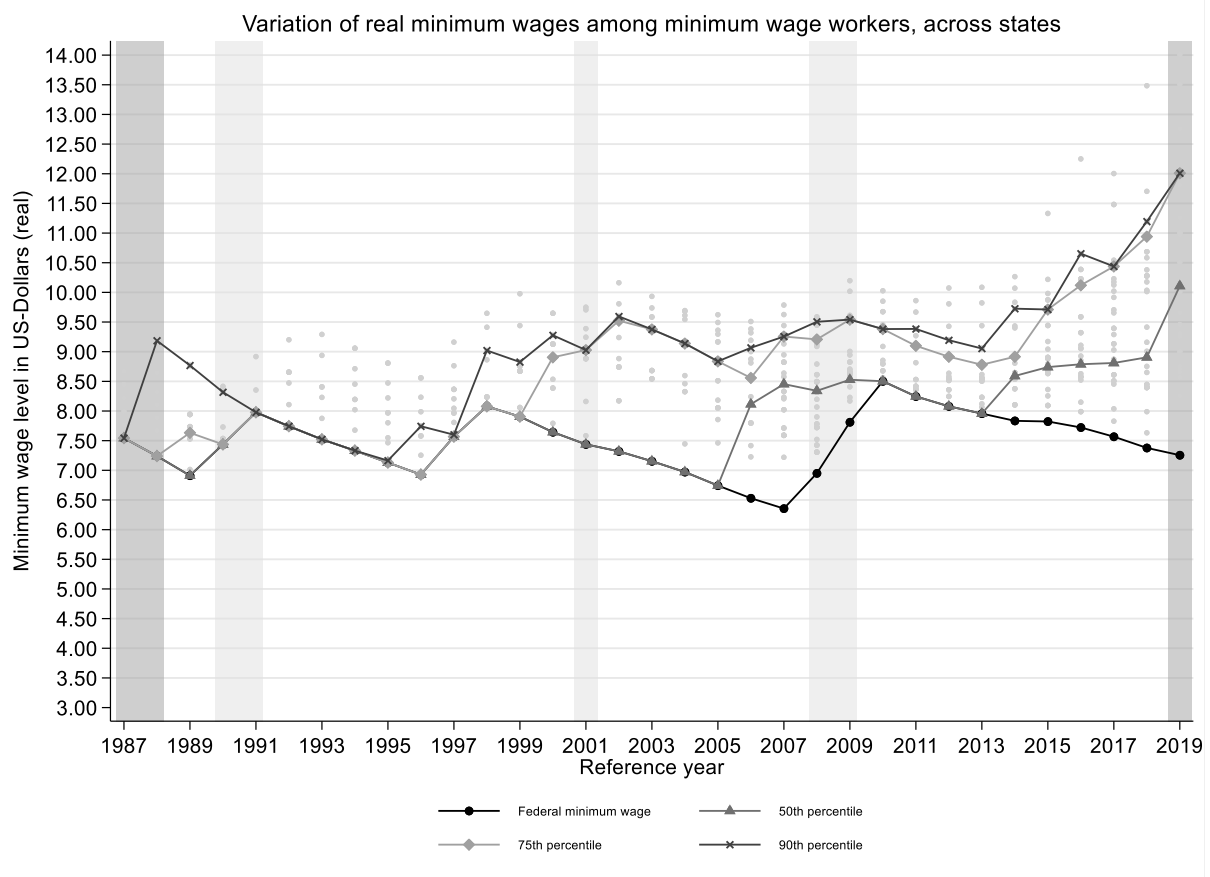


Figure 18: Variation in real statutory minimum wages, 1987 to 2019.

Note: Annualized minimum wages are constructed by averaging the nominal statutory minimum wage on the federal level respectively on the state levels during the twelve months in a given year. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. The light gray dots in the scatter plot represent annualized statutory minimum wages in each state. For the real value of the federal minimum wage in a given year, that year's nominal federal minimum wage is inflated using the consumer price index (CPI-U) to 2018 dollars. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement weights.

A comparison of the absolute levels of minimum wages, both nominal and real, does not necessarily denote that a minimum wage is more or less meaningful as a social policy tool in different time periods. For example, it matters decisively in how far a substantial part of the labor force is affected by it at all and how the minimum wage floor compares with wages further up the distribution. Changing labor market structures over time could imply that the relevance of a minimum wage at a given level differs at different points in time. To evaluate the potential impact of a minimum wage floor, scholars and practitioners often refer to its bite. Broadly speaking, the bite of the minimum wage is strong when a meaningful share of the labor force is affected by it, and when the minimum wage is not a long way from the center of the earnings distribution but close to it, potentially affecting a larger number of employees.⁷⁷ One widespread and popular measure to illustrate the bite of the minimum wage is the Kaitz index.

⁷⁷ In this thesis, I abstract from the coverage of minimum wage laws and the extent of compliance with them. The CPS ASEC does not allow for identification of individuals who are covered or non-covered by minimum wage laws. Accordingly, non-compliance with said law cannot be identified either. I will assume affected individuals to be those who work for hourly wage rates at the statutory minimum wage level (including a small bandwidth to reduce false negatives due to measurement error). Accordingly, individuals with hourly wages lower than the statutory minimum wage in a given state (and lower than the lower bound of the bandwidth) are not defined as minimum wage earners in the respective year and state. It is not possible to diagnose if these individuals are not covered by law or if their employers do not comply with prevailing law.

This indicator is represented by the ratio of the nominal legal minimum wage to the average wage of the working population in a given year (Kaitz 1970; Garnero, Kampelmann, and Rycx 2015). Small values indicate that the wage floor is a long way from the center of the earnings distribution, suggesting that its potential impact is low. The higher the Kaitz index, the closer the minimum wage to the center of the distribution and the more likely that it affects a larger number of employees. If, hypothetically, the statutory minimum wage remains stagnant at a low level while workers higher up the wage distribution benefit from increasing wages, the minimum wage loses its bite. As the gap between the wage floor and average wages widens, the proportion of the labor force earning these disproportionately low wages may decrease. Conversely, if the effective minimum wage were to double while other wages in the overall economy remained unchanged, its impact would intensify significantly, resulting in a substantial increase in the share of workers affected.



Figure 19: Ratio of federal minimum wage to average hourly wages

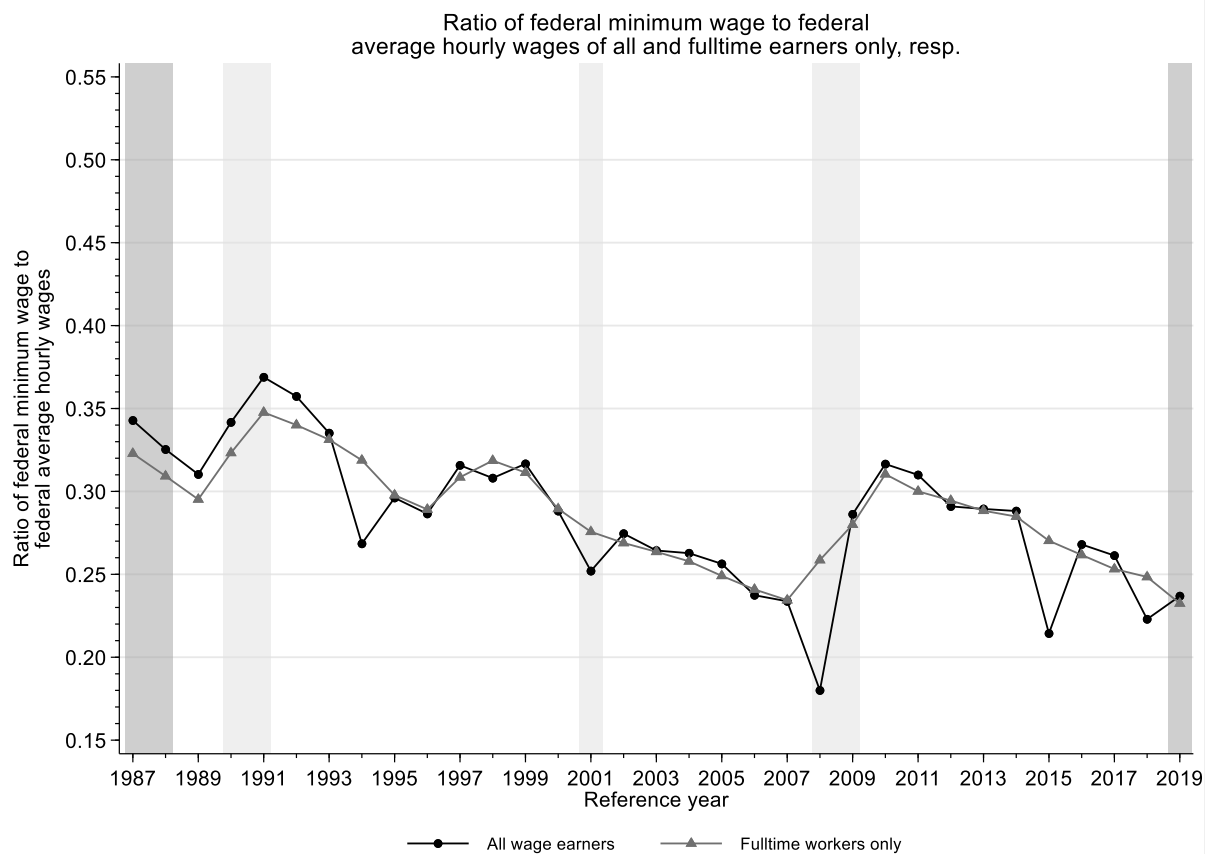


Figure 19 presents the trend of the ratio of the federal minimum wage to the average hourly wage over time. The average hourly wage is computed on basis of number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income, for all wage and salary workers and for workers working full time only. When compared with the average hourly wage on the federal level, the federal minimum wage has clearly lost ground. At the beginning of the analyzed time frame in 1989, the ratio taking account of all workers stood at 0.34, meaning that employees working for the federal minimum wage earned 34% of the average wage in that year, i.e. a third of what the average worker in the same year earned per hour. The ratio overall shows a downward trend with a few drops and recoveries in-between. In 2018, the last year of my analysis time frame, the ratio stands at 0.22. Thus, workers being paid by the federal minimum wage made less than a quarter of what the average worker earned. The trend of the ratio of the federal minimum wage to the average wage of full-time workers largely resembles the trend of all workers but appears to be a bit less volatile.⁷⁸

⁷⁸ Given that the trends are the same (except for the drops in 1994, 2008, and 2015), I will present the following data on state-level trends for all workers only, including both full time and part-time workers. The minimum wage workforce itself represents both full- and part-time workers, and from a policy perspective, these workers' wage rates should keep up with higher-wage workers in general, which is why I will use all workers average wage as a reference point.

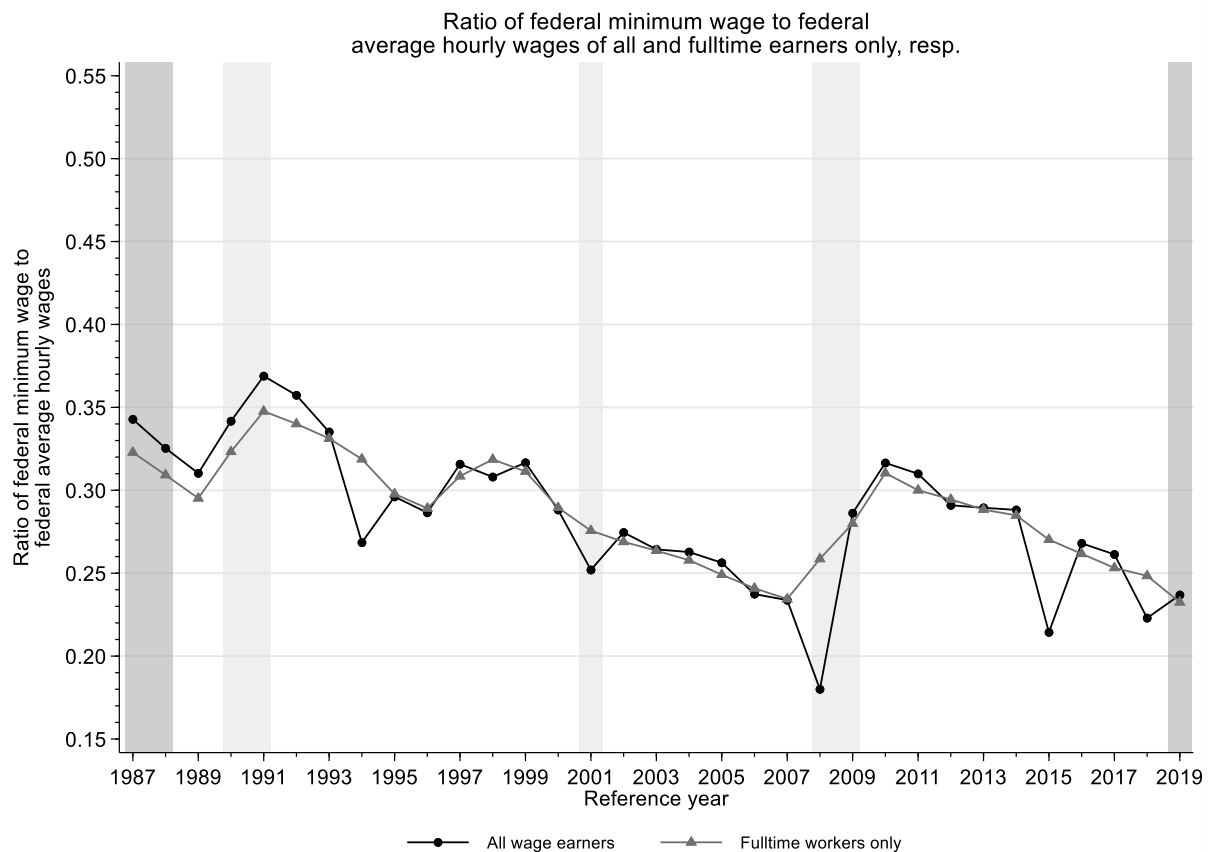


Figure 19: Ratio of federal minimum wage to average hourly wages, 1987 to 2019.

Note: Data on federal and state-level minimum wages are obtained the US Department of Labor. Average hourly wages are based on own calculations, matching the data base for the descriptive and multivariate analyses in this thesis: Hourly wages are not available in the Annual Social and Economic Supplement of the Current Population Survey. They are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement weights.

When the federal minimum wage stalls at a low level while increasingly more states pass bills to increase the minimum wage on the state level, the number of workers being paid the federal minimum wage decreases, meaning that the federal minimum wage floor loses its bite. Additionally, if wage levels are higher in certain states in general, and if the overall average wage is driven upwards by this trend, the stagnant federal minimum wage will represent a wage floor that is a long way from the center of the distribution. Thus, higher statutory minimum wages across increasingly more states covering an increasingly larger share of low-wage workers should be scrutinized as well.

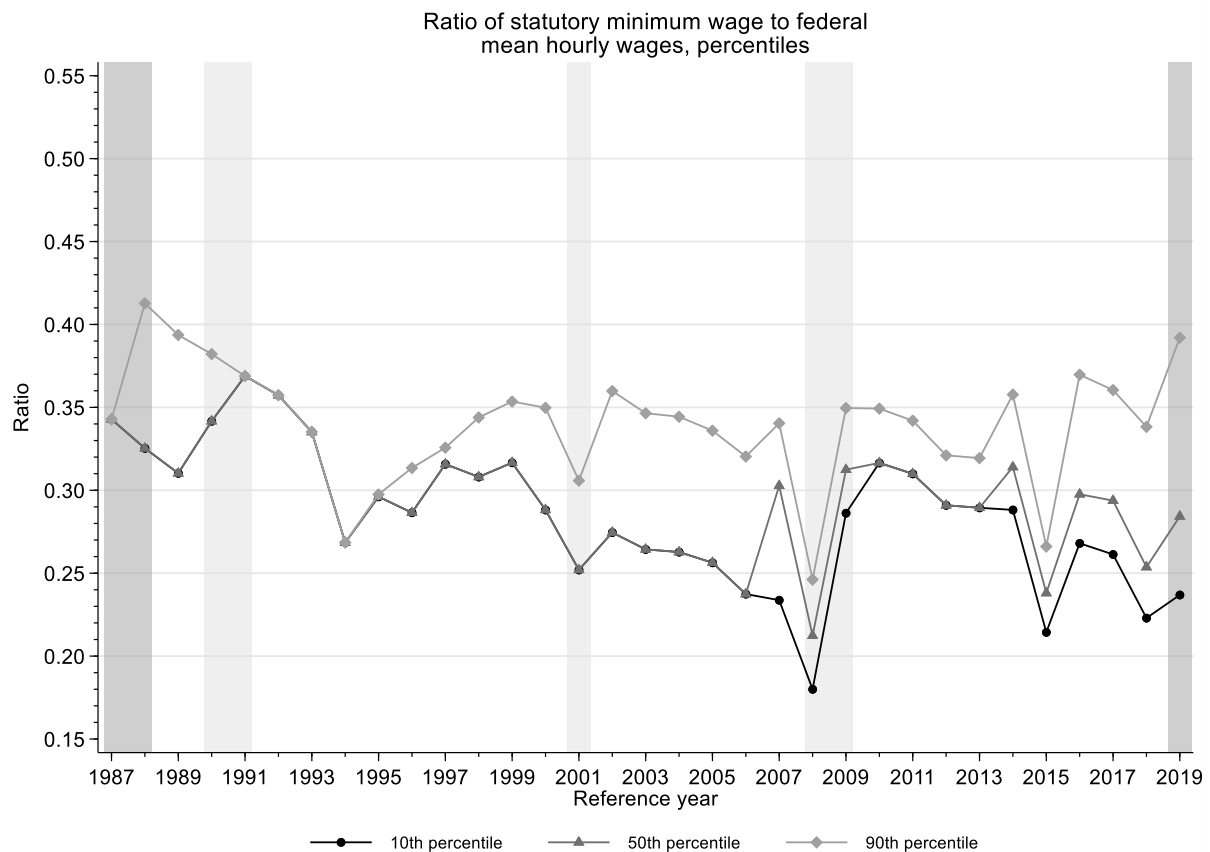


Figure 20: Variation in ratios of statutory minimum wages on state level to the federal average hourly wage, 1987 to 2019.

Note: Data on federal and state-level minimum wages are obtained the US Department of Labor. Average hourly wages are based on own calculations, matching the data base for the descriptive and multivariate analyses in this thesis: Hourly wages are not available in the Annual Social and Economic Supplement of the Current Population Survey. They are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement weights.

Figure 20 illustrates the variation of the Kaitz index depicting the 10th, the 50th, and the 90th percentile of the ratio of the statutory minimum wage on state level to the nationwide average hourly wage, whereas the ratio in Figure 21 refers to the state-specific average hourly wage (and not the nationwide average). Figure 20 shows that the Kaitz index resembles the one on the federal level in the majority of the states, since the median across all states is fairly close to the trend on the federal level, with a significant decline in the ratio. However, the 90th percentile's trend differs substantially. Here, there is no overall decline in the ratio. This means that in some states, the state-level minimum wages could keep pace with the federal average of hourly wages of all workers. Figure 21 shows that, when setting the state minimum wage into relation with the state-specific average hourly wage, the trends decline even for the states with the highest Kaitz indices (presented by the 90th percentile separating the 10 percent of states with the most favorable indices from those with lower indices). However, using the average hourly wage as a benchmark, either on the federal or the state level, may be misleading.

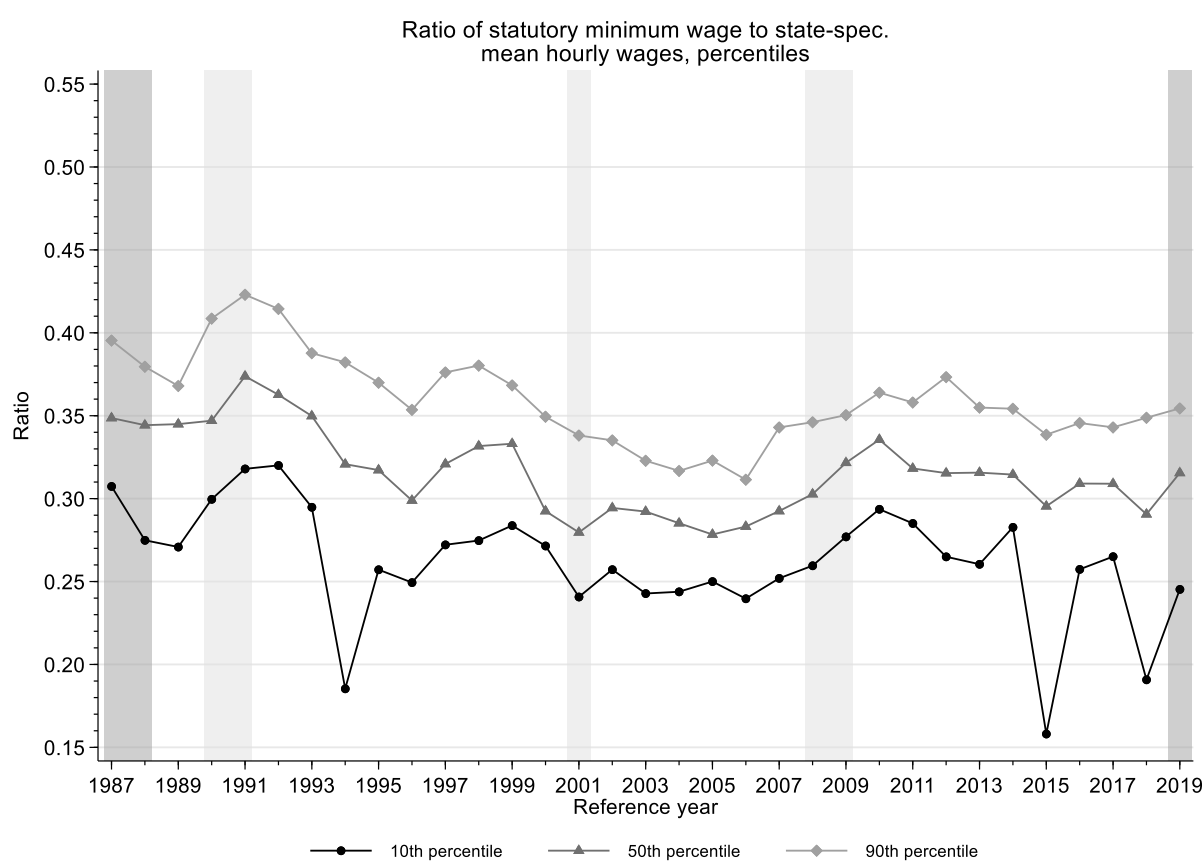


Figure 21: Variation in ratios of statutory minimum wages on state level to the state-specific average hourly wage, 1987 to 2019.

Note: Data on federal and state-level minimum wages are obtained the US Department of Labor. Average hourly wages are based on own calculations, matching the data base for the descriptive and multivariate analyses in this thesis: Hourly wages are not available in the Annual Social and Economic Supplement of the Current Population Survey. They are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

To improve comparability across countries or over time, the Kaitz index can be calculated using median earnings instead of average earnings (Garnero, Kampelmann, and Rycx 2015). When countries have varying levels of wage inequality or when wage dispersion within a country changes over time, comparing the minimum wage to average wages can be misleading. For instance, if the growth in wage inequality in the USA since the early 1990s was mainly rooted in the upper tail of the wage distribution, this will raise the average wage. the median will continue to represent middle wages and will not react to changes in the same way as the average if rising wages only affect the top part of the distribution and not a reference point in the "middle" of the labor force.

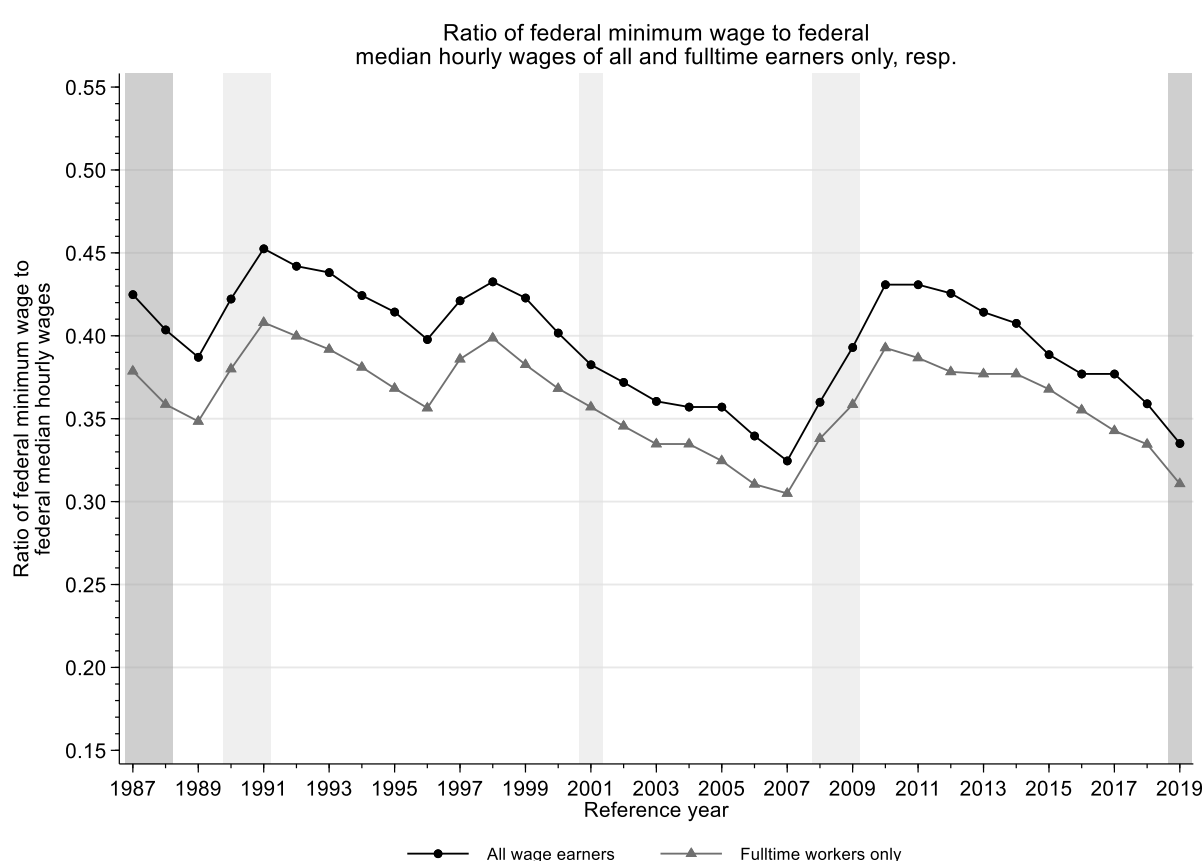


Figure 22: Ratio of federal minimum wage to median hourly wages, 1987 to 2019.

Note: Data on federal and state-level minimum wages are obtained the US Department of Labor. Median hourly wages are based on own calculations, matching the data base for the descriptive and multivariate analyses in this thesis: Hourly wages are not available in the Annual Social and Economic Supplement of the Current Population Survey. They are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 22 uses the median hourly wage as a reference point and presents the trend of the ratio of the federal minimum wage to the federal median hourly wage over time. As expected, the ratio is overall higher than that using the average hourly wage as a reference point, and its declining trend is more subtle: in 1989, the ratio stood at .39, which means that workers working for the federal minimum wage earned 39% of the median hourly wage in that year (compared to 31% of the average hourly wage). The different trends between the two measures indicate that average hourly wages have increased disproportionately more and might not be a useful reference point to represent the center of the wage distribution. Using the median, the trend more clearly displays a continuous decline in the ratio until the federal minimum wage increased with the amendments to the FLSA in 2007. Thus, the Kaitz index on basis of the median hourly wage more likely reflects the bite of the federal minimum wage: it decreased during periods the real value of the minimum wage decreased, especially before 2007 (see Figure 16). Since 2012, the ratio has decreased strongly again, and stood at 0.36 in 2018, compared to 0.22 using the average hourly wage as an anchor. However, the declining bite of the federal minimum wage may be counteracted by the growing importance of minimum wages

at the state level in recent years. The trend of the ratio of the federal minimum wage to the median wage of workers working full time moves in parallel to that of all workers (both full time and part-time).

Figure 23 illustrates the variation of the Kaitz index depicting the 10th, the 50th, and the 90th percentile of the ratio of the statutory minimum wage on state level to the federal median hourly wage. Thus, this figure illustrates in how state-level minimum wages have fared in relation to the evolution of the nationwide median hourly wage. For example, the 90th percentile represents the states with the highest statutory minimum wages, in which the prevailing minimum wage is closest to the federal median hourly wage. The index stood at .54 in 2018, which means that minimum wage workers made a little more than half of the nationwide median hourly wage, up from .39 in 1989. Thus, minimum wage workers could catch up with the hourly wages at the median. The 50th percentile largely resembles the trend based on the federal minimum wage, as many states' statutory minimum wages were determined by federal wage floor for long. However, the most recent years show that this trend changes: the median across states diverges upwards, which means that the majority of US minimum wage workers has recently benefitted relatively to workers at the center of the distribution.

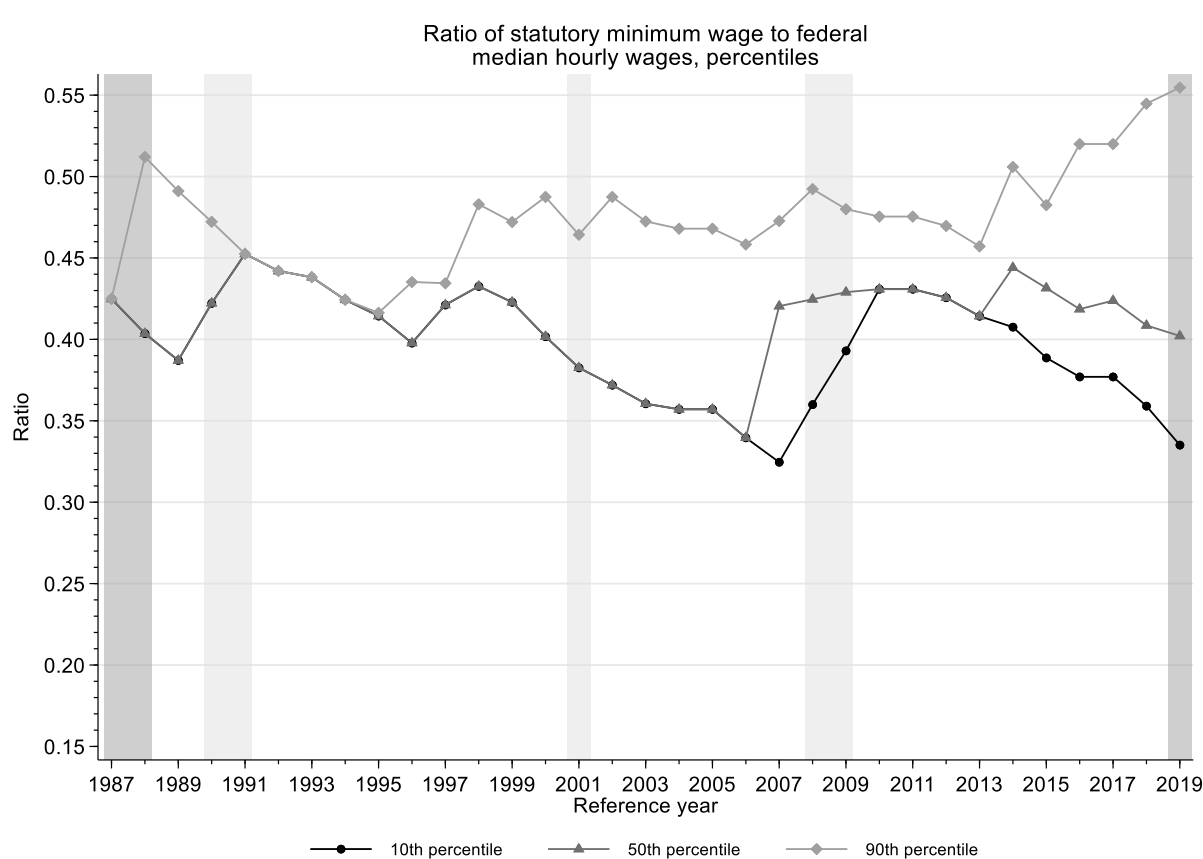


Figure 23: Variation in the Kaitz index, i.e. the ratio of statutory minimum wages on state level to the nationwide median hourly wage, 1987 to 2019.

Note: Data on federal and state-level minimum wages are obtained the US Department of Labor. Median hourly wages are based on own calculations, matching the data base for the descriptive and multivariate analyses in this thesis: Hourly wages are not available in the Annual Social and Economic Supplement of the Current Population Survey. They are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person

weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.



Figure 24: Variation in the Kaitz index, i.e. the ratio of statutory minimum wages on state level to state-specific median hourly wages, 1987 to 2019

Note: Data on federal and state-level minimum wages are obtained the US Department of Labor. Median hourly wages are based on own calculations, matching the data base for the descriptive and multivariate analyses in this thesis: Hourly wages are not available in the Annual Social and Economic Supplement of the Current Population Survey. They are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 24 illustrates the variation of the Kaitz index depicting the 10th, the 50th, and the 90th percentile of the ratio of the statutory minimum wage on state level to the state-specific median hourly wage, representing the bite of the minimum wage on the state levels. The level and trend of the 50th percentile's value is quite similar to that of the ratio of the federal minimum wage to the federal median hourly wage, at least until the 2000s. In the period in which the federal minimum loses ground before 2007, the ratio of the state-level minimum wages to the state-specific median hourly wages decreases as well, but to a comparatively low degree. Likewise, the bite on state-level appears to be relatively stable after 2009 compared to the trend on the federal level, even though it is slightly decreasing. In 1989, the 10th percentile stood at 0.33, and the 90th percentile at 0.45, which means that among the 10 percent of states with the lowest

bite, minimum wage workers earned only a third of what the median worker earned in the same state, in the most favorable cases. In the 10 percent of states with the highest bite, minimum wage workers earned 45% of the state's median hourly wage. In 2017, this figure increased for both the lower and the higher end: the 10th percentile is now located at a ratio of 0.38, and the 90th percentile's ratio is located at 0.50. Thus, in states with the highest bite considering the states' overall wage level, minimum wage workers earned half of the median hourly wage. Further, in the most recent years, this ratio has still increased compared to the declining trend on the federal level (see Figure 22).

The Kaitz index does not necessarily declare the actual impact of the minimum wage but only relates its level to the level of wages of a "typical" employee. The potential impact of the minimum wage depends on the number of workers whose hourly wages are set according to it. One factor which determines the number of workers that are paid the minimum wage is the coverage of minimum wage laws and the compliance of employers with the law. In a scenario with limited coverage, a certain share of the workforce will earn sub-minimum wages, which limits the minimum wage's bite. The higher this share, the lower the effective bite of the minimum wage (Garnero, Kampelmann, and Rycx 2015; Kaitz 1970). However, in the time frame under consideration here, coverage was nearly complete and changes in coverage by minimum wage law are negligible.

Another scenario would be that all employers in a labor market pay their employees hourly wages above the minimum wage. This could hypothetically be the case either when the minimum wage is set too low as to attract employees to take up work on minimum wage level, or when productivity of all employees exceeds its level.

Unfortunately, data on the number of workers who are paid on minimum wage levels is very limited. The Bureau of Labor Statistics (Bureau of Labor Statistics 2008, 2019b) tracks the number of minimum wage workers being paid the *federal* minimum wage only. This neglects the growing share in the workforce and especially the low-wage labor force employed according to state minimum wage laws. Considering a broader range of the low-wage labor force, i.e. the share of employees earning hourly wages between the statutory minimum and 50% of average annual earnings, Levin-Waldman (2015) refers more broadly to the "effective minimum wage labor market". Results on basis of data from 1982 to 2013 from the Current Population Survey (IPUMS-CPS) suggest that the "effective minimum wage labor market" is increasing in size as a percentage of the overall labor market. At the beginning of the 1980s, the share of minimum wage earners in the total labor force stood at 3.3%. At the beginning of the 1990s following the increases on federal level, 10% earned hourly wages in this low-wage sector. At the beginning of the 2000s, 15% were "effective minimum wage earners" and this figure increased further to 17% in 2006. After this turning point, the share of employees in this low-wage labor force decreased again to 11% in 2009. Until 2013, the share rebounded to 16%. Even though these figures do not strictly refer to the minimum wage labor force, they still refer to the workers in the labor force who are either affected by minimum wages already or who will be affected by prospective increases in its level. In other words, contrary to the claims of the critics that only a very small segment of the labor market earns the minimum wage and that the benefits would be too small as to justify the costs, these figures suggest that taking a broader minimum wage labor market into consideration, the affected part of the labor force is substantial.

However, neither the federal nor the state level minimum wages stood at 50% of the average hourly wage at any time during the observation period.

For a more complete picture, I calculate the share of workers who averaged an hourly wage equal to the prevailing minimum wage over the calendar year. In each case, the higher of the national or state minimum wage applies. I use annual averages of hourly wages because all other household income components are reported by respondents in the Annual Social and Economic Supplement (ASEC) of the CPS, which takes place in March of each year, for the previous calendar year.

Figure 25 shows the share of minimum wage recipients in both the total population and the population employed in the past year. The share of minimum wage workers in the population employed in the last year is relatively high. At the beginning of the period studied, 10% of those employed in the last year earned an hourly wage equal to the statutory minimum wage (the higher of the respective federal or the state minimum wage). The overall trend is broadly similar to that of the real value of the minimum wage and the ratio of the federal minimum wage to the median hourly wage, reinforcing the view that these measures represent a coherent concept such as the bite of the minimum wage. The share fluctuates in the years before 2000 and then declines to 8% in 2006, paralleling the declining real value of the minimum wage at the federal level and in most states. The share then rises again to 11% in 2010, after the federal minimum wage floor was raised, and has been relatively stable with a slight downward trend since then. Minimum wage recipients as a share of the total population are a broader and fuzzier concept that provides a picture of the share of people in overall U.S. society who are currently directly affected by minimum wage policies. Needless to say, the share is lower, hovering around 5%. The downward trend prior to the minimum wage increase in 2007 is also visible, but less pronounced.

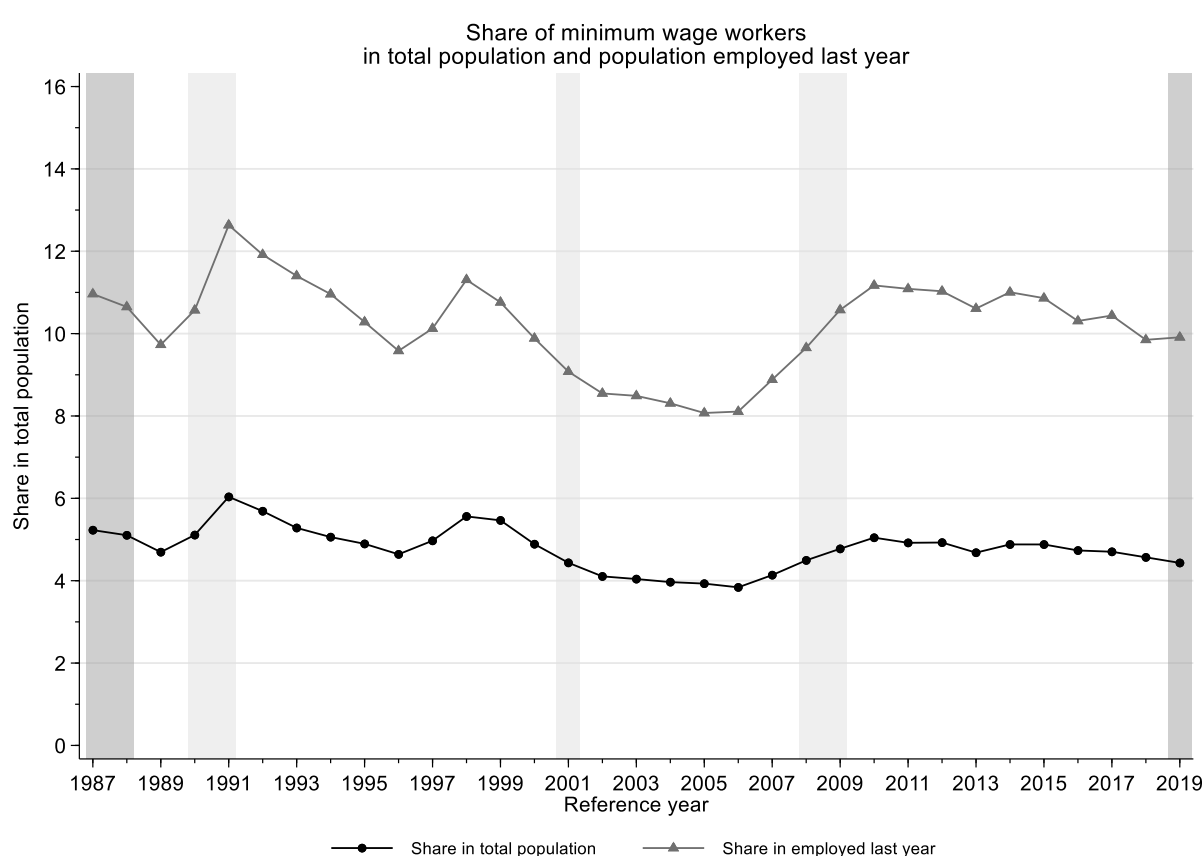


Figure 25: Share of minimum wage earners in overall population and in population employed last year, 1987 to 2019.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20% around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 26 illustrates the variation in the share of minimum wage workers in the population employed last year. In states with higher statutory minimum wages or in states in which the statutory minimum wage has a stronger bite (either due to the minimum wage level itself or due to a large low wage sector, e.g.), the share of minimum wage workers might be substantially higher than in states with minimum wages on a lower level or with a lower bite. The 10th percentile value represents the share of minimum wage workers separating the 10% of states with the lowest shares from states with shares above that threshold. The 90th percentile value represents the share of minimum wage workers separating the 10% of states with the highest shares of minimum wage workers in their employed population. The figure shows that the disparities between states is substantial: the difference between the 10th and the 90th percentile varies between 4 and 11 percentage points. The smallest difference among states was visible in 2010 and 2011, after the increase in the federal minimum wage lifted the “low road” states closer to the wage floors of other states. In other words, the disparity among states is smaller when the federal minimum wage ensures a higher wage floor and larger during periods in which

the federal minimum wage stagnates. This is particularly eminent in the period before the increase in the federal minimum wage in 2007, and since 2014. The 90th percentile's value reaches peaks at a share of 16% in 2014 and 2019, and the 10th percentile's value reaches lows of 5% in 2007 and 2019.

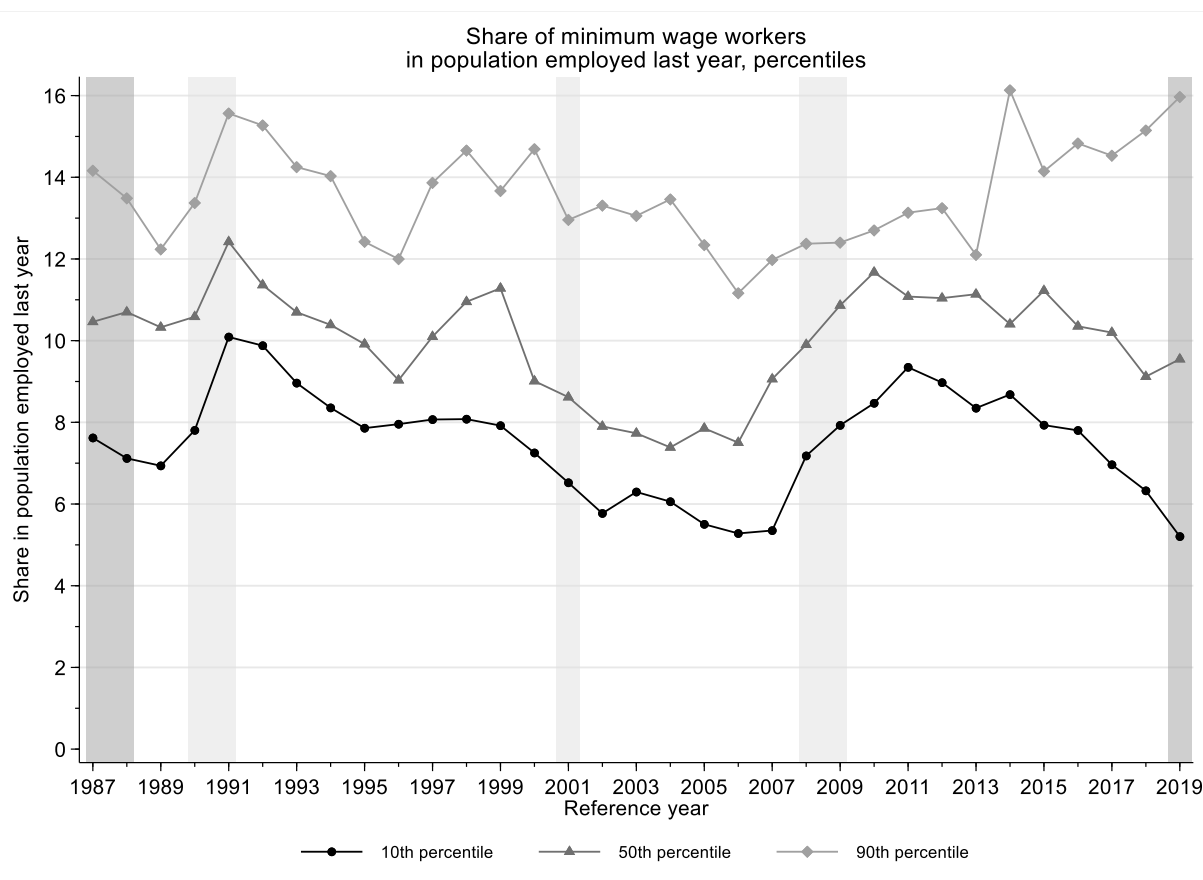


Figure 26: Variation in the share of minimum wage workers in the population employed in the last year, across states, 1987 to 2019.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20% around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained from the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 27 shows the variation in the share of minimum wage workers in the overall population. Compared to Figure 26, the dispersion across states is much lower: the difference between the 10th and the 90th percentile fluctuates only between 2 and 4.5 percentage points only with a comparable trend over time as the variation in the share of minimum wage workers in the employed population.

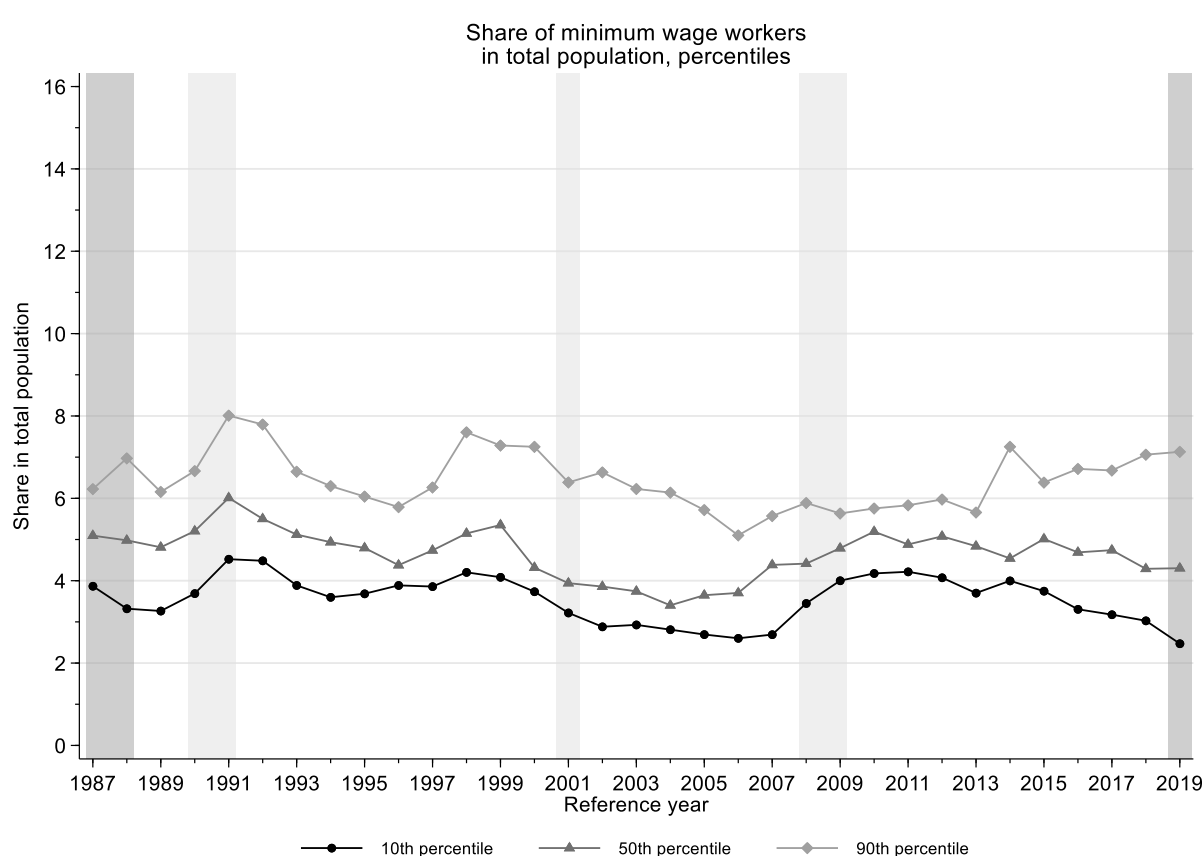


Figure 27: Variation in the share of minimum wage workers in the overall population, across states, 1987 to 2019.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20% around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained from the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

To sum up, one can observe that the federal minimum wage has lost ground: Given that its level has not been raised since 2009, its real value has deteriorated. This has been countered by the increasing minimum wages on state level. Particularly since 2012, a growing share of the US population lives in states that more and more pass bills setting minimum wages decisively higher than the federal level. Over the entire period, the majority of the U.S. population lives in states where the real value of the statutory minimum wage has increased since the late 1980s. These overall trends are resembled by the trends of the Kaitz index, which measure the distance between minimum wage floors and the center of the wage distribution. The trends in the ratios of minimum wage levels to the median hourly wages reveal that the bite of the federal minimum wage is strongly dependent on the points in time in which the wage floors has been increased through amendments to the FLSA. Overall, the federal minimum wage loses ground compared to mid-level wages. When comparing *state-level* minimum wages with median wages, however, it becomes clear that due to the rising number of states passing bills to increase the minimum

wage, the minimum wages of increasingly more workers could catch up with wage trends further up the distribution.

The share of minimum wage workers in the total population and the population that was employed over the year stood at the same level in 2019 as in 1989, marking the two time points for the analysis. Between these two points in time, the shares have fluctuated slightly, in parallel to the trend of the real value of the minimum wage and the ratio of the federal minimum wage to the median hourly wage, reinforcing the view that these measures represent a coherent concept such as the bite of the minimum wage. This is even more evident regarding the variation in the share of minimum wage workers among states. The lower bound, represented by states in which the federal minimum wage floor applies, clearly mimics the trend of the minimum wage level, both in absolute and relative terms (Kaitz index). The heterogeneity of the share of minimum wage workers among states has increased, since the 90th percentile's value increased slightly, whereas the 10th percentile's value declined slightly. These trends point to the endogeneity of the potential impact of a given minimum wage floor. Higher minimum wages which decrease the gap between the wage floor and the average or median income may 'automatically' lead to higher shares in the workforce that are affected by it. This increases the potential impact of the minimum wage on the overall income distribution, because a larger population group is targeted by relevant policies. The relative improvement of minimum wages in increasingly more states as evidenced by the Kaitz index is in line with the evidence that minimum wages have contributed to declines in wage inequality. Further, a strong bite will not only lead to a larger part of the workforce that is affected by minimum wages, but also to a higher number and possibly larger heterogeneity of households in which the minimum wage workers live. This means that a more 'diverse' profile of households will be affected by an increase, which may alter the target efficiency of minimum wage policy. This underpins the importance to study the composition and income trends of the group of minimum wage workers and the households they live in.

8.2. The share of households with minimum wage earners as one subgroup of the total population

As discussed in chapter 2, the share of workers earning minimum wages and the share of households affected by minimum wages are critical factors when considering the impact of the minimum wage on population-wide aggregate statistics such as income inequality or the poverty rate. Besides the size of the affected population, its composition with regard to demographics, family constellations, education, labor market activity as well as their income situation is a meaningful factor determining the impact minimum wages have on such aggregate-level statistics. Furthermore, such information and data may improve decision-making processes on future minimum wage policies. Yet, such statistics have not been tracked systematically over time, and the changing composition of the affected population has not been systematically accounted for in studies estimating impacts of the minimum wage on (aggregate-level) poverty rates. Scholars regularly account for changes in demographics, shifts in educational composition, or family constellations *in the overall population* to rule out their impact on changes in poverty rates, but they do not account for changes in the composition of the target group of minimum wage policy, i.e. households with minimum wage earners.

Figure 28 shows the share of households with minimum wage workers in the total population and among non-pensioner households. The trends move in parallel, and the share is almost consistently about 2 percentage points smaller when it refers to the total population. From 1989 to 2018, which mark the two time points for the analysis, the shares have overall declined by about one percentage point, from 11% to 10% in the total population, respectively from 13% to 12% among non-pensioner households. The fluctuations between these two time points are stronger than for the share of individual minimum wage workers and similarly moves in parallel to the trend of the real value of the minimum wage and the ratio of the federal minimum wage to the median hourly wage. In what follows, I will limit the discussion to trends in the total population.

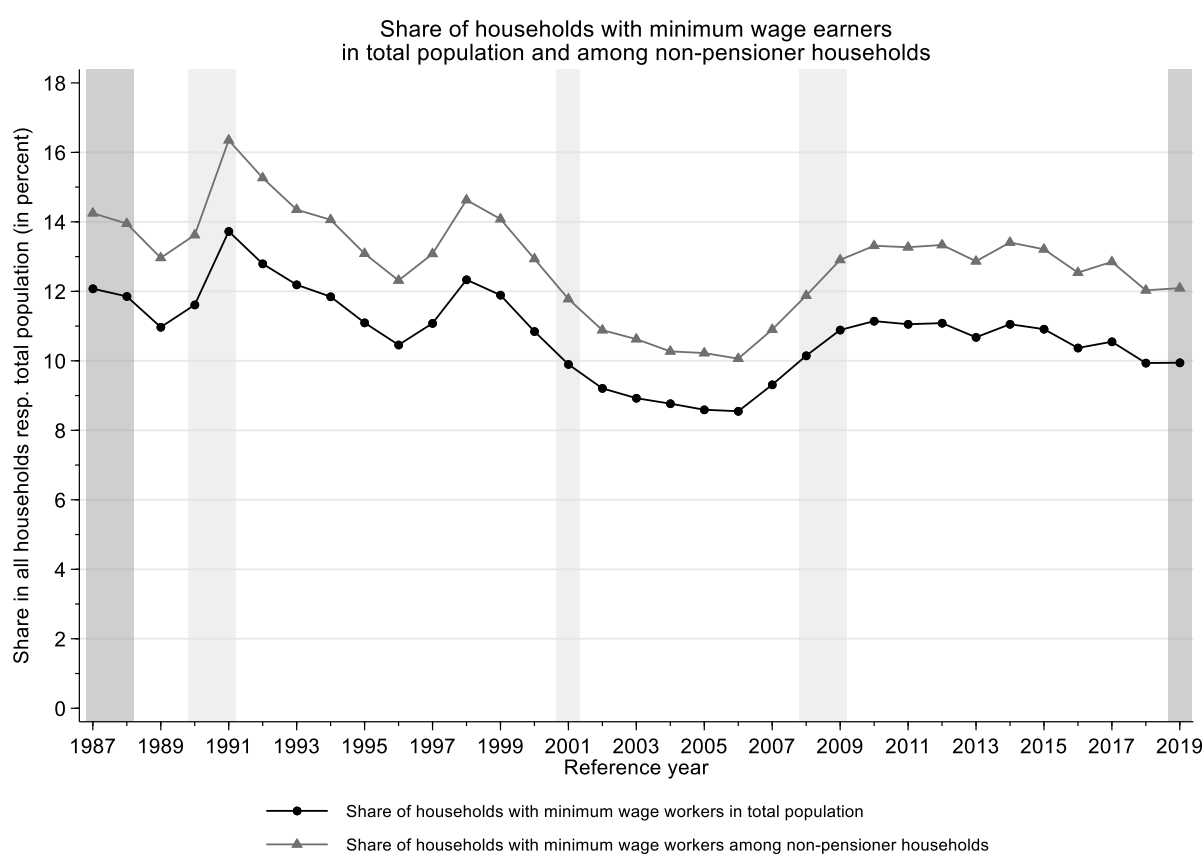


Figure 28: Share of households with minimum wage workers, in total population and among non-pensioner households, 1987 to 2019.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20% around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 29 depicts the variation in shares of households with minimum wage workers across states and shows that the difference among states is substantial: the difference between the 10th

and the 90th percentile varies between 4 and 11 percentage points. The difference among states was smallest between 2011 and 2013, shortly after the increase in the federal minimum wage lifted the “low road” states closer to the wage floors of other states. In other words, the disparity among states is smaller when the federal minimum wage ensures a higher wage floor and larger during periods in which the federal minimum wage stagnates.

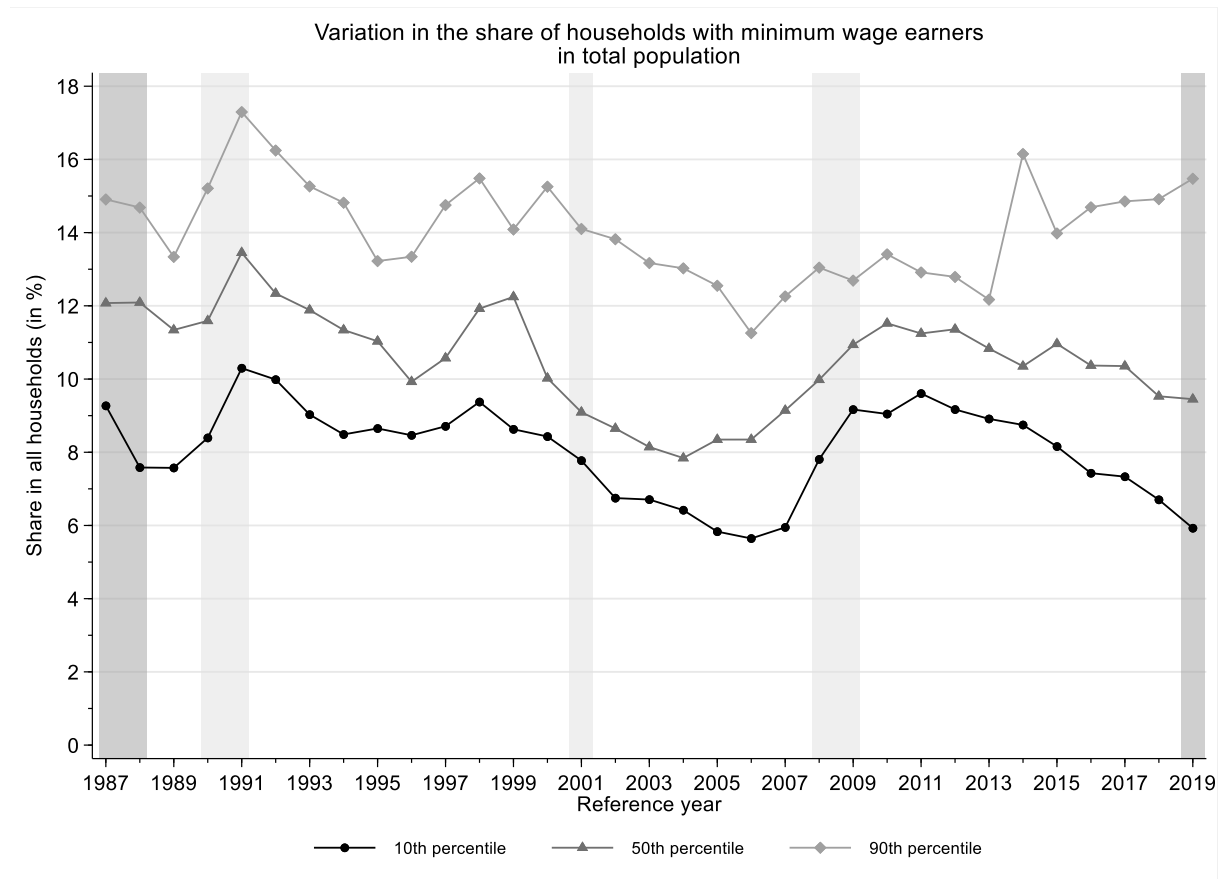


Figure 29: Variation in the share of households with minimum wage workers in the total population, across states, 1987 to 2019.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20% around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 30 displays the share of households with minimum wage workers in the total population. The line for all households with minimum wage workers, presented before, serves as a benchmark. This figure distinguishes between households with a strong dependency, a medium dependency, and a minor dependency on the minimum wage. The share of households with a medium dependency was relatively constant across the whole time period. The share of households with a strong dependency has increased by one percentage point, whereas the share of households with a minor dependency has declined by 2.5 percentage points. The proportion

of households strongly affected by the minimum wage clearly follow the cycles starting with a minimum wage increase, a decline in the real value and bite of the minimum wage over several years and a renewed increase in the minimum wage due to federal minimum wage law. Compared to the earlier cycles, however, the proportion of households strongly affected by the minimum wage hardly fell between 2010 and 2018. The size of this population group has therefore remained fairly stable since 2010 despite the lack of increases at federal level. A similar cyclical trend can be seen for moderately affected households, but not for lightly affected households.

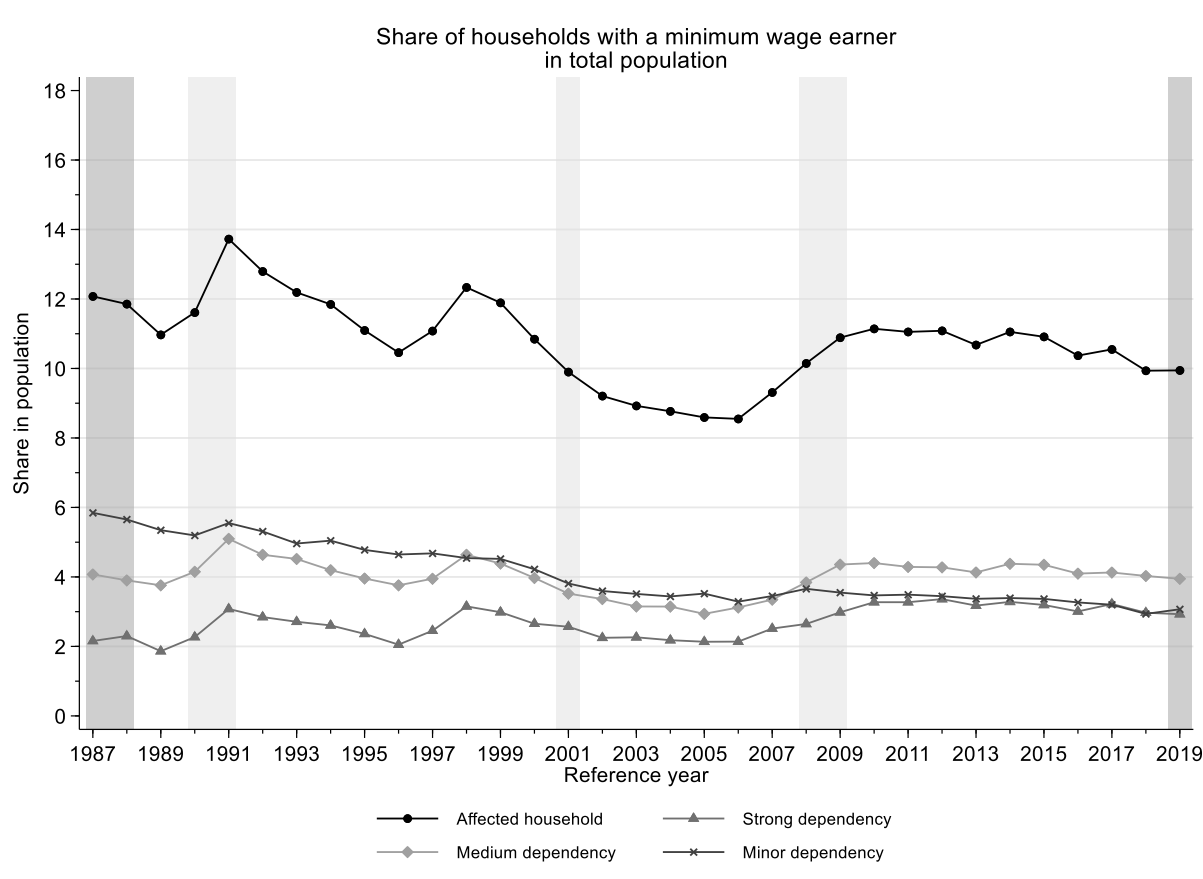


Figure 30: Mean shares of households with minimum wage earners, distinguishing between households with a strong dependency, a medium dependency, and a minor dependency on the minimum wage, 1987 to 2019.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20% around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019. Own calculations, using Annual Social and Economic Supplement Household weights.

The difference between the proportion of households with minimum wage earners in the total population compared to their proportion among all non-pensioner households is negligible and amounts to less than 1 percentage point. Furthermore, the trends for all sub-categories of those affected by the minimum wage run parallel. The difference between the proportions is greater

for households with only higher-wage earners and households with no one in employment (see section C of the appendix), but here too the trends run parallel.

The following tables give an overview of the descriptives of the variables that will be used for the multivariate analyses, which uses a long-term timeframe based on a comparison between only two points in time, 1989 and 2018.⁷⁹ Table 3 shows the means of all covariates, representing the respective shares of households with certain characteristics for each point in time. The selected years are chosen prior and after increases in the federal minimum wage (1990 to 1991, 1996 to 1998, and from 2007 to 2009), which always lifted the “low-road” states’ minimum wage levels and therefore the hourly wages of a significant proportion of the minimum wage workforce to a substantially higher level. This helps to investigate how social strata changed over time and in what settings the increases in the federal minimum wage were implemented.

In the top rows, Table 3 shows how the population is divided into groups that are affected to varying degrees by minimum wage policy. The table confirms what I reported on the basis of the annual panels: The share of strongly affected households increased over time from 1.9% in 1989 to 3.0% in 2018, while the share of households in which the minimum wage plays a minor role in total household income (“lightly affected households”) decreased significantly, from 5.3% in 1989 to 2.9% in 2018. The table also confirms the cyclical trends previously found in the shares of strongly and moderately affected households, as well as the lack of cyclical trends among lightly affected households. With regard to the labor market integration of households, the results show that households with couples in which both partners work (“dual-earner household”) have become a more common constellation, while the modified breadwinner model and constellations in which both partners work part-time have become rarer. The descriptives for the educational composition within households confirm the decline in the share of people with a low level of education and the increase in the proportion of the population with a high level of education. As far as the income tax burden of households is concerned, the proportion of households with a high (or medium) income tax burden of more than 15% (or more than 10% and up to 15 percent) of total household income is decreasing as expected. In contrast, the proportion of households with a low tax burden and the proportion of households receiving tax refunds have increased significantly. The most notable change in terms of demographics is the sharp increase in the percentage of households with Hispanic members and households with members of other ethnicities. The proportion of young households, in which everyone is aged 29 or under, has fallen significantly, while the proportion of single-person households and households without children has risen.

Table 3: Shares of households with varying dependence on income from minimum wages, and for all covariates for a selection of years over the whole timeframe between 1989 and 2018 for the total population

	1989	1991	1996	1998	2007	2010	2018
MINIMUM WAGE DEP.							
Strongly affected households	1.9	3.1	2.1	3.2	2.5	3.3	3.0
Moderately affected households	3.8	5.1	3.8	4.6	3.3	4.4	4.0
Lightly affected households	5.3	5.6	4.6	4.5	3.5	3.5	2.9

⁷⁹ The tables contain two additional variables on household composition. They indicate whether the household is a one-person household and whether there are no children living in the household. These variables are included in the descriptive tables, but not in the multivariate analyses, as models that include them lead to collinearity and the variables are omitted accordingly.

Higher-wage household	63.1	59.7	63.7	62.6	65.2	61.7	62.3
Non-working	25.9	26.5	25.8	25.1	25.4	27.1	27.7
MINIMUM WAGE HH							
Household with MW earner(s)	11.0	13.7	10.5	12.3	9.3	11.1	9.9
Household with higher-wage earner(s)	63.1	59.7	63.7	62.6	65.2	61.7	62.3
Household: inactive / jobless	25.9	26.5	25.8	25.1	25.4	27.1	27.7
HH's LABOR MARKET INT.							
Pensioner household	23.5	23.7	23.0	22.7	22.4	23.8	25.6
Jobless household	5.0	5.6	5.1	4.7	4.9	6.5	5.6
Double-earner household	17.3	16.7	19.3	19.9	20.2	17.5	20.1
Trad. breadwinner	13.7	12.8	12.6	12.8	13.2	13.4	13.1
Modif. breadwinner	10.9	10.6	10.8	10.3	9.0	8.7	7.6
Both in part-time	1.4	1.5	1.2	1.2	1.1	1.3	0.8
Precarious	3.0	3.2	3.0	2.6	2.6	4.0	2.4
Single working full-time	20.0	20.2	19.8	21.0	21.4	19.4	20.2
Single working part-time	5.2	5.6	5.2	4.9	5.2	5.4	4.7
HH's EDUC. COMP.							
Single, low education	25.6	11.3	9.5	8.7	6.9	6.3	4.9
Single, medium education	14.2	24.6	24.5	24.9	26.1	26.5	25.8
Single, high education	3.6	8.7	9.2	9.6	11.5	12.0	13.9
Couple, low/low education	25.3	5.7	4.7	4.5	3.4	3.1	2.5
Couple, medium/low education	12.2	7.4	7.0	6.5	5.2	4.8	3.5
Couple, medium/medium education	10.8	25.0	25.1	25.0	23.2	23.0	20.7
Couple, high/medium education	6.3	9.7	10.9	11.1	11.8	11.9	13.1
Couple, high/high education	2.0	7.5	9.1	9.7	12.0	12.4	15.5
PAYABLE INCOME TAX							
Tax refunds	6.2	6.7	9.5	10.2	12.3	16.4	13.7
No income tax	18.2	17.9	16.9	16.4	15.8	16.0	22.7
Low, >0% - 10%	24.3	21.1	19.6	20.6	25.3	27.2	30.4
Medium, >10% - 15%	22.9	20.8	20.5	18.9	19.2	16.7	18.0
High, >15%	28.4	33.5	33.5	33.9	27.4	23.7	15.2
PAYABLE PAYROLL TAX							
No Payroll Tax	24.2	24.6	24.9	23.3	23.4	25.1	26.1
Low, >0% - 6%	23.1	22.0	23.7	23.9	23.0	25.5	23.6
High, >6% - 8%	52.7	53.4	51.4	52.8	53.6	49.4	50.3
PUBLIC TRANSFERS RECEIVED							
No transfers	78.5	75.0	77.8	80.7	82.1	73.7	81.2
Low, >0% - 5%	11.7	12.9	11.3	10.0	8.8	10.8	10.0
Medium, >5% - 20%	6.3	7.9	7.4	6.5	6.5	10.8	6.3
High, >20%	3.5	4.2	3.6	2.7	2.5	4.8	2.6
Young household	15.1	13.7	12.1	12.0	11.2	10.5	10.0
Single-mother household	9.2	9.6	9.1	8.9	8.4	8.4	7.0
Couple without children	8.2	8.1	8.4	8.4	7.8	7.1	8.0
Large household (3+ children)	8.3	8.4	8.6	8.5	7.8	7.4	6.7
Single-person household	24.5	24.9	25.0	25.4	27.2	27.2	28.0
Household with no children	61.3	61.9	61.1	62.0	64.6	65.6	69.0
Household with self-employed member	12.7	12.4	12.7	11.9	12.0	11.0	10.4
HH's ETHNIC COMP.							
Household with Hispanic members	8.1	8.7	9.4	10.1	12.4	13.0	15.1
Household with Black (non-Hispanic) members	11.2	11.5	11.9	12.1	12.9	13.1	13.9
Household with members from	3.5	3.8	4.5	4.7	6.9	7.5	9.0

other ethnicity										
Household members	with	only	White	77.2	76.0	74.2	73.2	67.9	66.4	62.1
REGION										
Atlantic				20.5	20.3	19.6	19.2	18.3	18.2	17.3
Midwest				24.4	24.4	23.8	23.6	22.5	22.4	21.6
Southern				34.6	34.5	35.3	35.5	36.8	37.4	38.5
Pacific and Mountain states				20.5	20.8	21.3	21.6	22.3	22.0	22.6
Observations				58783	58011	49312	49669	74324	73601	67043

Note: The selected years are chosen prior and after increases in the federal minimum wage (1990 to 1991, 1996 to 1998, and from 2007 to 2009). Minimum wage levels are annualized, so a minimum wage change throughout the year may lead to diverging years chosen. The year prior to a minimum wage increase is the last year in which the prior minimum wage rate was in effect for at least 7 months. The year after a minimum wage increase is the first year in which the newly mandated minimum wage rate was in effect for at least 7 months. IPUMS-CPS ASEC 1990 to 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 4 shows the same descriptive characteristics only for the lower half of the income distribution that were previously shown for the entire population over time. The patterns regarding the development of the proportions of households for which income from the minimum wage plays a more or less important role are clearer when measured only for the population in the lower half of the income distribution. The proportion of households in which minimum wage income accounts for at least half of total household income (“strongly affected households”) rose from 3.8% in 1989 to 6% in 2018. The cyclical trends are also evident here: the proportion rose sharply with the increases in the federal minimum wage. In general, the proportion of severely affected households in the lower half of the income distribution is, as expected, higher. The proportion of moderately affected households was also higher in the lower half of the income distribution and fluctuated with the cycles of minimum wage increases and falling real values of the minimum wage. The proportion of households that are only marginally affected has fallen continuously, from 5% in 1989 to 2.1% in 2018. As expected, the overall proportion of households with minimum wage recipients is higher than in the general population. Similar to the proportion of moderately affected households, this proportion has fluctuated cyclically: it started at 14.9% in 1989, peaked at 18.5% and 17.2% in 1991 and 1996, respectively, and fell to 14% in 2018. What most distinguishes the lower half of the income distribution from the overall population is the higher proportion of inactive households, which do not include anyone working for minimum wage or higher hourly wages. The proportion of households with higher-wage earners was relatively stable in the lower half of the income distribution as well, albeit on a lower level: the share fluctuated around 48%, compared to 63% in the total population. The share of non-working households rose slightly from 36.4% in 1989 to 39% in 2018 on a level which is about 10 percentage points higher than in the total population.

Trends in the labor market integration of households were overall relatively stable. In contrast to the total population, the share of dual-earner households did not increase. The proportion of jobless households increased slightly over time, with a visible peak after the Great Recession. The descriptives for the educational composition within households confirm the decline in the share of people with a low level of education and the increase in the proportion of the population with a high level of education.

As far as the income tax burden of households is concerned, the expected declines in the proportion of households with a high and income tax burden are even more pronounced in the lower half of the income distribution than in the total population. There are hardly any households with a high income tax liability in 2018, and the proportion of households with a medium income tax liability has declined from 18.1% in 1989 to 5.6% in 2018. The changes here appear to be stronger over the Great Recession than in the early 1990s, but it is unclear if this is due to changed labor market activity or due to reforms in the tax system. In contrast, the share of households receiving tax refunds increased significantly in the early 1990s (the period with the most significant EITC reforms) and again during the Great Recession. Overall, their share increased strongly, from 12.4% in 1989 to 26.2% in 2018. The figures for households' payroll tax liability show that with a range between 42% to 45% (excluding the recessionary year of 2010), almost half of all households in the lower half of the income distribution were relatively well integrated into the labor market, resulting in significant social security contributions. The proportion of households in which public transfers make up a high share in total household income declined slightly over time, from 7% to 5.1% in 2018. The most notable demographic changes are the decline in households headed by young adults and the sharp increase in the share of households with Hispanic members, and with members of other ethnicities. The percentage of households with only white members declined from about 70% to 54%. The rise of single-person households and households without children is slightly more pronounced in the lower half of the income distribution than when regarding the total population.

Table 4: Shares of households with varying dependence on income from minimum wages, and all covariates for a selection of years over the whole timeframe between 1989 and 2018 for the bottom half of the income distribution

	1989	1991	1996	1998	2007	2010	2018
MINIMUM WAGE DEP.							
Strongly affected households	3.8	6.3	4.2	6.4	5.0	6.5	6.0
Moderately affected households	6.2	7.6	6.2	7.2	5.2	6.4	5.9
Lightly affected households	5.0	4.7	4.2	3.6	2.7	2.6	2.1
Higher-wage household	48.6	44.1	49.2	46.6	50.6	45.1	47.0
Non-working	36.4	37.4	36.2	36.2	36.5	39.4	39.0
MINIMUM WAGE HH							
Household with MW earner(s)	14.9	18.5	14.6	17.2	12.9	15.5	14.0
Household with higher-wage earner(s)	48.6	44.1	49.2	46.6	50.6	45.1	47.0
Household: inactive / jobless	36.4	37.4	36.2	36.2	36.5	39.4	39.0
HH's LABOR MARKET INT.							
Pensioner household	32.6	32.5	32.1	32.2	31.8	32.5	33.8
Jobless household	8.3	9.9	8.8	7.9	8.4	11.4	9.7
Double-earner household	7.6	6.7	8.1	8.5	8.1	6.1	7.9
Trad. breadwinner	13.7	12.9	13.2	13.6	14.0	13.1	14.1
Modif. breadwinner	8.9	8.3	8.2	8.0	6.6	5.8	5.6
Both in part-time	1.8	1.9	1.5	1.5	1.3	1.7	0.9
Precarious	4.6	5.0	4.7	3.7	3.9	6.1	3.5
Single working full-time	15.2	14.7	15.8	17.3	18.4	15.6	17.4
Single working part-time	7.3	8.1	7.6	7.3	7.6	7.8	7.0
HH's EDUC. COMP.							
Single, low education	37.6	19.9	16.8	15.8	12.4	11.3	9.0
Single, medium education	12.0	28.8	30.9	31.5	34.8	36.0	36.9
Single, high education	1.5	4.4	5.1	5.6	7.5	8.1	9.9

Couple, low/low education	30.8	9.3	8.1	7.7	6.0	5.4	4.5
Couple, medium/low education	10.0	9.7	9.4	9.0	7.5	7.1	5.5
Couple, medium/medium education	5.7	21.4	21.9	22.6	22.5	22.2	21.6
Couple, high/medium education	2.0	4.5	5.2	5.3	5.9	6.4	7.8
Couple, high/high education	0.4	2.0	2.6	2.6	3.4	3.5	4.9
PAYABLE INCOME TAX							
Tax refunds	12.4	13.4	19.0	20.5	24.1	31.5	26.2
No income tax	34.8	32.7	30.8	30.2	29.2	29.0	35.9
Low, >0% - 10%	33.5	30.4	27.9	29.5	33.5	31.3	32.1
Medium, >10% - 15%	18.1	18.3	18.1	15.6	10.7	6.1	5.6
High, >15%	1.2	5.2	4.2	4.2	2.5	2.1	0.3
PAYABLE PAYROLL TAX							
No Payroll Tax	34.2	35.1	34.7	34.0	33.8	36.5	36.7
Low, >0% - 6%	21.0	21.8	23.1	22.0	21.4	26.1	21.2
High, >6% - 8%	44.8	43.1	42.1	44.0	44.8	37.4	42.2
PUBLIC TRANSFERS RECEIVED							
No transfers	69.9	65.8	69.1	73.6	74.5	62.4	71.3
Low, >0% - 5%	12.2	12.5	11.7	10.2	10.0	12.0	13.0
Medium, >5% - 20%	10.9	13.2	12.1	10.7	10.6	16.4	10.6
High, >20%	7.0	8.5	7.1	5.5	4.8	9.2	5.1
Young household	17.2	15.7	13.9	14.1	13.4	12.4	11.3
Single-mother household	14.8	15.4	14.9	14.4	13.4	13.2	11.3
Couple without children	4.0	3.9	4.4	4.4	4.5	4.4	4.9
Large household (3+ children)	12.8	13.0	13.1	12.4	11.1	10.5	9.5
Single-person household	27.8	28.4	28.8	29.3	31.7	31.5	33.3
Household with no children	55.1	56.0	55.9	57.3	60.7	61.7	65.6
Household with self-employed member	10.4	10.1	9.3	9.3	8.8	8.5	7.9
HH's ETHNIC COMP.							
Household with Hispanic members	11.0	12.0	13.3	14.2	16.8	17.5	19.8
Household with Black (non-Hispanic) members	15.9	16.2	16.2	16.5	16.8	17.4	18.3
Household with members from other ethnicity	3.4	3.7	4.2	4.5	6.4	7.0	8.0
Household with only White members	69.7	68.1	66.2	64.8	60.0	58.1	53.9
REGION							
Atlantic	18.0	18.9	18.5	18.6	17.4	16.8	15.6
Midwest	24.6	24.2	23.0	22.8	22.4	22.4	21.0
Southern	38.4	37.7	38.0	37.7	39.0	39.4	41.9
Pacific and Mountain states	19.0	19.2	20.6	20.9	21.3	21.4	21.5
Observations	29392	29006	24656	24834	37162	36801	33521

Note: The selected years are chosen prior and after increases in the federal minimum wage (1990 to 1991, 1996 to 1998, and from 2007 to 2009). Minimum wage levels are annualized, so a minimum wage change throughout the year may lead to diverging years chosen. The year prior to a minimum wage increase is the last year in which the prior minimum wage rate was in effect for at least 7 months. The year after a minimum wage increase is the first year in which the newly mandated minimum wage rate was in effect for at least 7 months. IPUMS-CPS ASEC 1990 to 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The presented descriptives for selected years illustrate in what settings increases in the federal minimum wage were implemented, and whether trends in the proportion of groups that are affected to varying degrees by the minimum wage followed cyclical trends of minimum wage legislation. The descriptives for both the total population and the lower half of the income distribution show that the share of strongly and moderately affected households follow cyclical

trends, whereas the share of lightly affected households declined continuously. As expected, the share of strongly affected households is substantially higher in the lower half of the income distribution and, in addition, the proportion rose strongly in the most recent period between 2010 and 2018.

The differentiation of the shares of the population groups for the total population and the lower half of the income distribution shows that the share of households that are not in employment is significantly higher in the lower half of the income distribution. The proportion of households with higher-wage earners was just as stable in the lower half as in the overall population, albeit at a lower level: The share fluctuated around 48%, compared with 63% in the overall population. The proportion of households whose members work for neither the minimum wage nor a higher hourly wage rose to a similar extent as in the overall population, but at a higher level. This third group of inactive households, alongside the minimum wage households and households with higher-wage earners, is therefore more significant in the lower half of the distribution. This is also reflected in the proportion of households with different payroll tax burdens. The proportion of households with a high payroll tax burden fell slightly and is at a lower level than in the overall population. Nevertheless, more than 40% of all households appear to be well integrated into the labor market, as their high *payroll tax* burden in relation to their total income suggests. The expected decline in the proportion of households with a high *income tax* burden is even more pronounced in the lower half of the income distribution than in the population as a whole. The sharp increase in households with income based mainly on income from minimum wage work is therefore paralleled by a slight decline in labor market integration of households in the lower half of the income distribution. How households with minimum wage earners can ultimately contribute to changes in income inequality at population level is therefore likely to depend on the positioning of working and non-working households particularly within the lower income ranges, and increasingly so over time.

8.3. Income trends and compositional changes among households with minimum wage earners

In what follows, I will provide an overview of the income situation of households with minimum wage earners using different income concepts. For each income concept, I use figures that are adjusted for inflation to account for changes in costs of living over time. I will begin with trends in disposable household income, distinguishing between the total population and the target group of households with minimum wage earners. Additionally, I will differentiate households based on the role that minimum wage income plays in their overall income. This includes households strongly dependent on the minimum wage (where minimum wage income makes up at least 50% of the household's total gross income), households with medium dependency (at least 25%), and households with minor dependency on the minimum wage (at least 15%). Afterward, I will focus on households with minimum wage earners as the main group of interest, as well as households that are strongly dependent on the minimum wage. For these two groups, I will examine trends in gross household income, households' market income, households' labor income, and finally, households' income from minimum wage work only.

Figure 31 shows the trends of the median disposable household income for the total population and different subgroups of the population distinguishing between households with and without

minimum wage earners and the degree to which they are affected by the minimum wage. The graph shows that the median levels of disposable household income differ between these groups, but that they increased in all of them. The increase in median income was slightly higher overall among households in which household members earn higher wages and those in which people with hourly wages at the level of the minimum wage only make a small contribution to total income. In 2018, households in which all working members work for higher wages had a median income of about \$43,000. The median income of households in which income from minimum wage work makes only a minor contribution to total household income caught up over time and are on the same level in 2018. The median income of the total population is somewhat lower, standing at \$36,000 in 2018. Households relying on income from minimum wage work most (“strong dependency”) have the lowest median income throughout the whole period, standing at \$16,000 in 2018. Median disposable incomes of the different groups differ substantially and the inequality between the most and least affected group have increased slightly over time.

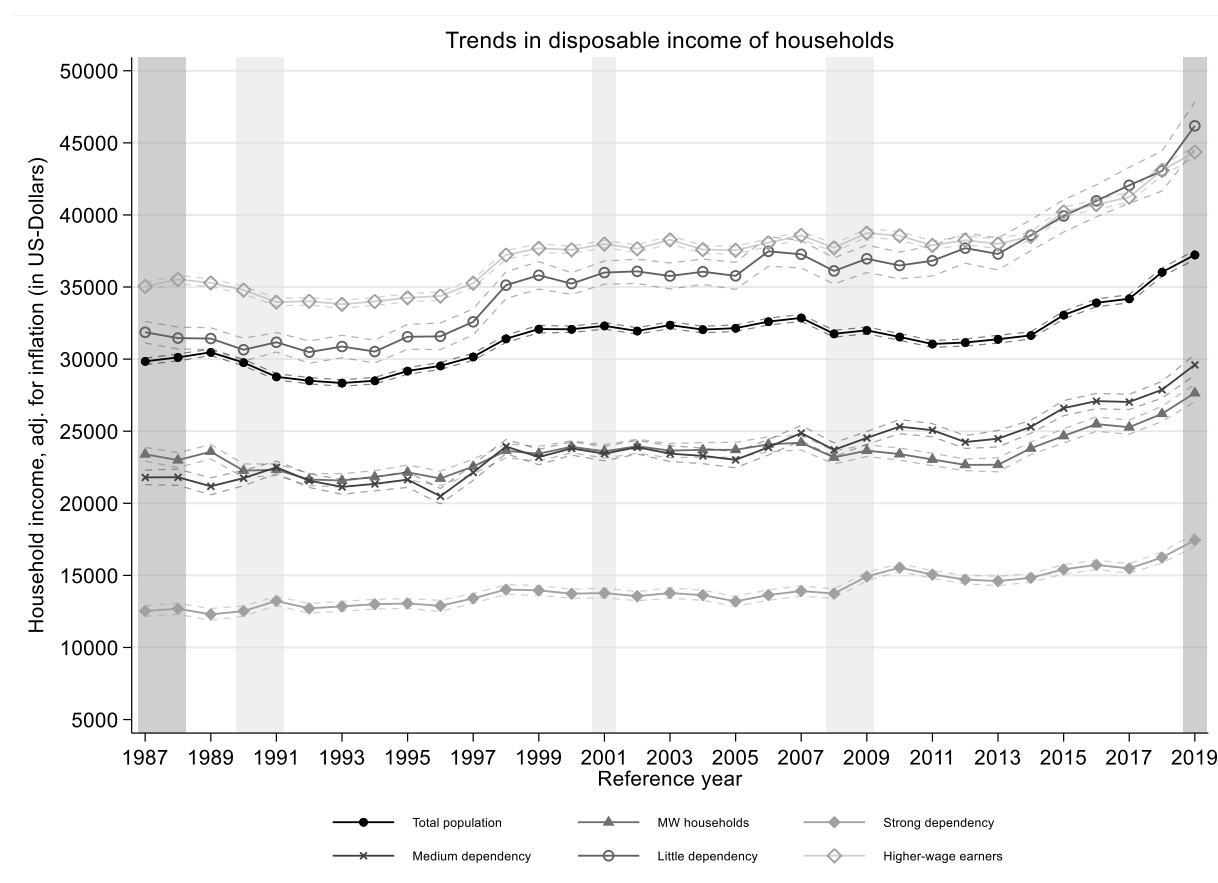


Figure 31: Trends in disposable income of households with and without minimum wage earners.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 32 shows the trends in disposable incomes only for households in which at least one person worked for the minimum wage in the previous calendar year, which is the targeted population group and of main interest in the multivariate analyses. The graph shows the median disposable income of minimum wage households for each year, as well as the 10th, the 25th, the

75th, and the 90th percentile. This illustrates how much disposable household incomes are dispersed among the group of minimum wage households, and how this has changed over time. The 10th percentile, for example, represents households with minimum wage earners with relatively low incomes: Among households with minimum wage earners, this value separates the 10 percent poorest from the 90 percent of households that have higher incomes. The median increased from about \$24,000 in 1987, to about \$28,000 in 2019, indicating a rising living standards. The main part of this increase has happened since 2013, which can be regarded as the phase in which increasingly more states have adopted higher minimum wages than the federal minimum wage. While the lower income strata among households with minimum wage earners developed quite similarly to the median, the higher income ranges developed even more favorably. In particular, the 90th percentile, increased strongly, indicating that among households with minimum wage earners, those with the highest incomes experienced the strongest increase in incomes.

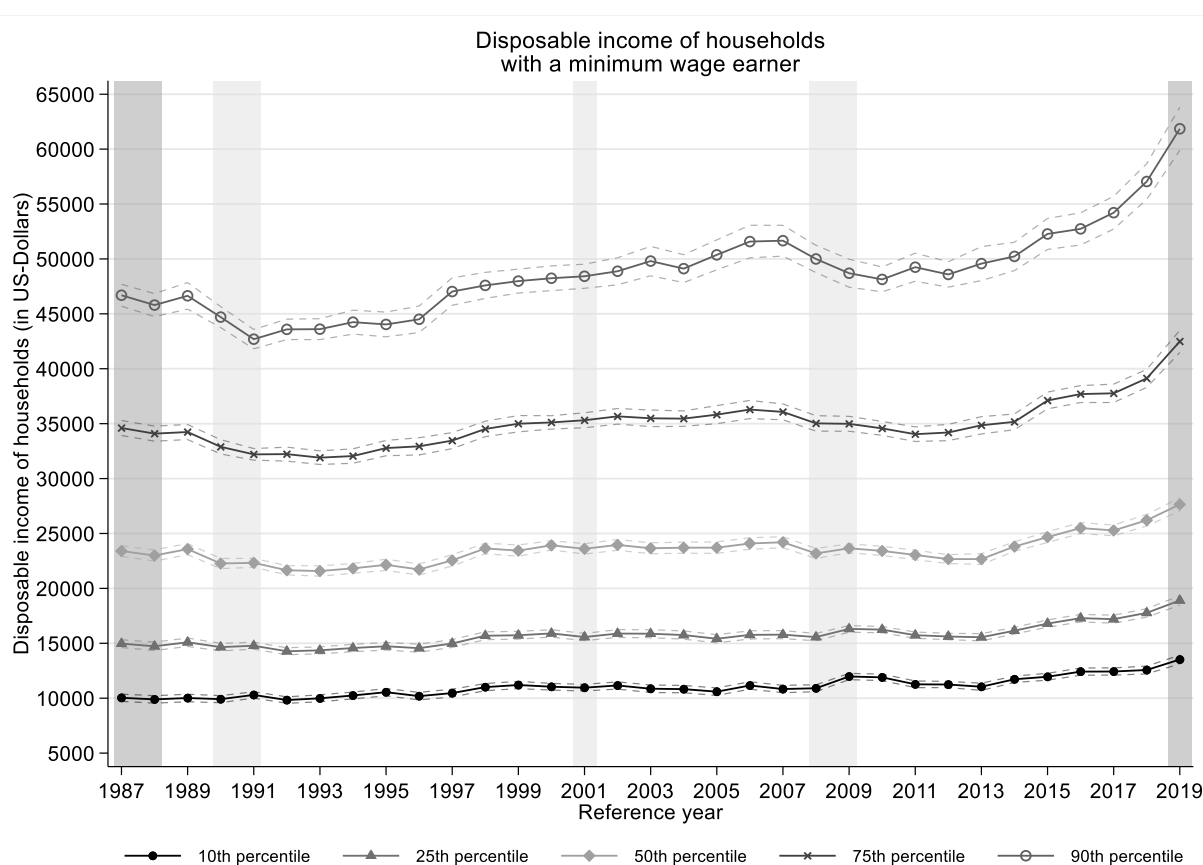


Figure 32: Disposable income of all households with at least one person defined as a minimum wage earner, 1987 to 2019.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

However, as these figures are based on all households with minimum wage workers, high incomes of households in which minimum wages make up only a small share in total income may strongly affect particularly the higher income ranges among this group. The previous figure has shown that the median incomes of that subgroup are substantially higher, and that the difference to the median income of households strongly dependent on the minimum wage was about \$26,000. Thus, Figure 33 shows the same income trends only for households in which

income from minimum wage work makes up at least half of total income. This graph shows that incomes in this group increased relatively evenly and that the extent of income inequality in this subgroup is lower than in the overall group of minimum wage households.

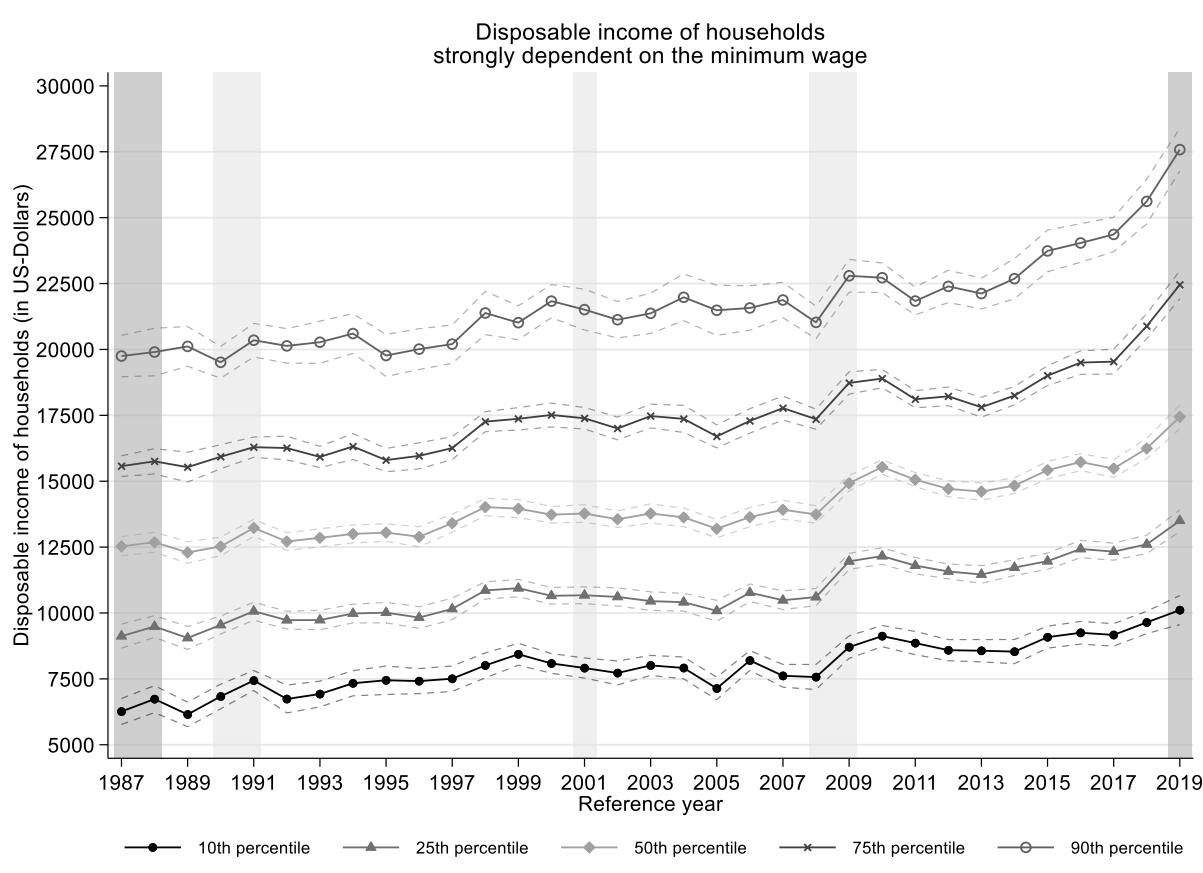


Figure 33: Disposable income of households strongly dependent on the minimum wage, 1987 to 2019.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

In the following, I will discuss trends in income based on different income concepts for households with minimum wage earners.⁸⁰ A distinction between the different income concepts provides initial insights into the sources of income that financially benefit these households. This differentiation may support earlier assumptions about the development of their income situation, which in turn has influenced the overall income distribution of the general population. Figure 34 shows the trends in gross household income of households with minimum wage earners. These figures refer to the total pre-tax income of households, including all sorts of income sources. Compared to the trends in disposable income, the trends in gross income are again a bit more heterogenous, with higher increases in higher income strata and only moderate increases among those with lower incomes. As can be seen in Figure 35, the trends in households' market income are very similar as the trends in households' gross income, at least for the 90th, 75th, 50th, and 25th percentiles. In contrast, the value of the 10th percentile of households' market income is on a notably lower level than the 10th percentile's value in gross

⁸⁰ Figures for trends of different income types and the share of income from minimum wage work in total income for households with minimum wage earners and households with varying levels of affectedness by the minimum wage can be found in section D of the appendix.

household income of households with minimum wage workers. The difference ranges between three and four thousand dollars, which is a relatively high amount in that income range. This suggests that income sources that contribute to market income are less common in this income range.



Figure 34: Trends in gross household income of households with a minimum wage earner.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

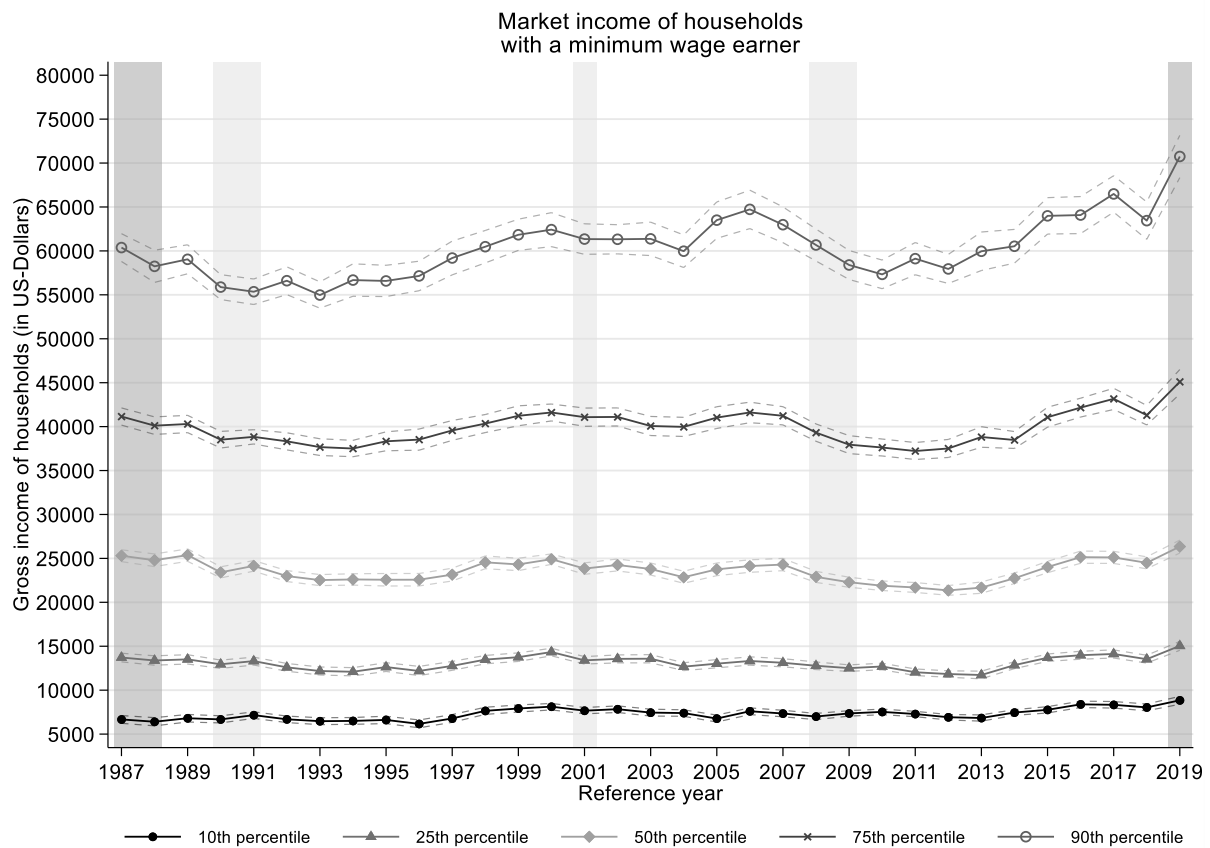


Figure 35: Trends in household market income of households with a minimum wage earner.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

Figure 36 shows trends in labor income of households with at least one minimum wage earner. A household's labor income is the sum of all income from work in the households, including earnings received as an employee of all household members, as well as income from self-employment (non-farm business income and farm income). In 2018, households with the lowest labor incomes (represented by the 10th percentile) had \$5,000 of total labor income, whereas high-income households had labor income of around \$60,000. We see a slight upward trend between 1989 and 2018, which is most pronounced at the 90th percentile among households with a minimum wage earner.

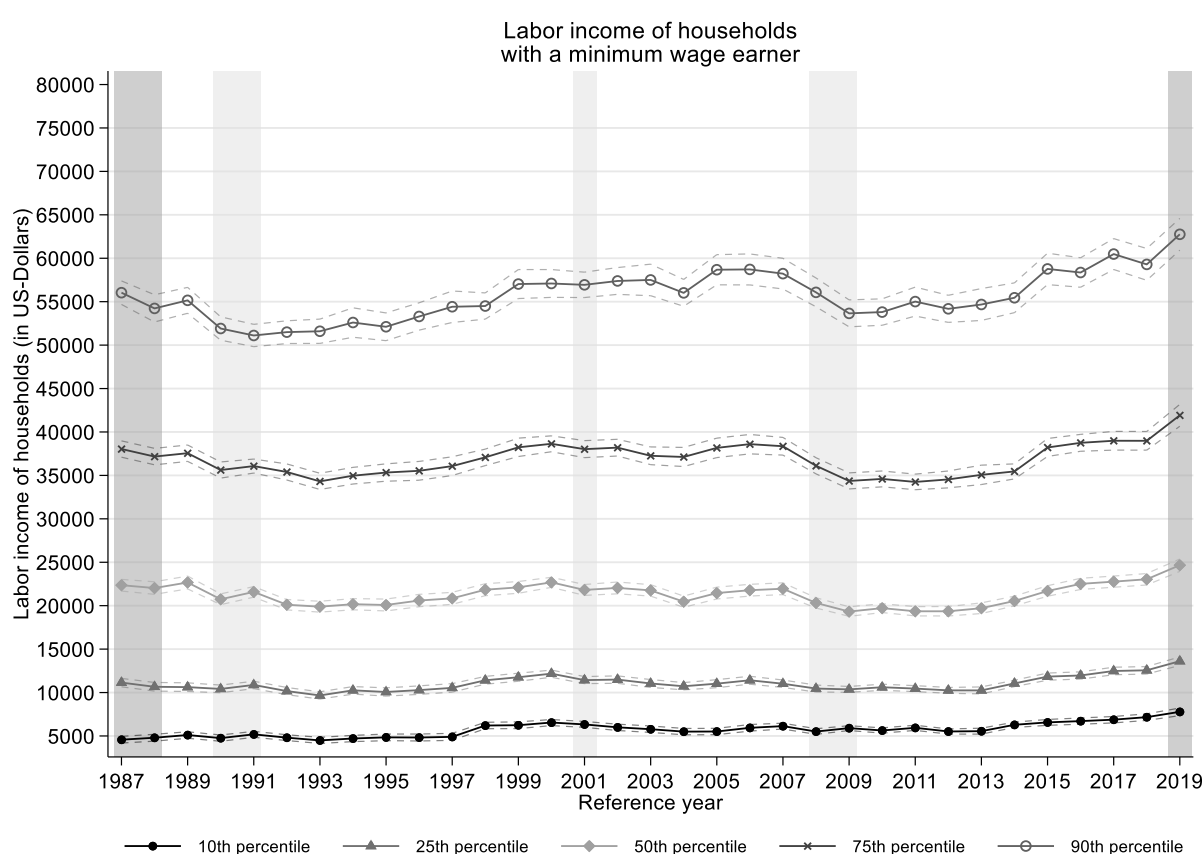


Figure 36: Trends in household labor income of households with a minimum wage earner.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

At this point, I take a closer look at the group that benefits most in relative terms from rising minimum wages, i.e. households in which at least half of total income comes from minimum wage work. Figure 37 shows the trends in the labor income of households in which income from minimum wage work makes up at least 50% of total gross income. As expected, the income levels are much lower, with the 90th percentile ranging at \$25,000 instead of \$60,000 as was the case when looking at all households with minimum wage earners, and not just the ones whose total income consists mostly of minimum wage income. Naturally, the inequality among this specific group is much lower than among all households with minimum wage earners, who are a very heterogenous group. Compared to the trends in households' labor income for all households with a minimum wage earner, the upward trends are more pronounced for all income strata in this subgroup, and particularly for the 10th, 25th, and 50th percentiles' values. It appears that among households whose incomes rely mostly on minimum wage work, the households with the lowest incomes (represented by the 10th percentile) were not decoupled from a favorable income trend. Since 2012, the upward trends have been more strongly pronounced, especially for households with relatively high labor incomes among households strongly affected by the minimum wage. The 90th percentile's value increased from \$21,000 in 1989 to \$25,000 in 2018.

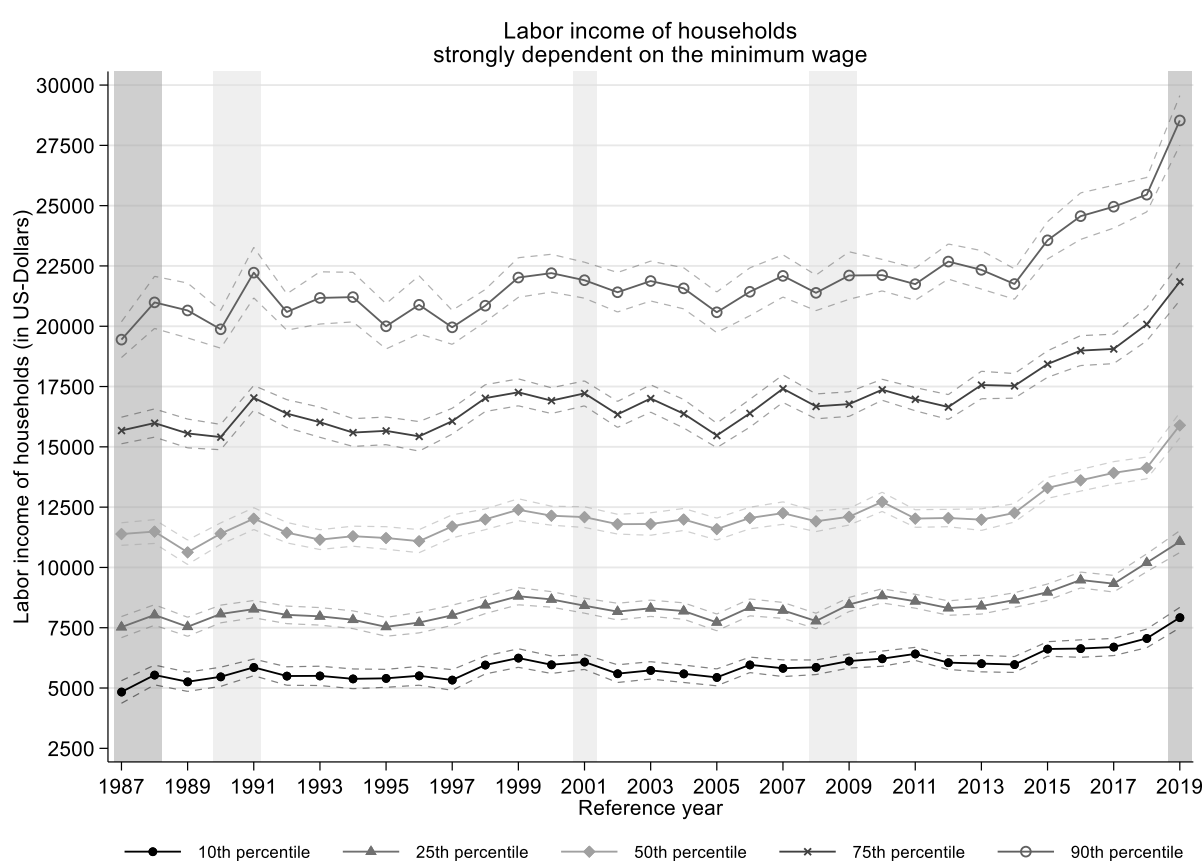


Figure 37: Trends in household labor income of households in which income from minimum wage work makes up at least 50% of the household's total gross income.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

To sharpen the focus even further, Figure 38 only shows the development of income from minimum wage work as one of the components of households' total labor income, referring to all households with at least one member who has worked for hourly wages at the level of the prevailing minimum wage. The increases over time are larger than the ones looking at the sum of all income from work in households with minimum wage workers (Figure 36). Income in all income brackets is at a lower level than when looking at total income from work, although this is much less pronounced in the lower bracket. In the higher income range, the differences are very large, but this is plausible as the high income range was probably previously characterized by households with significant other earned incomes that are considerably higher. The 90th percentile in this analysis, on the other hand, is characterized by households that earn particularly high incomes from minimum wage work alone. Figure 39 shows the corresponding trends in earnings from minimum wage jobs only for households that are strongly affected by minimum wages. Incomes in this selective subgroup are significantly higher across all income brackets. This is plausible because households with only marginal income from minimum wage work are now systematically excluded. The population in which minimum wage work is the main income source is composed quite differently, which is reflected in a different overall income distribution within this group.

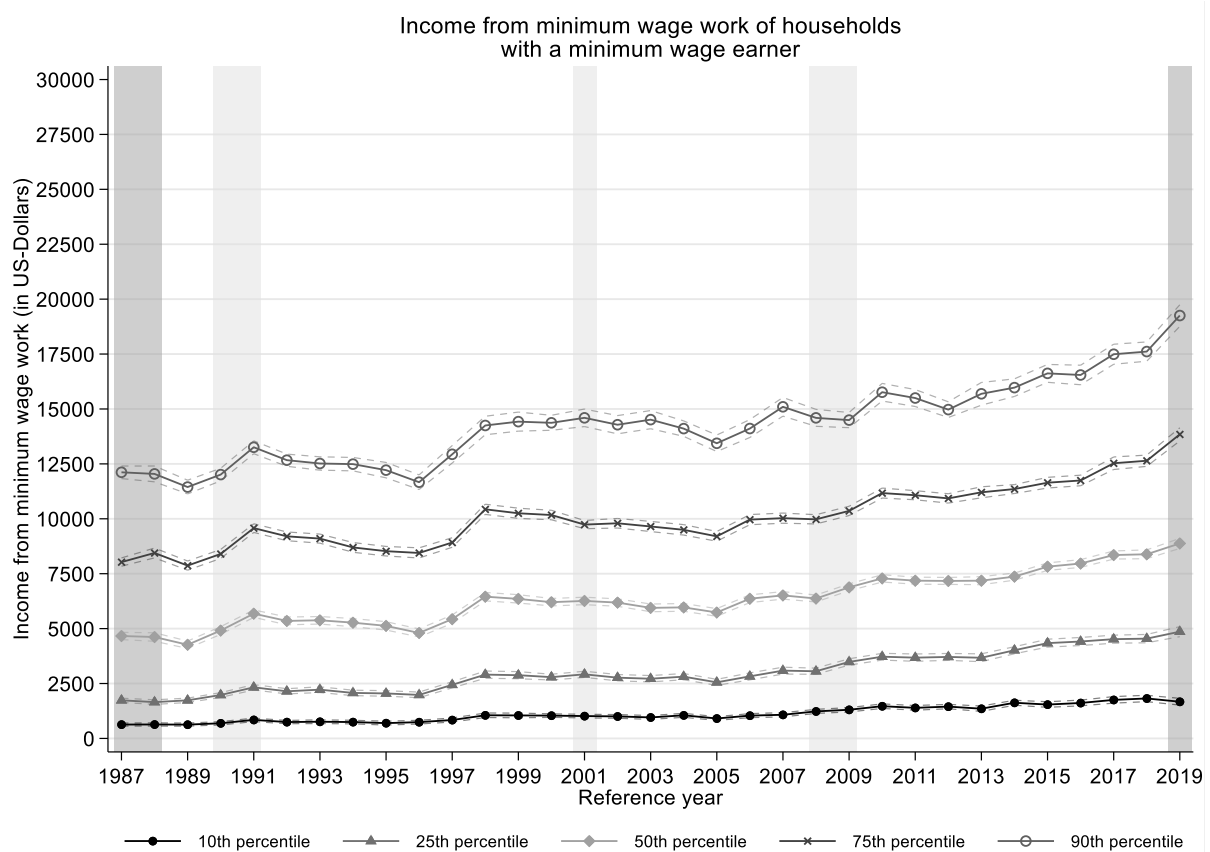


Figure 38: Trends in income from minimum wage work among households with a minimum wage earner.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

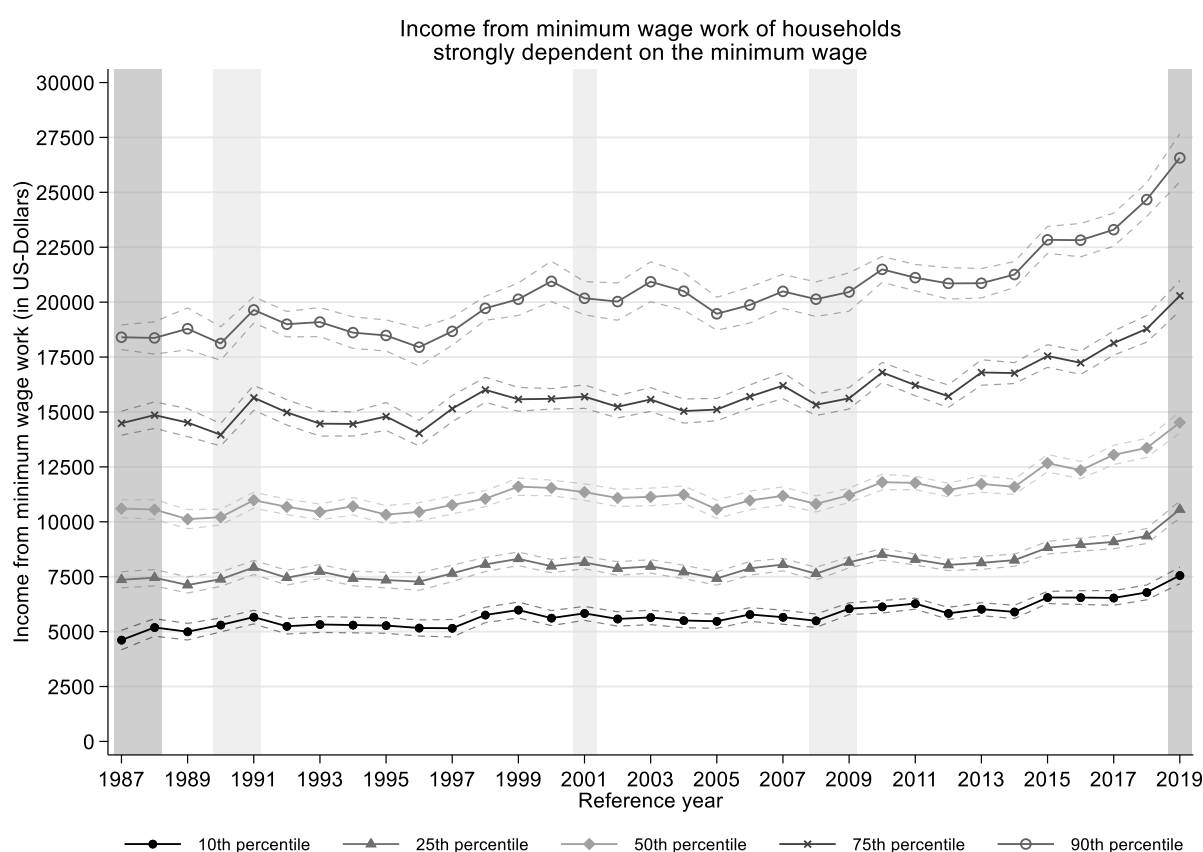


Figure 39: Trends in income from minimum wage work among households strongly dependent on the minimum wage.

Note: Data for 1987, 1988, and 2019 are shown for illustrative purposes only, the analysis period is 1989 to 2018. Analyses based on the 2020 ASEC are performed with the newly delivered person-level weight that should be used in analyses of individual-level ASEC data to account for nonrandom nonresponse in the 2020 survey. IPUMS-CPS ASEC 1988 to 2020. Own calculations, using Annual Social and Economic Supplement Household weights.

In absolute terms, the disposable income of households with minimum wage earners has increased, indicating a rise in their living conditions. This was the case for all income strata among the group of minimum wage households, meaning that households with the lowest incomes (represented by the 10th percentile) were not decoupled from a favorable income trend. The inequality increased most regarding the trends in disposable household income among households with minimum wage workers. Regarding this income concept, the 90th percentile's value increased particularly strongly, which led to higher dispersion of disposable income among households with minimum wage workers. Looking at trends in disposable household income only for households in which income from minimum wage work makes up at least half of total income, I find that incomes in this group increased relatively evenly and that the extent of income inequality in this subgroup is lower than in the overall group of minimum wage households. The comparison between different income concepts suggests that increasing disposable household incomes are at least to a certain extent rooted in increasing labor income of households. Otherwise, if one would think that lower tax burdens, higher public transfers or other income components besides income from work were the main drivers behind growing incomes, then one would not observe the significant increases also regarding households' gross, market, or labor income. When regarding only the sum of income from minimum wage work, the trends even show that the increases over time are larger compared to the increases when looking at the sum of all income from work in households with minimum wage workers. In

addition, it is evident that incomes increased in particular in households in which at least half of the total household income comes from minimum wage work. This is indicative of a meaningful impact of income from minimum wage work in the improving economic situation of households with minimum wage workers and especially among households in which minimum wage income makes up most of the household's total income.

Table 5 shows the same descriptive characteristics only for households with minimum wage earners that were previously shown for the entire population over time. Therefore, the selected years prior and after increases in the federal minimum wage, which lifted the hourly wages of a significant proportion of the minimum wage workforce to a substantially higher level, help to investigate how the target group of households with minimum wage earners, has evolved over time in terms of its composition. The table provides information on typical family constellations and what role minimum wage workers typically have in the families and households they live in.

Table 5: Shares of households with varying dependence on income from minimum wages, and all covariates for a selection of years over the whole timeframe between 1989 and 2018 for households with at least one minimum wage earner

	1989	1991	1996	1998	2007	2010	2018
MINIMUM WAGE DEP.							
Strongly affected households	17.0	22.4	19.6	25.6	27.0	29.4	29.9
Moderately affected households	34.3	37.1	35.9	37.6	35.9	39.5	40.5
Lightly affected households	48.7	40.4	44.4	36.8	37.1	31.1	29.6
Higher-wage household	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-working	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HH's LABOR MARKET INT.							
Pensioner household	9.5	9.1	9.3	8.3	9.1	9.0	10.0
Jobless household	3.2	4.0	3.7	3.2	3.9	4.6	4.4
Double-earner household	19.5	20.3	21.3	24.2	23.5	19.9	24.1
Trad. breadwinner	14.3	13.5	12.2	12.6	12.4	12.5	12.4
Modif. breadwinner	20.0	18.0	18.7	17.1	16.1	15.0	14.2
Both in part-time	3.2	2.9	2.8	2.8	2.3	3.5	1.9
Precarious	5.4	5.1	5.3	4.1	4.3	6.6	3.7
Single working full-time	16.4	17.9	17.8	20.1	19.8	19.5	20.7
Single working part-time	8.5	9.2	8.8	7.6	8.7	9.4	8.6
HH's EDUC. COMP.							
Single, low education	22.2	10.1	9.1	9.0	8.1	7.5	5.8
Single, medium education	9.4	22.2	22.9	22.1	23.7	25.6	25.5
Single, high education	1.9	3.3	3.9	4.1	5.3	5.7	7.3
Couple, low/low education	35.9	8.7	7.9	8.3	7.5	7.0	6.4
Couple, medium/low education	13.7	11.2	10.1	10.3	8.2	7.9	6.3
Couple, medium/medium education	10.0	30.5	30.9	30.9	30.2	29.0	26.5
Couple, high/medium education	5.7	8.9	9.2	9.5	9.8	10.4	12.7
Couple, high/high education	1.2	5.3	5.9	5.8	7.1	6.9	9.4
PAYABLE INCOME TAX							
Tax refunds	18.5	18.7	26.0	27.6	31.0	39.5	34.2
No income tax	7.1	5.6	4.6	3.6	3.7	1.6	4.4
Low, >0% - 10%	36.4	33.3	30.7	32.3	37.5	37.0	45.6
Medium, >10% - 15%	21.5	22.9	19.5	18.6	14.7	12.0	10.0
High, >15%	16.6	19.6	19.2	17.9	13.0	10.0	5.8
PAYABLE PAYROLL TAX							
No Payroll Tax	3.8	3.0	3.5	2.5	2.3	1.9	1.8
Low, >0% - 6%	40.2	37.4	43.2	42.3	42.6	47.1	42.9

High, >6% - 8%	56.0	59.7	53.3	55.2	55.1	51.0	55.2
PUBLIC TRANSFERS RECEIVED							
No transfers	67.7	64.0	64.4	69.5	70.7	59.3	69.8
Low, >0% - 5%	18.4	19.4	18.9	16.4	15.1	18.3	17.5
Medium, >5% - 20%	10.8	13.5	13.5	12.1	12.6	18.9	11.5
High, >20%	3.1	3.1	3.2	2.0	1.6	3.5	1.3
Young household	17.2	16.8	16.3	15.7	15.0	15.1	13.0
Single-mother household	14.6	15.1	15.7	15.8	15.0	13.6	12.7
Couple without children	8.0	9.5	9.5	8.8	8.7	8.7	9.1
Large household (3+ children)	14.1	13.2	14.4	15.5	13.6	11.6	11.0
Single-person household	7.0	7.7	7.3	7.7	9.5	10.5	10.3
Household with no children	39.8	43.8	42.0	40.8	45.6	50.1	52.7
Household with self-employed member	11.5	10.2	9.6	7.7	8.6	7.3	8.2
HH's ETHNIC COMP.							
Household with Hispanic members	12.7	12.8	15.9	18.8	22.8	23.6	27.5
Household with Black (non-Hispanic) members	13.7	14.9	15.8	14.1	13.8	14.7	15.8
Household with members from other ethnicity	4.1	4.8	5.3	5.8	8.5	8.4	11.1
Household with only White members	69.5	67.5	63.0	61.3	54.9	53.4	45.7
REGION							
Atlantic	16.0	16.0	17.3	16.2	20.1	15.9	17.8
Midwest	24.5	25.8	22.6	23.0	24.6	23.0	19.4
Southern	36.9	39.6	39.2	36.0	29.6	38.0	32.4
Pacific and Mountain states	22.6	18.6	21.0	24.8	25.7	23.1	30.4
Observations	6556	8186	5399	6460	7534	9006	7197

Note: The selected years are chosen prior and after increases in the federal minimum wage (1990 to 1991, 1996 to 1998, and from 2007 to 2009). Minimum wage levels are annualized, so a minimum wage change throughout the year may lead to diverging years chosen. The year prior to a minimum wage increase is the last year in which the prior minimum wage rate was in effect for at least 7 months. The year after a minimum wage increase is the first year in which the newly mandated minimum wage rate was in effect for at least 7 months. IPUMS-CPS ASEC 1990 to 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The share of strongly affected households increased over time from 17% in 1989 to 29.9% in 2018, while the share of households in which the minimum wage plays a minor role in total household income (“lightly affected households”) decreased significantly, from 48.7% in 1989 to 29.6% in 2018. The table also confirms the cyclical trends previously found in the shares of strongly and moderately affected households. Different from the results for the total population, the share of lightly affected households follows a cyclical trend among minimum wage households as well, but in the opposite direction: their proportion declines with increases in the federal minimum wage and increases during phases of standstill when the real value of the minimum wage declines. Between 2010 and 2018, there was a standstill for all three groups.

The proportions in different arrangements regarding households’ labor market integration suggest a rise in the total volume of work for both couples and single persons. The share of dual-earner households increased, and so did the share of single persons working full-time. Considering the income tax liability of households, the proportion of households with a low income tax burden has increased particularly between 2010 and 2018. The share of households receiving tax refunds increased significantly from 18.5% in 1989 to 34.2% in 2018, particularly during the periods that cover EITC reforms in the early 1990s and during the Great Recession.

The most notable changes in terms of demographics are the sharp increase in the percentage of households with Hispanic members and households with members of other ethnicities, the rise of the proportion of households with no children, and the rise in the share of households with minimum wage workers living in the Pacific and Mountain states. Compared to the trends in the overall population, the shift in the regional distribution is different: In the general population, the share of the population living in the Pacific and Mountain states, as well as the Southern region has increased, paralleled with a declining share living in the Midwest and in the Atlantic region overall. In contrast, the proportions living in the Southern region has declined among minimum wage workers, and the proportion living in the Atlantic region has increased. Combined with the particularly strong increase in the Pacific and Mountain states, this highlights the higher bite of minimum wages in the Atlantic region and the Pacific and Mountain region.

Table 6 shows the means only for minimum wage households located in the lower half of the income distribution. The cyclical trend of the share of strongly affected households is more pronounced compared to the overall income distribution. Their proportion rose strongly with increases in the federal minimum wage, from 25.3% in 1989 to 43.0% in 2018. The increase was particularly pronounced with the minimum wage hikes between 1989 and 1991, as well as between 1996 and 1998. These increases were fed by a decline in the share of marginally affected households, while the share of moderately affected households was stable. The standstill regarding the groups of households that differ by the degree to which they are affected by the minimum wage between 2010 and 2018 is less pronounced than among all households with minimum wage workers in the overall income distribution.

The patterns regarding households' labor market integration are similar to the ones in the overall population. A declining proportion of households pays no payroll tax, mainly because more households have at least a low payroll tax burden. The share in different categories regarding the income tax liability show that essentially no more households have a high income tax burden, and only a marginal share has a medium income tax burden. The share of households with tax refunds increased significantly in the early 1990s, from 28.3% to 37.6% between 1991 and 1996, and again with the Great Recession, from 44% to 54.3% between 2007 and 2010. Both periods were characterized by extensions in the EITC, but this trend may also be due to lower taxable income of minimum wage households, especially during the crisis years.

Table 6: Shares of households with varying dependence on income from minimum wages, and all covariates for a selection of years over the whole timeframe between 1989 and 2018 for households with at least one minimum wage earner, for the bottom half of the income distribution

	1989	1991	1996	1998	2007	2010	2018
MINIMUM WAGE DEP.							
Strongly affected households	25.3	33.8	29.0	37.4	38.9	42.0	43.0
Moderately affected households	41.3	41.1	42.5	41.8	40.4	41.5	42.2
Lightly affected households	33.3	25.1	28.5	20.8	20.7	16.5	14.8
Higher-wage household	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-working	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HH's LABOR MARKET INT.							
Pensioner household	10.9	9.9	10.0	8.3	9.1	8.5	9.0
Jobless household	4.3	5.5	4.8	4.1	5.2	6.0	5.9
Double-earner household	13.0	12.9	14.7	16.7	16.1	12.5	17.8
Trad. breadwinner	13.9	13.5	12.6	13.6	13.3	13.1	13.9
Modif. breadwinner	17.6	15.6	15.9	15.5	14.1	13.1	12.4

Both in part-time	4.0	3.5	3.4	3.5	2.8	4.2	2.2
Precarious	7.3	6.9	7.0	5.3	5.6	8.6	4.8
Single working full-time	17.9	19.7	19.7	22.8	22.3	21.9	23.0
Single working part-time	11.2	12.4	11.8	10.2	11.4	12.2	11.1
HH's EDUC. COMP.							
Single, low education	28.7	14.1	12.4	12.0	10.9	9.9	7.7
Single, medium education	10.0	26.2	27.4	26.7	28.9	30.7	31.2
Single, high education	1.5	2.6	3.4	3.3	4.9	5.3	6.2
Couple, low/low education	38.9	11.5	11.0	10.9	10.1	9.3	8.4
Couple, medium/low education	11.8	12.8	11.7	12.7	9.9	9.4	8.0
Couple, medium/medium education	6.8	26.0	27.4	27.4	28.0	26.7	25.7
Couple, high/medium education	1.9	5.0	4.5	5.1	4.8	6.2	8.7
Couple, high/high education	0.3	1.8	2.3	1.9	2.5	2.6	4.1
PAYABLE INCOME TAX							
Tax refunds	27.2	28.3	37.6	40.1	44.0	54.3	46.8
No income tax	10.3	8.0	6.0	5.0	5.0	2.1	5.1
Low, >0% - 10%	45.9	42.6	38.3	39.1	42.9	38.9	45.7
Medium, >10% - 15%	15.5	17.5	15.5	13.2	6.5	3.6	2.4
High, >15%	1.1	3.6	2.7	2.7	1.5	1.1	0.1
PAYABLE PAYROLL TAX							
No Payroll Tax	3.4	2.7	3.2	2.4	2.2	2.0	1.9
Low, >0% - 6%	41.4	40.4	45.8	44.0	44.4	51.4	43.6
High, >6% - 8%	55.3	56.8	51.0	53.6	53.4	46.6	54.5
PUBLIC TRANSFERS RECEIVED							
No transfers	63.8	59.8	59.9	66.2	67.7	55.1	66.2
Low, >0% - 5%	17.1	17.4	17.9	15.6	14.4	17.0	17.7
Medium, >5% - 20%	14.6	18.3	17.6	15.5	15.9	23.2	14.4
High, >20%	4.5	4.5	4.6	2.7	2.1	4.7	1.7
Young household	22.5	21.5	20.7	19.9	18.9	18.2	15.4
Single-mother household	18.7	19.7	19.9	20.6	19.1	16.9	15.9
Couple without children	6.9	7.2	9.1	7.7	7.4	7.6	8.2
Large household (3+ children)	17.7	16.9	17.6	19.4	16.4	14.4	13.5
Single-person household	9.7	10.7	9.9	10.4	12.7	13.8	13.6
Household with no children	37.3	40.4	39.7	37.7	42.7	46.8	49.5
Household with self-employed member	9.5	8.0	7.2	5.7	6.7	6.0	6.5
HH's ETHNIC COMP.							
Household with Hispanic members	15.6	16.5	20.2	23.4	27.6	28.1	32.1
Household with Black (non-Hispanic) members	17.3	18.7	19.1	17.5	16.3	17.2	18.2
Household with members from other ethnicity	4.3	4.7	5.5	5.4	8.9	8.3	11.1
Household with only White members	62.9	60.1	55.2	53.6	47.2	46.5	38.6
REGION							
Atlantic	13.9	14.0	15.7	15.1	18.3	14.3	16.6
Midwest	22.7	24.9	20.4	21.1	23.6	22.0	18.7
Southern	41.4	42.6	41.8	38.1	31.8	40.0	34.8
Pacific and Mountain states	21.9	18.6	22.1	25.7	26.2	23.8	29.9
Observations	4427.0	5513.0	3697.0	4455.0	5126.0	6208.0	4977.0

Note: The selected years are chosen prior and after increases in the federal minimum wage (1990 to 1991, 1996 to 1998, and from 2007 to 2009). Minimum wage levels are annualized, so a minimum wage change throughout the year may lead to diverging years chosen. The year prior to a minimum wage increase is the last year in which the prior minimum wage rate was in effect for at least 7 months. The year after a minimum wage increase is the first year in which the newly mandated minimum

wage rate was in effect for at least 7 months. IPUMS-CPS ASEC 1990 to 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The presentation of the proportions of different household types among households with minimum wage recipients for a selection of years shows that certain characteristics have not changed steadily over time but have developed cyclically with increases in the minimum wage at federal level. The proportions of severely affected households and moderately affected households have developed cyclically, as in the population as a whole: they increased when the minimum wage has been raised and fell in times when the standstill in the federal minimum wage policy has led to a fall in the real value of the minimum wage. The increases were fed by households that were only slightly affected, which is why their shares fell when the minimum wage was increased. The trends were quite similar for households with minimum wage workers in the overall income distribution and minimum wage households with total incomes below the median. In contrast to the overall income distribution, there was no such stagnation between 2010 and 2018 among households with varying degrees of affectedness by the minimum wage. The share of strongly affected households rose slightly, while the proportion of marginally affected households declined. This could indicate that since the last increase in the federal minimum wage, a phase in which more and more states enacted higher state minimum wages, a trend towards greater dependence on minimum wage income is more pronounced among minimum wage households in the lower half of the income distribution than across all income ranges.

9. Descriptive results

In this chapter, I present the descriptive results. In contrast to the trend analyses in the previous overview chapter, these refer to the two years between which the long-term influence of households with minimum wage earners on the development of income inequality is considered. I will first present descriptive analyses on the change of the income distribution between 1989 and 2018. I use a detailed description using all percentiles of the lower half of the income distribution to discuss the income strata in which household income dispersed more whereas household income moved in parallel in other income strata. This is complemented with a discussion of changes in the ratios between the median household income and percentiles in the lower area of the income distribution. Afterwards, I present a visualization of the location of households with minimum wage earners in the total population, followed by a comparison of the means of all covariates for the whole population and the subpopulation of households with minimum wage earners. Descriptives for all covariates are presented for both points in time for the whole population and the lower half of the income distribution. Finally, I present the most important descriptive findings visually. I highlight changes in households' work intensity and the relevance of various income components, including the tax burdens of households, again comparing all households and households with at least one minimum wage earner.

In recent decades, many affluent democracies experienced an increase in income dispersion. Countries differ, however, in their overall pattern of inequality trends. The U.S. has experienced a strong increase in income inequality over the last three decades and is a clear outlier regarding its exceptionally high current level of inequality (Grusky and Hill 2018; Atkinson 2015;

Gornick and Milanović 2015; Alderson and Doran 2013; McCall and Percheski 2010; Gottschalk and Smeeding 1997; Morelli, Smeeding, and Thompson 2015). This long-term trend was driven mainly by a steep rise in income and wealth at the top end while the middle and the bottom of the income distribution has experienced only slow income growth in favorable economic environments.⁸¹ In some countries, the incomes of households in lower parts of the distribution failed to keep pace with those in the middle, whereas in others the relation between middle- and low-income households remained stable. The USA is one such case. In the long term, inequality in the lower half of the household income distribution remained relatively stable (Donovan, Labonte, and Dalaker 2016; Smeeding 2005; Kenworthy 2018). The claims regarding the stability of inequality in the lower half of the income distribution are based on the ratio between the median and the 10th percentile of the distribution (Smeeding 2005:963). It is possible that other developments may be observed below this point. Nevertheless, the stability in the income range above it means that the relative poverty rate, for example, has also been relatively stable since the 1990s.

Changes over time can be investigated in more detail when comparing the values of specific percentiles and how they evolved between two selected time points. This also permits comparing the size of percental changes of quantile values at different points of the distribution. Figure 40 illustrates the changes in incomes at different percentiles between 1989 and 2018. It depicts the percentile values of the lower half of the distribution of logged equivalized annual net household incomes.⁸² The dots on the upper and lower lines represent percentiles for 1989 and 2018, respectively. For example, the seventh percentile (“P7”) in 1989 is located at a value of \$9,856. Thus, 7% of American households had equivalized net incomes of \$9,856 or less. In 2018, the seventh percentile’s value was approximately 10% higher, with a value of approximately \$10,790. That is, the poorest 7% of American households gained almost \$900 *per equivalent member* of annual income.

⁸¹ During economic downturns, it was especially the bottom of the income distribution that has experienced falling incomes, but these did not translate into long-term trends of dispersion below the median, Fisher and Smeeding (2016).

⁸² My discussion on the relationship between minimum wage policy and income inequality refers only to inequality in the lower half of the income distribution. My analyses are limited to the income distribution up to the median, and the conclusions I will draw from the results are restricted to the lower half of the income distribution. This is aligned with the debates on the efficiency of the minimum wage as an antipoverty tool, even though debates on the growth of inequality in the USA focus on growing top income shares. The picture shown here ignores trends in the higher income rungs, assuming that they are unrelated to minimum wage hikes. This must not necessarily be true considering that incomes of self-employed persons or incomes from businesses may be affected by higher minimum wage rates that need to be paid to employees, but this is beyond the research question on the policy effects of minimum wages operating through growing incomes of households with minimum wage workers.

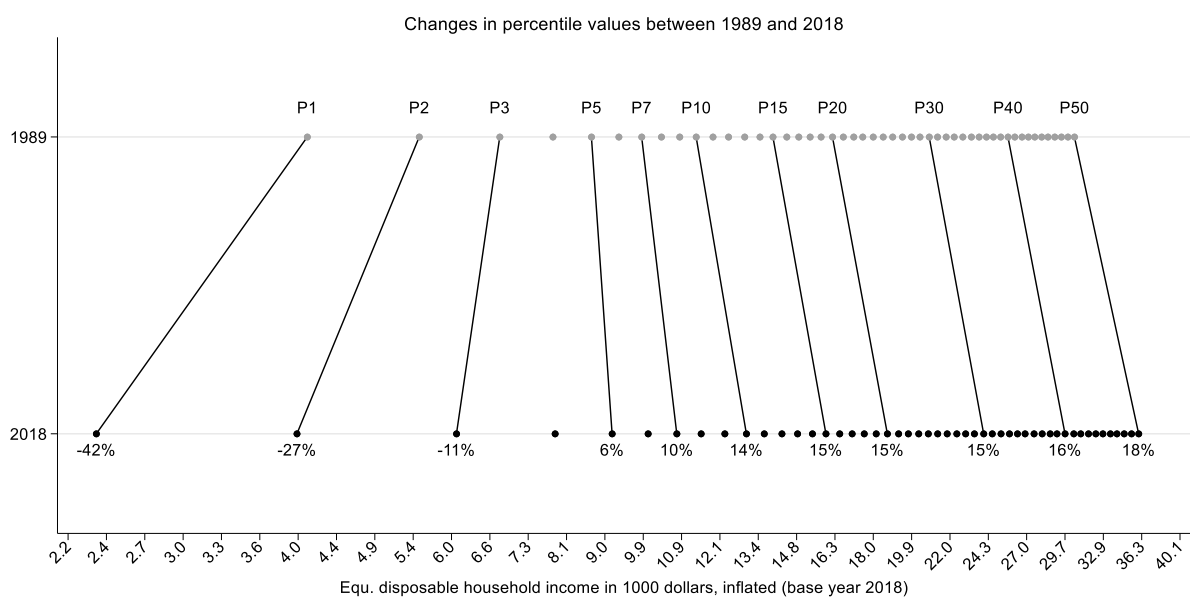


Figure 40: Percentile values of equivalized disposable household income and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the % change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Incomes between the 7th percentile and the median grew by 10 to 18% between 1989 and 2018, indicating an upswing for large parts of the income distributions' lower half. However, the lowest part of the population faced real income losses: the values of the lowest three percentiles declined significantly, the third by 11%, the second by 27%, and the first by 42%.⁸³ In other words, the poorest households lost ground relative to the rest of the population as the upswing did not reach the bottom of the income distribution (Shaefer, Edin, and Talbert 2015). The lowest 4% fared differently than the rest, exhibiting either constant or declining incomes. This trend did not translate into higher poverty rates, since the poverty thresholds are well above that,⁸⁴ but the purchasing power of the lowest 4% of U.S. households clearly decreased between 1989 and 2018. Against the backdrop of a growing population, this means that a growing number of households experiences declining incomes. However, the income growth at other quantiles in the lower half of the income distribution was sufficient to keep the share of poor households relatively constant.

⁸³ The lower tail's depiction comes with caveats. Values below one standard deviation below the first percentile of the distribution were bottom coded since it is unclear if extremely low annual incomes are measurement errors or if they reflect severe economic hardship. Also, note that the bottom of the distribution in the data must not necessarily represent the poorest in society. The sample of the CPS only captures the civilian population living in private households. Thus, it excludes people who are homeless, incarcerated or living in elderly residences – groups that are growing rapidly in the US. For these substantial and technical reasons, I decided to not emphasize the trends in the first two percentiles.

⁸⁴ Note that a stable poverty rate does not mean that the absolute number of poor households is not growing. With a growing number of households, all quantiles contain more households in absolute numbers. For example, the bottom 4% of households in the overall population represented approximately 13 million households in 2018 as compared to 9.78 million households back in 1989. Constant quantile values in the lowest regions of the distribution are therefore not in contradiction to rising absolute numbers of poor households. The fact that the lowest percentiles' values are decreasing thus means that incomes in the bottom of the income distribution are deteriorating, and that this affects a growing absolute number of households in the USA.

Overall, the descriptive picture indicates a clear upswing in large parts of the lower half of the income distribution. Despite the relatively high absolute level of inequality in the USA, income growth in the lower half of the income distribution was very inclusive over the last three decades. The percentile values have increased almost in parallel between the 10th percentile and the median, by 14 to 18%, which means that a large part of the population has benefitted from growing incomes while the dispersion of incomes remained constant. This stands in sharp contrast to the deteriorating situation of the poorest households below the 4th percentile. The evenly growing incomes starting from the 7th percentile up to the median reflect the standstill in the poverty rate.⁸⁵

Table 7 shows the ratios of lower percentile values to the median for 1989 and 2018, as well as their change over time. This table illustrates clearly that the strongest growth in the disparities between lower percentiles and the median occurred among the lowest 5 percentiles. In 1989, the ratio between the first percentile and the median (P01/P50 ratio) was 14.8%. It declined substantially by 7.3 percentage points to 7.4%. The P03/P50 ratio declined by 5.5 percentage points, the P05/P50 ratio by 3 percentage points. In general, all ratios are declining, indicating that the median is increasing more than any other percentile value, indicating a growing inequality in the lower half of the income distribution.

Table 7: Ratios of lower percentile values to the median over time and their difference

	1989	2018	Diff
P01/P50	14.8	7.4	-7.3
P02/P50	18.1	11.1	-7.0
P03/P50	22.3	16.9	-5.5
P05/P50	28.4	25.3	-3.0
P10/P50	37.3	35.9	-1.3
P15/P50	45.6	44.2	-1.3
P20/P50	53.2	51.9	-1.2
P30/P50	68.5	66.8	-1.7
P40/P50	84.1	82.5	-1.6

Note: Ratios are multiplied by 100 for better readability. Higher ratios indicate that the percentile value in the nominator is closer to the median, i.e. low ratios indicate that the lower percentile value is relatively low compared to the median income. Positive differences indicate a declining gap between the percentile in the nominator and the median. Negative differences indicate that the gap is increasing. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Figure 41 shows how households with minimum wage workers are distributed in the total population, and how this has changed over time. In Figure 15, I exemplarily showed how one group can affect the distribution of the overall population. I first presented a change in the share of a group affected the shape of the overall income distribution and compared this with the situation when instead of the share of the group, the group-specific income dispersion changed. Both processes led to changes in the distribution of the overall population (i.e. the unconditional distribution) but were based on fundamentally different processes. Empirically, these two processes often happen in parallel. This is also the case for the group of households with minimum wage earners: From 1989 to 2018, both the group's proportion in the overall income

⁸⁵ Figures for all income concepts and all analysis samples can be found in section A of the appendix. Section B of the appendix illustrates the percentile changes for all percentiles in the lower half of the income distribution of different income concepts and analysis samples.

distribution changed (albeit to a limited extent), and the group's (group-specific) income dispersion has changed. The Oaxaca-Blinder decomposition will separate the impact that the change in the group's proportion has (the decline from 11% to 10%) from the impact that the change in the group-specific income dispersion has on the overall, unconditional income distribution.

The top panel of Figure 41 shows their distribution in the overall, unconditional distribution in 1989. They made up 11% in the total population and their median income was \$23,575 (adjusted for inflation, 2018 dollars), with a standard deviation of 0.62. The median income of the total population was \$30,473 with a standard deviation of 0.69. In 2018, households with minimum wage earners made up 10% in the total population and their median income was \$26,200, with a standard deviation of 0.64. The median income of minimum wage households therefore increased over time, whereas the standard deviation was stable. The median income in the total population increased more over time and stood at \$36,027 in 2018. The standard deviation increased substantially to 0.82. Also visibly, the total distribution became more unequal, with both the lower and the top end being further away from the center. In 2018, the group of households with minimum wage earners appears to be more clearly overrepresented in the lower half of the income distribution compared to the upper half than it was the case in 1989. The gap between the group's median and the median of the overall population has also increased over time.

Different from the example in Figure 15, there are many other subgroups in the overall income distribution which have changed their proportion and within-group income dispersion as well. Thus, the changes in the overall income distribution are not only the result of the changes in the group of households with minimum wage earners. For this reason, the contribution of households with minimum wage earners on the overall distribution needs to be measured independent of changes in other subgroups of the total population.⁸⁶

⁸⁶ The figure also underpins the unconditionality of the outcome variable of interest: The goal is to estimate the contribution that a certain subgroup has on the total, unconditional distribution. The main interest lies in the income structure effects, i.e. the contribution of the group-specific (conditional) income situation of households with minimum wage earners on the overall, population-level (unconditional) income distribution.

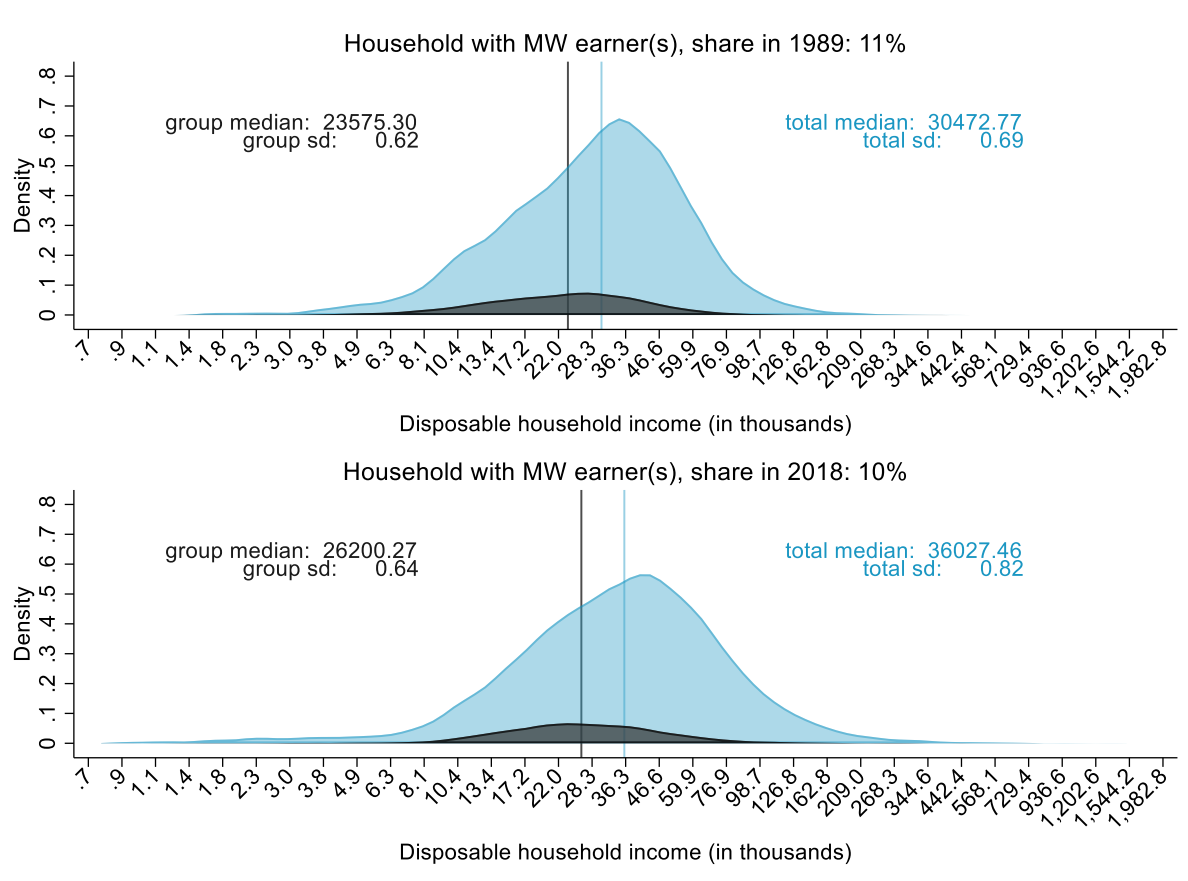


Figure 41: Distribution of households with minimum wage earners in total population

Note: The graph shows the group of households with minimum wage earners as a subgroup (in black) in the total population (in blue). The median (“group median”) and standard deviation (“group sd”) of households with minimum wage workers is shown in the left graph area (in black), the median and standard deviation of disposable household income in the overall population is shown in the right graph area (in blue). The added lines in black and blue illustrate the subgroup’s and total’s median income. The group’s distribution (black) is rescaled such that it visualizes the share of the group within the sample. The y-axis (not shown) of the graphs therefore does not refer to the density, but to the rescaled density for all distributions. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 8 shows the shares of all household types as captured by the used covariates in the analyses for 1989 and 2018 and their difference over time for the lower half of the income distribution. The first three columns refer to all households in the lower half of the income distribution, whereas the last three columns refer to the shares of different household types among households with minimum wage earners in the lower half of the income distribution.

These figures have been part of the descriptive overview in the previous chapter, but their direct comparison makes it easier to grasp the difference in the changing composition of the population among households with minimum wage earners and all households in the lower half of the income distribution.

Of course, the proportions vary greatly in terms of labor market participation, as the population with incomes below the median also includes older people and households without employment. Nevertheless, an increase in dual-income households can be observed among minimum wage households, which is not evident in the general population. The increase in full-time employment is also more pronounced among single households. Among minimum wage households, the decline in the proportion of households that are strongly supported by public transfers is more pronounced. An increasing proportion receives no public transfers.

The decline in young households is more pronounced within the group of minimum wage households than in the general population, although the latter also includes households in which older people who are no longer working live. What is particularly striking is that among minimum wage households, the proportion of households with Hispanics has increased considerably more. While in 1989, 15.6% of households contained at least one person of Hispanic origin, in 2018 it was 32.1 percent. The proportion has therefore more than doubled, while the proportion in the general population has risen by 8.7 percentage points, from 11% to 19.8%. The proportion of households with only White members has fallen more sharply among minimum wage households, namely by 24.3 percentage points, compared to 15.8 percentage points in the general population.

There are also significant differences in terms of the region in which households live. In the general population (with incomes below the median), the proportion of households living in the Southern region or the Pacific and Mountain states has risen by 3.5 and 2.5 percentage points respectively. In contrast, the proportion living in the Atlantic and Midwest regions has decreased. The picture is different among minimum wage households: the proportion living in the Atlantic region has risen by 2.7 percentage points. The increase in the Pacific region is significantly stronger than in the general population, namely 7.9 percentage points compared to 2.5 percentage points. In contrast, the proportion of minimum wage households in the South has fallen sharply, by 6.6 percentage points, while it has risen by 2.5 percentage points in the general population. These differences illustrate the stronger bite of the minimum wage in the Atlantic region and the Pacific and Mountain states, whether because of generally larger low-wage sectors or by covering a larger share of the labor force because minimum wage levels are higher. By contrast, in the Southern region, which is characterized by numerous states whose prevailing minimum wages are on par with the federal minimum wage, the share of minimum wage households has fallen sharply.

Table 8: Shares for all covariates for each time point and their difference over time, among all households in the lower half of the income distribution and among minimum wage households in the lower half of the income distribution

	Share 1989	Share 2018	Diff.	Share 1989, among MW HH	Share 2018, among MW HH	Diff.
MINIMUM WAGE HH						
Household with MW earner(s)	14.9	14.0	-0.9	100.0	100.0	0.0
Household with higher-wage earner(s)	48.6	47.0	-1.6	0.0	0.0	0.0
Household: inactive / jobless	36.4	39.0	2.5	0.0	0.0	0.0
HH's LABOR MARKET INT.						
Pensioner household	32.6	33.8	1.2	10.9	9.0	-1.9
Jobless household	8.3	9.7	1.4	4.3	5.9	1.6
Double-earner household	7.6	7.9	0.4	13.0	17.8	4.9
Trad. breadwinner	13.7	14.1	0.4	13.9	13.9	-0.0
Modif. breadwinner	8.9	5.6	-3.3	17.6	12.4	-5.2
Both in part-time	1.8	0.9	-0.9	4.0	2.2	-1.8
Precarious	4.6	3.5	-1.1	7.3	4.8	-2.5
Single working full-time	15.2	17.4	2.2	17.9	23.0	5.1
Single working part-time	7.3	7.0	-0.3	11.2	11.1	-0.1
HH's EDUC. COMP.						

Single, low education	37.6	9.0	-28.6	28.7	7.7	-21.0
Single, medium education	12.0	36.9	24.9	10.0	31.2	21.1
Single, high education	1.5	9.9	8.4	1.5	6.2	4.8
Couple, low/low education	30.8	4.5	-26.3	38.9	8.4	-30.5
Couple, medium/low education	10.0	5.5	-4.5	11.8	8.0	-3.9
Couple, medium/medium education	5.7	21.6	15.9	6.8	25.7	18.9
Couple, high/medium education	2.0	7.8	5.8	1.9	8.7	6.7
Couple, high/high education	0.4	4.9	4.5	0.3	4.1	3.8
PAYABLE INCOME TAX						
Tax refunds	12.4	26.2	13.8	27.2	46.8	19.5
No income tax	34.8	35.9	1.1	10.3	5.1	-5.2
Low, >0% - 10%	33.5	32.1	-1.4	45.9	45.7	-0.2
Medium, >10% - 15%	18.1	5.6	-12.6	15.5	2.4	-13.1
High, >15%	1.2	0.3	-0.9	1.1	0.1	-1.0
PAYABLE PAYROLL TAX						
No Payroll Tax	34.2	36.7	2.4	3.4	1.9	-1.4
Low, >0% - 6%	21.0	21.2	0.2	41.4	43.6	2.2
High, >6% - 8%	44.8	42.2	-2.6	55.3	54.5	-0.8
PUBLIC TRANSFERS RECEIVED						
No transfers	69.9	71.3	1.4	63.8	66.2	2.4
Low, >0% - 5%	12.2	13.0	0.8	17.1	17.7	0.6
Medium, >5% - 20%	10.9	10.6	-0.4	14.6	14.4	-0.2
High, >20%	7.0	5.1	-1.8	4.5	1.7	-2.8
Young household	17.2	11.3	-5.9	22.5	15.4	-7.1
Single-mother household	14.8	11.3	-3.5	18.7	15.9	-2.7
Couple without children	4.0	4.9	0.9	6.9	8.2	1.3
Large household (3+ children)	12.8	9.5	-3.3	17.7	13.5	-4.2
Single-person household	27.8	33.3	5.5	9.7	13.6	4.0
Household with no children	55.1	65.6	10.5	37.3	49.5	12.2
Household with self-employed member	10.4	7.9	-2.5	9.5	6.5	-3.0
HH's ETHNIC COMP.						
Household with Hispanic members	11.0	19.8	8.7	15.6	32.1	16.5
Household with Black (non-Hispanic) members	15.9	18.3	2.4	17.3	18.2	1.0
Household with members from other ethnicity	3.4	8.0	4.6	4.3	11.1	6.8
Household with only White members	69.7	53.9	-15.8	62.9	38.6	-24.3
REGION						
Atlantic	18.0	15.6	-2.3	13.9	16.6	2.7
Midwest	24.6	21.0	-3.6	22.7	18.7	-4.0
Southern	38.4	41.9	3.5	41.4	34.8	-6.6
Pacific and Mountain states	19.0	21.5	2.5	21.9	29.9	7.9
Observations	29392.0	33521.0	.	4427.0	4977.0	.

Note: IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

	Share 1989	Share 2018	Diff.	HH inc. 1989	HH inc. 2018	Diff.
MINIMUM WAGE HH						
Household with MW earner(s)	11.0	9.9	-1.0	26730	32534	5804
Household with higher-wage earner(s)	63.1	62.3	-0.8	39497	53580	14083
Household: inactive / jobless	25.9	27.7	1.8	27600	35022	7422
HH's LABOR MARKET INT.						
Pensioner household	23.5	25.6	2.2	27614	36584	8970

Jobless household	5.0	5.6	0.5	18550	19845	1295
Double-earner household	17.3	20.1	2.7	46838	65279	18441
Trad. breadwinner	13.7	13.1	-0.7	35625	46461	10836
Modif. breadwinner	10.9	7.6	-3.4	37998	52985	14987
Both in part-time	1.4	0.8	-0.5	28647	46727	18080
Precarious	3.0	2.4	-0.6	23490	33311	9822
Single working full-time	20.0	20.2	0.2	40054	49771	9717
Single working part-time	5.2	4.7	-0.5	25799	30972	5174
HH's EDUC. COMP.						
Single, low education	25.6	4.9	-20.7	23966	19290	-4677
Single, medium education	14.2	25.8	11.7	38136	31641	-6495
Single, high education	3.6	13.9	10.3	54000	56116	2116
Couple, low/low education	25.3	2.5	-22.8	29069	22696	-6373
Couple, medium/low education	12.2	3.5	-8.8	37781	28310	-9471
Couple, medium/medium education	10.8	20.7	10.0	45177	40852	-4325
Couple, high/medium education	6.3	13.1	6.8	54482	55927	1445
Couple, high/high education	2.0	15.5	13.6	62596	77526	14930
PAYABLE INCOME TAX						
Tax refunds	6.2	13.7	7.5	12991	20398	7407
No income tax	18.2	22.7	4.5	15776	26666	10890
Low, >0% - 10%	24.3	30.4	6.1	27567	40394	12827
Medium, >10% - 15%	22.9	18.0	-4.9	34393	54404	20011
High, >15%	28.4	15.2	-13.2	59049	101419	42371
PAYABLE PAYROLL TAX						
No Payroll Tax	24.2	26.1	1.9	27570	34949	7379
Low, >0% - 6%	23.1	23.6	0.5	41387	63265	21878
High, >6% - 8%	52.7	50.3	-2.4	35637	44323	8687
PUBLIC TRANSFERS RECEIVED						
No transfers	78.5	81.2	2.7	37720	50411	12690
Low, >0% - 5%	11.7	10.0	-1.8	32948	36524	3576
Medium, >5% - 20%	6.3	6.3	-0.0	18865	23400	4535
High, >20%	3.5	2.6	-0.9	10242	12063	1821
Young household	15.1	10.0	-5.1	30258	39144	8886
Single-mother household	9.2	7.0	-2.2	20943	26414	5470
Couple without children	8.2	8.0	-0.2	47691	58665	10974
Large household (3+ children)	8.3	6.7	-1.6	22459	32809	10350
Single-person household	24.5	28.0	3.5	32735	40510	7775
Household with no children	61.3	69.0	7.7	38265	48625	10360
Household with self-employed member	12.7	10.4	-2.2	42942	62508	19566
HH's ETHNIC COMP.						
Household with Hispanic members	8.1	15.1	7.0	26425	36277	9852
Household with Black (non-Hispanic) members	11.2	13.9	2.7	24454	33851	9397
Household with members from other ethnicity	3.5	9.0	5.5	35546	50532	14986
Household with only White members	77.2	62.1	-15.1	37425	50974	13549
REGION						
Atlantic	20.5	17.3	-3.3	38329	50581	12252
Midwest	24.4	21.6	-2.8	33939	45178	11240
Southern	34.6	38.5	3.9	32609	43704	11096
Pacific and Mountain states	20.5	22.6	2.1	37029	48709	11681
Observations	58783	67043	.	58783	67043	.

Note: IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 9 and Table 10 show the descriptive statistics for the total population and for the lower half of the income distribution. They show the means of all covariates, representing the respective shares of households with certain characteristics, the mean income for each of these groups for each point in time, as well as their differences over time. I discussed the long-term trends in the shares of different groups in the population in section 8.2. These tables additionally provide the difference in the means between the begin and end of the analysis period. Furthermore, they include the mean income in the different groups. In almost all groups, real incomes increased, both in the total population and in the lower half of the income distribution. What distinguishes the total from the lower half of the income distribution most is the that the increase in income is not substantially unequal between households with minimum wage earners and those with higher-wage earners when regarding the lower half of the income distribution. In the total population, the income of households with minimum wage earners increased by \$5,803, while the income of households with higher-wage earners increased by \$14,083. In the lower half, the income of households with higher-wage earners increased by \$3,282, whereas that of households with minimum wage increased by \$3,058. In percentage terms, the mean income of the latter increased more.

Table 9: Shares and average equivalized disposable household income for each covariate and time point, for the total population

	Share 1989	Share 2018	Diff.	HH inc. 1989	HH inc. 2018	Diff.
MINIMUM WAGE HH						
Household with MW earner(s)	11.0	9.9	-1.0	26730	32534	5804
Household with higher-wage earner(s)	63.1	62.3	-0.8	39497	53580	14083
Household: inactive / jobless	25.9	27.7	1.8	27600	35022	7422
HH's LABOR MARKET INT.						
Pensioner household	23.5	25.6	2.2	27614	36584	8970
Jobless household	5.0	5.6	0.5	18550	19845	1295
Double-earner household	17.3	20.1	2.7	46838	65279	18441
Trad. breadwinner	13.7	13.1	-0.7	35625	46461	10836
Modif. breadwinner	10.9	7.6	-3.4	37998	52985	14987
Both in part-time	1.4	0.8	-0.5	28647	46727	18080
Precarious	3.0	2.4	-0.6	23490	33311	9822
Single working full-time	20.0	20.2	0.2	40054	49771	9717
Single working part-time	5.2	4.7	-0.5	25799	30972	5174
HH's EDUC. COMP.						
Single, low education	25.6	4.9	-20.7	23966	19290	-4677
Single, medium education	14.2	25.8	11.7	38136	31641	-6495
Single, high education	3.6	13.9	10.3	54000	56116	2116
Couple, low/low education	25.3	2.5	-22.8	29069	22696	-6373
Couple, medium/low education	12.2	3.5	-8.8	37781	28310	-9471
Couple, medium/medium education	10.8	20.7	10.0	45177	40852	-4325
Couple, high/medium education	6.3	13.1	6.8	54482	55927	1445
Couple, high/high education	2.0	15.5	13.6	62596	77526	14930
PAYABLE INCOME TAX						
Tax refunds	6.2	13.7	7.5	12991	20398	7407
No income tax	18.2	22.7	4.5	15776	26666	10890
Low, >0% - 10%	24.3	30.4	6.1	27567	40394	12827
Medium, >10% - 15%	22.9	18.0	-4.9	34393	54404	20011
High, >15%	28.4	15.2	-13.2	59049	101419	42371

PAYABLE PAYROLL TAX						
No Payroll Tax	24.2	26.1	1.9	27570	34949	7379
Low, >0% - 6%	23.1	23.6	0.5	41387	63265	21878
High, >6% - 8%	52.7	50.3	-2.4	35637	44323	8687
PUBLIC TRANSFERS RECEIVED						
No transfers	78.5	81.2	2.7	37720	50411	12690
Low, >0% - 5%	11.7	10.0	-1.8	32948	36524	3576
Medium, >5% - 20%	6.3	6.3	-0.0	18865	23400	4535
High, >20%	3.5	2.6	-0.9	10242	12063	1821
Young household	15.1	10.0	-5.1	30258	39144	8886
Single-mother household	9.2	7.0	-2.2	20943	26414	5470
Couple without children	8.2	8.0	-0.2	47691	58665	10974
Large household (3+ children)	8.3	6.7	-1.6	22459	32809	10350
Single-person household	24.5	28.0	3.5	32735	40510	7775
Household with no children	61.3	69.0	7.7	38265	48625	10360
Household with self-employed member	12.7	10.4	-2.2	42942	62508	19566
HH's ETHNIC COMP.						
Household with Hispanic members	8.1	15.1	7.0	26425	36277	9852
Household with Black (non-Hispanic) members	11.2	13.9	2.7	24454	33851	9397
Household with members from other ethnicity	3.5	9.0	5.5	35546	50532	14986
Household with only White members	77.2	62.1	-15.1	37425	50974	13549
REGION						
Atlantic	20.5	17.3	-3.3	38329	50581	12252
Midwest	24.4	21.6	-2.8	33939	45178	11240
Southern	34.6	38.5	3.9	32609	43704	11096
Pacific and Mountain states	20.5	22.6	2.1	37029	48709	11681
Observations	58783	67043	.	58783	67043	.

Note: IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 10: Shares and average equivalized disposable household income for each covariate and time point, for the bottom half of the income distribution

	Share 1989	Share 2018	Diff.	HH inc. 1989	HH inc 2018	Diff.
MINIMUM WAGE HH						
Household with MW earner(s)	14.9	14.0	-0.9	17739	20799	3059
Household with higher-wage earner(s)	48.6	47.0	-1.6	20184	23465	3281
Household: inactive / jobless	36.4	39.0	2.5	15431	16865	1434
HH's LABOR MARKET INT.						
Pensioner household	32.6	33.8	1.2	16867	18914	2046
Jobless household	8.3	9.7	1.4	11594	12697	1103
Double-earner household	7.6	7.9	0.4	23083	27134	4051
Trad. breadwinner	13.7	14.1	0.4	19716	22171	2455
Modif. breadwinner	8.9	5.6	-3.3	21285	25044	3759
Both in part-time	1.8	0.9	-0.9	17341	21429	4089
Precarious	4.6	3.5	-1.1	13996	15564	1568
Single working full-time	15.2	17.4	2.2	20810	23954	3144
Single working part-time	7.3	7.0	-0.3	15882	18503	2621
HH's EDUC. COMP.						
Single, low education	37.6	9.0	-28.6	15805	15425	-380
Single, medium education	12.0	36.9	24.9	18847	19357	510
Single, high education	1.5	9.9	8.4	19951	21282	1331
Couple, low/low education	30.8	4.5	-26.3	18642	18377	-265

Couple, medium/low education	10.0	5.5	-4.5	20997	20299	-698
Couple, medium/medium education	5.7	21.6	15.9	21293	22981	1688
Couple, high/medium education	2.0	7.8	5.8	21899	23441	1542
Couple, high/high education	0.4	4.9	4.5	22583	23798	1215
PAYABLE INCOME TAX						
Tax refunds	12.4	26.2	13.8	12428	17955	5527
No income tax	34.8	35.9	1.1	14108	16683	2576
Low, >0% - 10%	33.5	32.1	-1.4	20323	25351	5028
Medium, >10% - 15%	18.1	5.6	-12.6	24957	29013	4055
High, >15%	1.2	0.3	-0.9	25905	30661	4756
PAYABLE PAYROLL TAX						
No Payroll Tax	34.2	36.7	2.4	15222	16713	1491
Low, >0% - 6%	21.0	21.2	0.2	17711	20601	2891
High, >6% - 8%	44.8	42.2	-2.6	20456	23789	3332
PUBLIC TRANSFERS RECEIVED						
No transfers	69.9	71.3	1.4	19408	21865	2457
Low, >0% - 5%	12.2	13.0	0.8	18435	20413	1978
Medium, >5% - 20%	10.9	10.6	-0.4	14664	16630	1966
High, >20%	7.0	5.1	-1.8	9625	10156	531
Young household	17.2	11.3	-5.9	17940	20668	2728
Single-mother household	14.8	11.3	-3.5	15005	18547	3542
Couple without children	4.0	4.9	0.9	20884	22816	1932
Large household (3+ children)	12.8	9.5	-3.3	16156	19703	3547
Single-person household	27.8	33.3	5.5	16807	18644	1837
Household with no children	55.1	65.6	10.5	18106	20168	2062
Household with self-employed member	10.4	7.9	-2.5	18595	21455	2860
HH's ETHNIC COMP.						
Household with Hispanic members	11.0	19.8	8.7	16559	19955	3396
Household with Black (non-Hispanic) members	15.9	18.3	2.4	15240	19061	3821
Household with members from other ethnicity	3.4	8.0	4.6	17919	20287	2367
Household with only White members	69.7	53.9	-15.8	18986	21257	2270
REGION						
Atlantic	18.0	15.6	-2.3	18415	20387	1972
Midwest	24.6	21.0	-3.6	18529	21161	2632
Southern	38.4	41.9	3.5	17396	20177	2781
Pacific and Mountain states	19.0	21.5	2.5	18601	20660	2059
Observations	29392.0	33521.0	.	29392	33521	.

Note: IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The way in which the relevance of work and labor income as an income source changed in households across the income distribution is one major argument for the improvement in the situation of minimum wage households. Figure 42 illustrates these trends among all households, among households with at least one member in employment and among households with at least one minimum wage earner. The top panel shows the change in the typical work intensity of all households in the five lower deciles of the income distribution. This measures the proportion of possible full-time work in a household that is put onto the labor market. A value of 90% for a household means that its working-age members⁸⁷ work 90% of their potential full-time volume. The leftmost graph shows that average work intensity declined particularly in the

⁸⁷ Working-age members are all household members between 16 and 69, excluding students below 30 years, the retired who were 55 years or older, and the ill or disabled who were 62 years and older.

first decile, and to a lesser extent, in the second and third deciles. This still includes pensioner households and households who are jobless or inactive in the labor market. When excluding these households, the picture suggests that work intensity still declined in the lower two deciles, albeit on a higher level. However, limiting this to households with minimum wage workers reveals a different pattern. Here, work intensity increased in the first and second deciles, along with the increases in all other deciles. This suggests that the labor market integration among households with minimum wage workers has increased, even among the households with the lowest incomes. This is reflected in the increasing share of labor income in total household income in the first decile, depicted in the rightmost graph in the lower panel. Despite the increased work intensity in the second and third deciles, labor income does not play a larger role in gross household income, suggesting that other income sources gained in importance too.

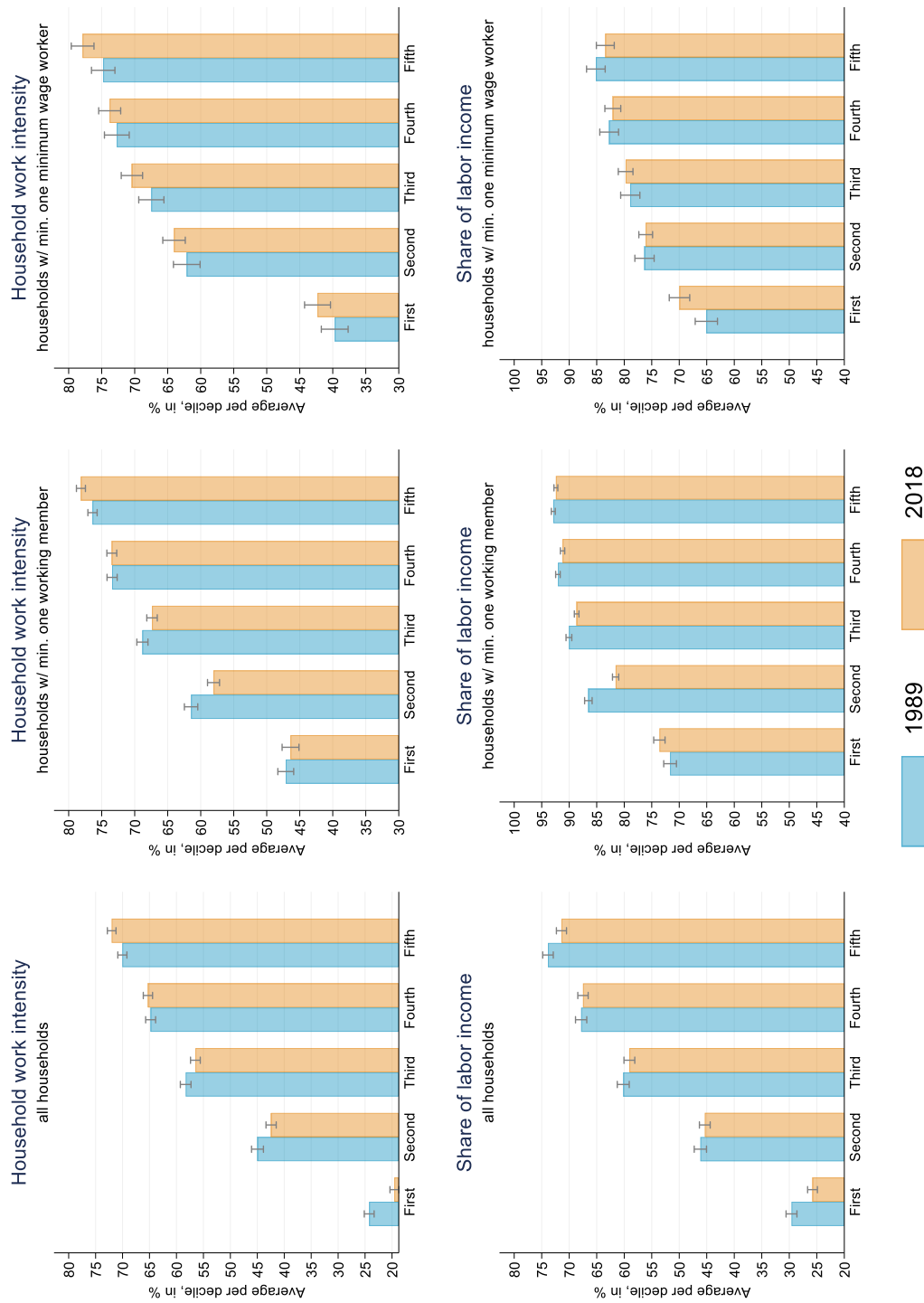


Figure 42: Average of households' work intensity and share of labor income in total household income per decile, for 1989 and 2018, for all households, for households with at least one working household member, and households with at least one minimum wage earner.

Note: Share of labor income refers to the proportion of the sum of all income from work (wages and salaries, including income from self-employment) in total gross household income. IPUMS-CPS ASEC 1989 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Figure 43 shows the share of households with minimum wage workers across the five deciles as well as the average of households' income from minimum wage work. The leftmost graph shows that the share of households with minimum wage workers declined only slightly in the first decile, from 31.5% to 29%. The other two figures illustrate the averages of the share of minimum wage income in total household income per decile which is indicative of the role that incomes from minimum wage work play in different income strata. Among all households with at least one working household member, the share of minimum wage income in total household income increased in all five deciles, particularly in the second and third deciles. Limiting this to households with minimum wage earners reveals the discussed pattern that the population of households with minimum wage workers increasingly relies on income from minimum wage work. Already in 1989, income from minimum wage work played an important role among minimum wage households in the first decile. On average, this income source accounted for 50% of total household income. This increased to 62% in 2018. The increases were of similar size in the second and third deciles.

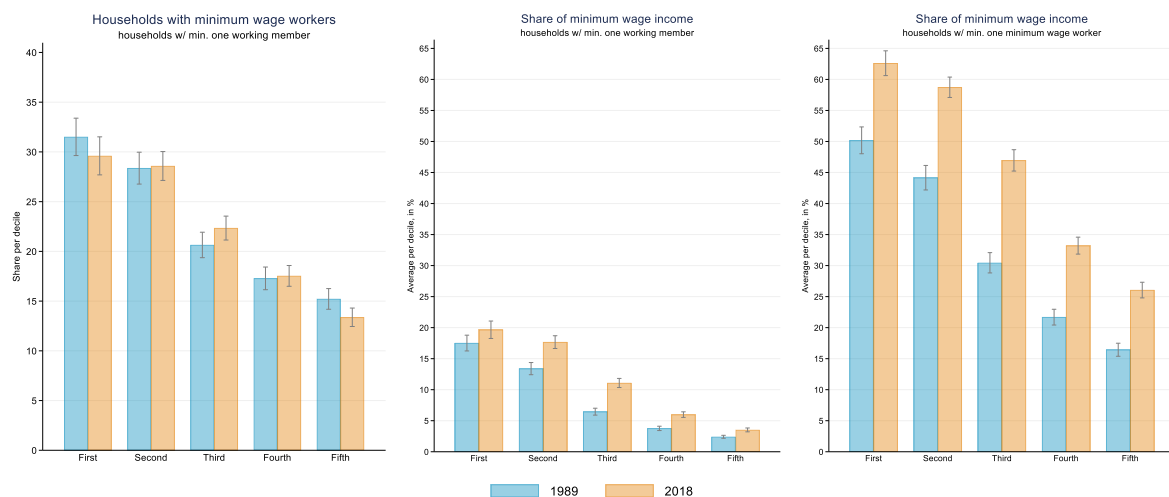


Figure 43: Share of households with minimum wage earners and average of households' income from minimum wage work for households with at least one working household member, and households with at least one minimum wage earner per decile, for 1989 and 2018.

Note: Share of labor income refers to the proportion of the sum of all income from work (wages and salaries, including income from self-employment) in total gross household income. IPUMS-CPS ASEC 1989 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The upper panel in Figure 44 shows the average shares of public transfers per decile, for all households and for households with at least one minimum wage earner. In both cases, the share of public transfers declined most in the first decile, followed by the second. The patterns are overall quite similar for the total population (left) and the for the population of minimum wage households (right). This is remarkable considering the increase in pensioner households and jobless households in the first decile. The lower panel shows the average shares of payable income taxes per decile and supports my expectations. Overall, the average share of payable income tax in gross household income declined sharply across all deciles for both groups – households in employment and households with at least one minimum wage earner. In 1989, households in the lowest decile received, on average, tax refunds, resulting in negative shares of payable income tax in gross income. That is, tax refunds made up around 4% in gross income

in households with at least one member working over the last year in the first decile. From the second decile onwards, households typically paid income taxes, and their share in gross household income was very low in the second decile and ranged between 6% of gross income to 11% in the third, fourth, and fifth deciles. For 2018 I estimate positive income tax proportions only for the fourth and fifth decile. That is, households in the lowest three deciles that participated in the labor market typically received income tax refunds. This supports the assumption that the declining relevance of labor income in total gross income can be explained by the strongly increased relevance of tax credits. In the first decile, tax refunds made up more than 11% of gross household income in 2018, compared to 4% in 1989. In the second decile, income tax refunds averaged around 8% of gross household income, while in 1989 households in the second decile had to pay income tax. In the fourth decile, the average payable income tax fell from 9 cents of payable taxes per dollar of gross income to less than 4 cents, and in the fifth decile from 11 cents to 6 cents. The patterns for households with minimum wage earners are almost identical to the trends in all households with at least one member working over the last year.



Figure 44: Average of the share of public transfers for all households and households with at least one minimum wage earner and payable income taxes in households with at least one working household member and households with at least one minimum wage earner per decile, for 1989 and 2018.

Note: Share of labor income refers to the proportion of the sum of all income from work (wages and salaries, including income from self-employment) in total gross household income. IPUMS-CPS ASEC 1989 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Overall, the descriptive results show that the patterns of work intensity and the relevance of various income components changed significantly. In general, households in the lowest two deciles work slightly less, whereas households with minimum wage workers work more. This

translates into a higher share of labor income among minimum wage households in the first decile, but not in the higher income strata. This is rooted in two factors: For once, the results suggest that minimum wage income became the dominant source of labor income among these households. The shares of minimum wage income increased sharply across all five deciles. In addition, tax refunds became a much more important income source in these households as well. Both of these factors could increase household incomes and be crucial factors shaping the income distribution over time.

10. Multivariate results

I now turn to the multivariate results, divided into sections corresponding to my research questions. I begin with an overview of the main results to discuss the contribution of households with minimum wage earners to changes in the inequality of disposable household income.

In what follows, I will present a set of multivariate results to explore the mechanisms behind this main result, i.e. the pathways by which the rising minimum wage is effective and under which conditions or circumstances it translates into changes in the distribution of household incomes based on the contribution of households with minimum wage earners. They consist of models that differ a) with regard to the dependent variable, i.e. with regard to the income concept used to assess changes in their distribution, and b) with regard to the model specification. The comparison of results based on different dependent variables will answer the question if increasing minimum wages translate more strongly into changes in the inequality of income concepts that are more directly linked to minimum wages, such as households' labor income or market income, compared to broader income concepts such as their gross or net income. The comparison of results of models using different specifications will answer the question if a) the contribution of households with minimum wage earners to changes in percentile values across the lower half of the income distribution differ among scenarios in which the different redistributive systems of the welfare state are or are not included and if b) interactions of rising minimum wages with changes in social policy and tax policy are at play, which moderate the found contribution of households with minimum wage earners on trends in income inequality.

For all different models, coefficients for the main explanatory variable of interest and all other variables are obtained from separate models, estimated for each percentile of the lower half of the income distribution for each income concept.

10.1. The contribution of households with minimum wage earners to changes in inequality of disposable household income

I now turn to the multivariate results and present an overview of the main findings at selected percentiles in Table 11. The coefficients are derived from separate models for each percentile. I assumed that the average increase in minimum wages across the USA, along with changes in the characteristics of minimum wage workers and their household constellations, has led to long-term improvements in the income situation of households with minimum wage earners. I hypothesized that this has increased incomes in the lower part of the income distribution, reduced the income gap between low-income households and those at the median, and

ultimately contributed to a decline in inequality in the lower half of the income distribution.⁸⁸ My primary focus is on changes in the inequality of disposable household income, the income concept that determines living conditions. The models underlying the presented results control for the influence of other household types using control variables on households' labor market integration, their tax liability, transfers received, their educational composition, demographics, household constellation, and region. This accounts for changes in labor market conditions, social and tax policies, as well as demographic change and changes in household constellations.⁸⁹

In the top panel, the table shows the quantile value differences over time at the selected percentiles. In the lower bottom of the income distribution, the overall decline in percentile values (from 8.83 to 8.71 at the 3rd percentile) was driven by composition effects which contributed to a decline, whereas income structure effects counteracted this and contributed to an increase of the 3rd percentile. In the lower middle, the increases in percentile values were associated with positive compositional changes. Further up the distribution, the rise of the 25th percentile value was associated with positive composition effects and income structure effects. Income structure effects were most pronounced in the lowest bottom of the income distribution, and at the median. The remainder of the table first contains the coefficients for the explained part of the decomposition, which relate to the composition effects. The bottom half of the table contains the coefficients for the unexplained part of the decomposition, which relate to the income structure effects that are the focus of interest in this paper and to which my hypotheses relate. The compositional effects show that changes in the proportion of households with minimum wage earners did not contribute to changes in percentile values at any point in the distribution, using selected percentiles as examples here. This is not surprising as the descriptive results have shown that the proportion of minimum wage households has not changed over time. Rather, the income situation of households with minimum wage earners and the income dispersion within the group have changed, which is reflected in the unexplained part of the decomposition.

Table 11: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates, selected percentiles

	P3	P5	P10	P15	P25	P50
Overall						

⁸⁸ As the group increasingly consists of households in which minimum wage workers are the main earners in their households and thus contribute the majority of the total income in these households, also the target efficiency of minimum wage policy should have improved: An increasing share of the benefits from higher minimum hourly wage rates flow to households with minimum wage earners. In principle, this could happen either because minimum wage workers are more likely to live in households that have relatively low total incomes, or because minimum wage workers' earnings determine the total income in their household more in poorer households than in higher-income households. Target efficiency could therefore rise either because minimum wage workers tend to be located in lower areas of the income distribution more often over time, or because minimum wage workers' income plays an increasingly important role in households typically located in lower income areas.

⁸⁹ The table excludes the control variables for households' educational composition, demographics, and region. The full table for the results on the distribution of disposable household income, as well as all other income concepts, using different analyses samples and model specifications, can be found in section H of the appendix.

2018	8.713*** (0.053)	9.119*** (0.025)	9.469*** (0.018)	9.676*** (0.018)	9.968*** (0.020)	10.492*** (0.028)
1989	8.826*** (0.031)	9.065*** (0.023)	9.338*** (0.022)	9.538*** (0.024)	9.826*** (0.025)	10.325*** (0.026)
Difference	-0.113** (0.038)	0.054** (0.018)	0.131*** (0.016)	0.138*** (0.017)	0.142*** (0.015)	0.167*** (0.014)
Composition	-0.348*** (0.086)	-0.044 (0.031)	0.117*** (0.022)	0.124*** (0.022)	0.079*** (0.021)	-0.031 (0.017)
Income Structure	0.235** (0.090)	0.098*** (0.030)	0.014 (0.021)	0.014 (0.020)	0.063*** (0.019)	0.199*** (0.012)

Composition effects

MINIMUM WAGE HH (Ref.: Higher-wage hh)

Household with MW earner(s)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Household: inactive / jobless	-0.027*** (0.006)	-0.011*** (0.003)	-0.008*** (0.002)	-0.007*** (0.001)	-0.004*** (0.001)	-0.000 (0.000)

HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)

Pensioner household	0.072*** (0.013)	0.024*** (0.004)	0.012*** (0.002)	0.009*** (0.002)	0.007*** (0.001)	0.005*** (0.001)
Jobless household	-0.032 (0.018)	-0.012 (0.006)	-0.005 (0.003)	-0.003 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Double-earner household	-0.002 (0.001)	-0.001* (0.000)	-0.001* (0.000)	-0.000 (0.000)	0.001** (0.000)	0.003*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.001 (0.001)
Both in part-time	-0.000 (0.001)	0.000 (0.000)	0.001* (0.000)	0.001** (0.000)	0.001*** (0.000)	0.000* (0.000)
Precarious	0.015*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.001*** (0.000)
Single working full-time	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
Single working part-time	0.002 (0.001)	0.002* (0.001)	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)	0.000 (0.000)

PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)

Tax refunds	-0.144*** (0.019)	-0.076*** (0.008)	-0.066*** (0.006)	-0.072*** (0.006)	-0.098*** (0.008)	-0.097*** (0.008)
No income tax	-0.149*** (0.030)	-0.064*** (0.013)	-0.045*** (0.008)	-0.044*** (0.007)	-0.052*** (0.007)	-0.060*** (0.008)
Low, >0 - 10	-0.014*** (0.003)	-0.003*** (0.001)	-0.003* (0.001)	-0.005*** (0.001)	-0.015*** (0.002)	-0.041*** (0.004)
High, >15	0.003 (0.003)	0.005*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	0.010*** (0.001)	-0.020*** (0.004)

PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)

No Payroll Tax	-0.019*** (0.006)	-0.005* (0.002)	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.005*** (0.001)
Low, >0 - 6	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)

PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)

Low, >0 - 5	-0.010*** (0.003)	-0.004** (0.001)	0.000 (0.001)	0.002* (0.001)	0.003** (0.001)	0.002*** (0.001)
Medium, >5 - 20	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20	0.005 (0.004)	0.010*** (0.003)	0.013*** (0.003)	0.009*** (0.002)	0.004*** (0.001)	-0.000 (0.000)
Controls for household's educational composition	Yes	Yes	Yes	Yes	Yes	Yes
Controls for household's demographics and family status	Yes	Yes	Yes	Yes	Yes	Yes
Controls for region	Yes	Yes	Yes	Yes	Yes	Yes

Income structure effects

MINIMUM WAGE HH (Ref.: Higher-wage hh)

Household with MW earner(s)	0.021 (0.011)	0.020** (0.006)	0.001 (0.004)	-0.003 (0.003)	-0.006* (0.003)	-0.004* (0.002)
Household: inactive / jobless	-0.297*** (0.056)	-0.113*** (0.022)	-0.079*** (0.017)	-0.061*** (0.012)	-0.036*** (0.009)	-0.011* (0.006)

HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)

Pensioner household	0.480*** (0.057)	0.099*** (0.018)	0.039** (0.013)	0.011 (0.011)	-0.006 (0.008)	0.001 (0.006)
Jobless household	-0.219*** (0.029)	-0.065*** (0.010)	-0.022*** (0.006)	-0.012** (0.004)	-0.011*** (0.002)	-0.010*** (0.002)
Double-earner household	-0.007 (0.006)	-0.006* (0.003)	-0.005* (0.003)	-0.005* (0.002)	-0.004 (0.003)	0.004 (0.002)
Trad. breadwinner	0.040*** (0.008)	0.014*** (0.004)	0.002 (0.003)	-0.005* (0.002)	-0.015*** (0.003)	-0.012*** (0.002)
Both in part-time	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Precarious	-0.040*** (0.008)	-0.014*** (0.004)	-0.010*** (0.002)	-0.011*** (0.002)	-0.010*** (0.001)	-0.004*** (0.001)
Single working full-time	0.025 (0.034)	-0.001 (0.013)	0.008 (0.009)	0.005 (0.007)	-0.008 (0.006)	-0.015** (0.005)
Single working part-time	0.011 (0.014)	-0.007 (0.006)	-0.005 (0.004)	-0.006 (0.003)	-0.009*** (0.002)	-0.006** (0.002)

PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)

Tax refunds	-0.032* (0.015)	0.015* (0.006)	0.039*** (0.005)	0.066*** (0.005)	0.043*** (0.004)	-0.028*** (0.003)

No income tax	-0.236** (0.089)	-0.001 (0.038)	0.065** (0.024)	0.113*** (0.019)	0.130*** (0.010)	-0.028*** (0.007)
Low, >0 - 10	-0.024* (0.011)	0.006 (0.006)	0.015*** (0.004)	0.040*** (0.006)	0.100*** (0.007)	-0.034* (0.014)
High, >15	-0.009 (0.007)	-0.003 (0.003)	0.000 (0.002)	0.001 (0.002)	-0.010*** (0.003)	-0.109*** (0.011)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	-0.158** (0.060)	-0.039 (0.023)	-0.015 (0.013)	-0.024* (0.011)	-0.044*** (0.007)	-0.010 (0.005)
Low, >0 - 6	-0.030 (0.015)	-0.005 (0.007)	-0.019*** (0.005)	-0.036*** (0.003)	-0.031*** (0.003)	0.005 (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0 - 5	0.039*** (0.009)	0.011* (0.005)	0.003 (0.004)	-0.001 (0.004)	-0.006* (0.003)	-0.010*** (0.001)
Medium, >5 - 20	0.013 (0.010)	-0.017*** (0.005)	-0.011 (0.006)	-0.009* (0.004)	-0.003 (0.002)	-0.003** (0.001)
High, >20	-0.015 (0.018)	-0.000 (0.010)	-0.008 (0.005)	0.000 (0.003)	-0.002 (0.001)	-0.003** (0.001)
Controls for household's educational composition	Yes	Yes	Yes	Yes	Yes	Yes
Controls for household's demographics and family status	Yes	Yes	Yes	Yes	Yes	Yes
Controls for region	Yes	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	<i>125826</i>	<i>125826</i>	<i>125826</i>	<i>125826</i>	<i>125826</i>	<i>125826</i>

Note: Standard errors in parentheses. Model includes the main covariate of households with minimum wage earners, covariates on transfer receipt, income tax and payroll tax liability, and control variables for: households' demographics, family status, ethnicity, self-employment status, region, educational composition, labor market activity. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The coefficients must always be interpreted with reference to the respective reference category. In case of the main covariate, these are households with a higher-wage earners, i.e. households with at least one member that has income from work with an hourly wage rate above the minimum wage, and without members working for minimum wage. This group of households makes up most of the sample, with a share of 63.1% in 1989 and 62.3% in 2018. The most common constellations of the other used covariates line up well with the group of households with minimum wage earners, suggesting that this reference group is a substantial group (see also Table 4 for the descriptives in the lower half of the income distribution and Table 6 for the descriptives conditional on households having at least one minimum wage earner).

The contribution to changing quantile values deriving from households with minimum wage earners reveal differences between different income strata of the lower half of the income distribution. It appears that changes in the group-specific income situation of minimum wage households had an inequality-reducing effect in the lower income strata. Relative to households with higher-wage earners, the changes in income in households with minimum wage earners contributed to an increase in the 5th percentile's value by 2 percent. A typical household at the 5th percentile has a net household income of about \$8600 per year, which means that a 2%

increase equals an increase of about \$172 per year for a typical family located at that point in the income distribution. In contrast, changes in income in households with minimum wage earners contributed to a decline in the 25th and 50th percentiles' values by 0.6 and 0.4%. Due to the positive contribution to quantile values of households with minimum wage earners at the bottom of the income distribution, inequality between households in the lowest 5 percentiles and households around the median declined slightly. Because households with minimum wage earners do not contribute to changes in the 10th percentile value, the frequently used 50/10 percentile ratio would remain largely unchanged. In order to have an impact on the relative poverty rate, households with minimum wage earners would have to contribute to a reduction in the difference between the median and the poverty line. However, the positive effects observed in the lowest range do not extend that far upwards. Minimum wage policy appears to have contributed to an improvement in the income situation of households at the lower end of the distribution, but not between the 18th and 25th percentiles, where the relative poverty line lies.⁹⁰ In this area of the distribution, I find no or slightly negative contributions. In combination with similarly pronounced negative contributions at the median, this means that the relative poverty rate is not affected by households with minimum wage earners.⁹¹

Households receiving tax refunds contributed to positive changes at the 5th, 10th, 15th and 25th percentiles, by 1.5, 3.9, 6.6, and 3.3 percent. These contributions are overall larger than the ones from households with minimum wage earners. For example, a 6% increase to the value of the 15th percentile equals between about \$830 per year on a total disposable income of about \$13,880. This is arguably a more significant amount, but the coefficients of this size are located further up in the distribution and therefore “target” households with higher incomes compared to the minimum wage. At the 3rd percentile, they contributed to a decline by 3.2%, and at the median to a decline by 2.8 percent. The coefficients at these selected percentiles therefore suggest a heterogeneous effect of households receiving tax refunds compared to households with a medium income tax liability across the lower half of the income distribution. Households with a low income tax liability contributed to changes in quantile values at the 10th, 15th, and 25th percentile, where they contributed to increases in percentile values by 1.5, 4, and 10 percent. At the median, they contributed to a decline by 3.4 percent.

In the lower bottom, the positive contributions of pensioner households, compared to the reference category of households in the modified breadwinner model, played a particularly important role. At the 3rd percentile, they contributed to an increasing quantile value by 48 percent. At the 5th percentile, this impact is lower but still substantial, with 10 percent. In contrast, jobless households contributed to a decreasing value at the 3rd percentile by 21.9 percent. At the 5th percentile, they contributed to a decline by 6.5 percent. The deteriorating situation of non-working households is also confirmed by the coefficients of income structure effects for households that pay no income tax, pay no payroll tax, and are categorized as non-working in the variable distinguishing households with and without minimum wage earners.

⁹⁰ According to LIS data, the relative poverty rate of the total population using the threshold set at 50% of the median was 17.6% in 1989 and in 2018. The relative poverty rate using the 60% threshold was 24% in 1989 and 24.5% in 2018 (2024).

⁹¹ The poverty threshold for the supplementary poverty measure (SPM) was located around the 13th percentile in 2018, see U.S. Census Bureau (2019d). Since no positive influences are identified in this income range, the results suggest that the poverty rate measured by the SPM would likely remain unaffected by the improvements in the income situation of households with minimum wage earners. However, the SPM was not yet used in 1989.

Thus, compared to a typical household with two employed persons, jobless households lost ground, whereas pensioner households benefitted in a way that substantially improved their relative income situation.

Figure 45 illustrates the results for the income structure effects of households with minimum wage earners graphically. It only shows the contribution of households with minimum wage workers to the difference of quantile values of equivalized net household income between 1990 and 2018. They contributed to increases in percentile values between the third and eighth percentile, with the largest contributions concentrated at the 5th percentile, where households with minimum wage earners increase the percentile value by 2%. The figure illustrates that the contributions vary by different income strata, and that the contributions turn negative above the 10th percentile. Above the 20th percentile, these households contributed to decreasing quantile values (with coefficients being significantly different from zero). Between the 20th and 45th percentiles, the contributions to changes in quantile values range between approximately 0.5 and 0.9%, but they approach zero again towards the median.

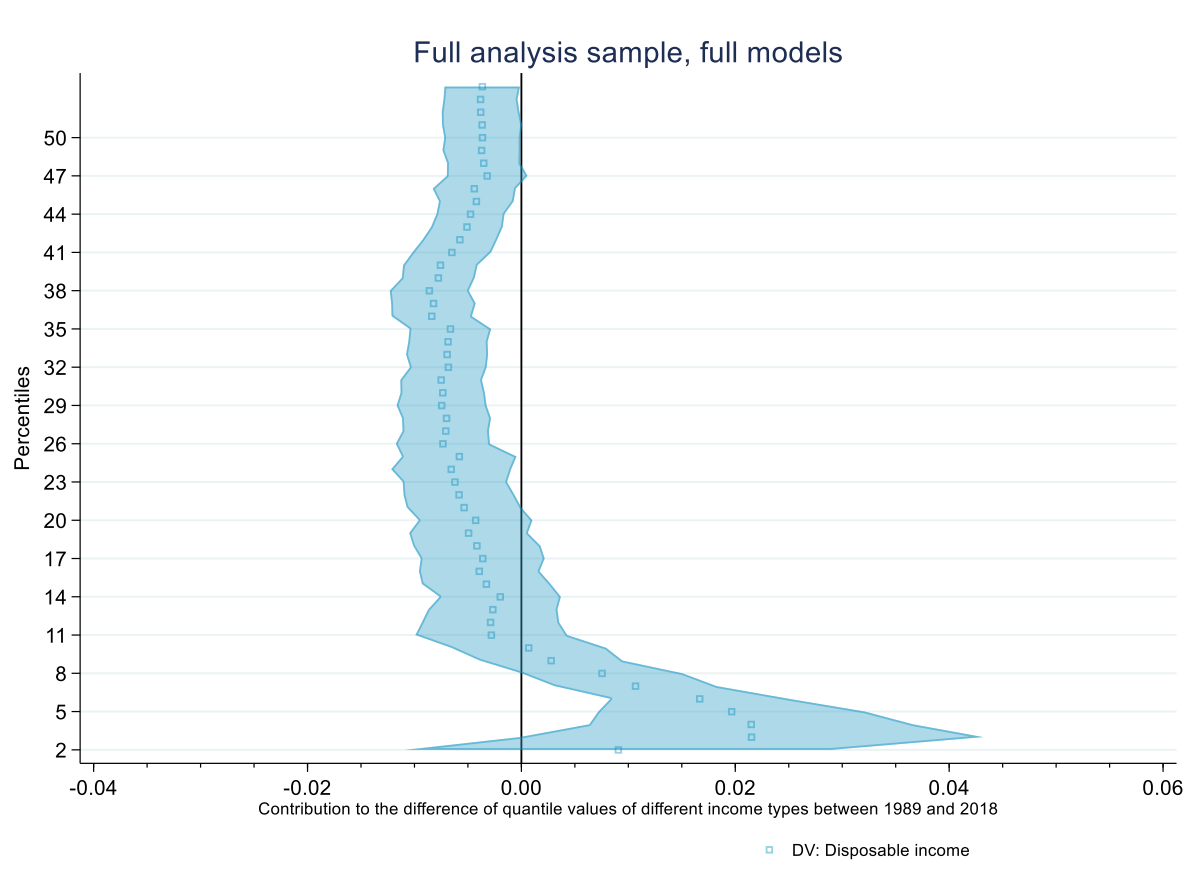


Figure 45: Results of OB-decompositions (income structure effects, unexplained part) for households' disposable income as dependent variable, for full model specification including variables for redistribution (income tax, social security tax, and transfers), full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Model includes the main covariate of households with minimum wage earners, covariates on transfer receipt, income tax and payroll tax liability, and control variables for: households' demographics, family status, ethnicity, self-employment status, educational composition, labor market activity. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

These main results show that the inequality of equivalized net household incomes declined slightly due to the positive contribution of households with minimum wage earners to quantile values at the bottom of the income distribution, which is based on a relative improvement of

their income situation. The impact on inequality is small but supports my first hypothesis (H1) that households with a minimum wage earner have contributed to positive changes in the lower percentile values, which in turn have led to a decrease in income inequality.

However, households with minimum wage earners may not just influence the income distribution due to changes in their income situation, but also due to changes in their share in the total population. The plain change of the proportion of such households over time changes the composition of all groups in the population and thus the shape of the overall distribution, resulting in percentile value changes. Figure 46 shows the corresponding composition effect of the results based on the main set of models that estimate the contribution of households with minimum wage earners on the percentile values across the lower half of the distribution of equivalized net household income. Overall, the contribution to changes in quantile values is not significantly different from zero, which is plausible, as the share of households with minimum wage earners *in general* has not changed in the analysis period. The descriptive results presented before have shown that among households with minimum wage earners, an increasing proportion relies strongly on income from minimum wage work. However, this ultimately affects the within-group inequality of incomes among households with minimum wage workers, and therefore translates into income structure effects.

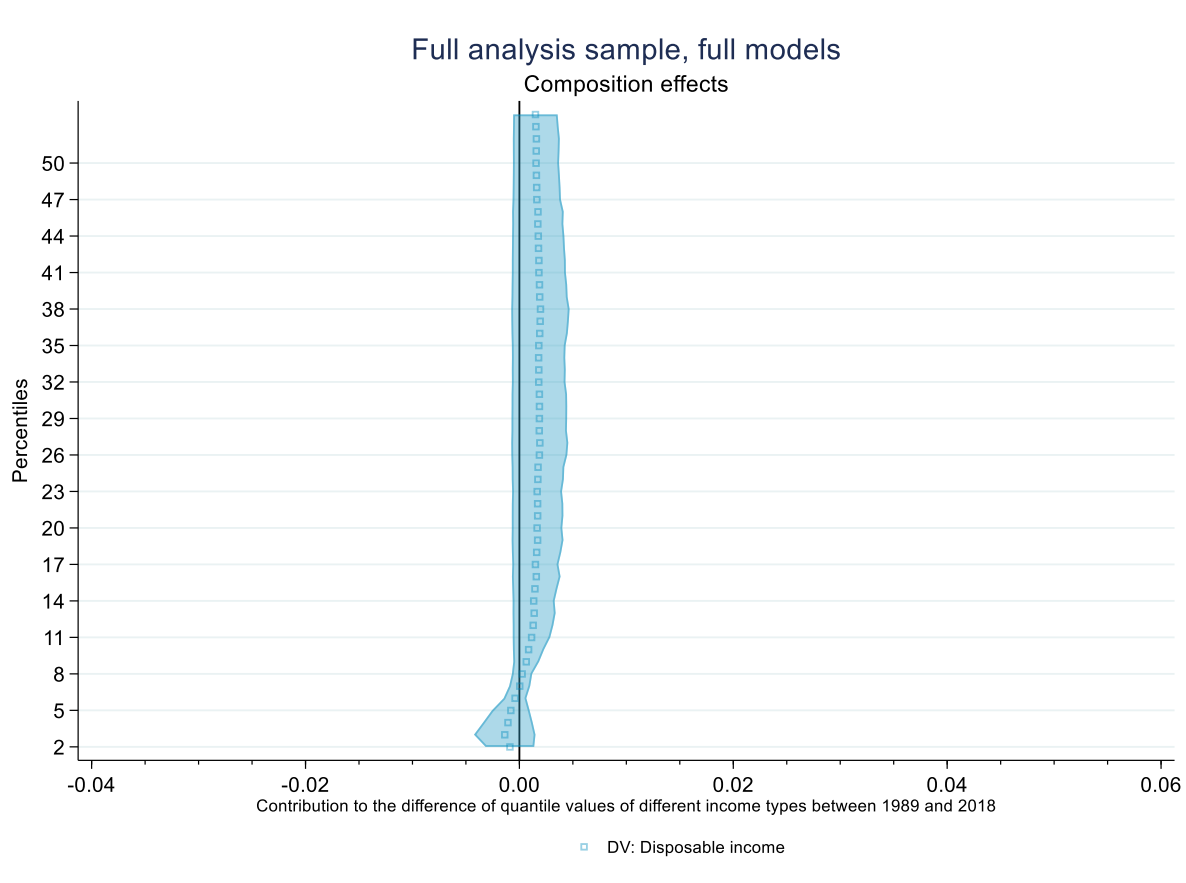


Figure 46: Results of OB-decompositions (composition effects, explained part) for households' disposable income as dependent variable, for full model specification including variables for redistribution (income tax, social security tax, and transfers), full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Model includes the main covariate of households with minimum wage earners, covariates on transfer receipt, income tax and payroll tax liability, and control variables for: households' demographics, family status, ethnicity, self-employment status, educational composition, labor market activity. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

To elaborate on the conditions under which rising minimum wages translated into changes in the distribution of disposable household income, additional models are estimated to compare the results of estimations of the distribution of different income concepts and of estimations based on different model specifications. Figure 46Figure 47 shows the results of nested models, where control variables were added gradually. The model including the main covariate of households with minimum wage earners is extended to include variables for households' demographics and family status, the educational composition of households, and households' labor market integration (as described in the variables section). Overall, the differences that arise in the coefficient of the main covariate are limited. In the lowest 15 percentiles, the results hardly differ. From there, the results for the model that includes information on households' educational composition increasingly diverge from the results of the models that include only the main covariate and that include the main covariate and the demographics and are shifted slightly to the right. This is most pronounced at the median, but the difference is still only small. The coefficients for the model that also includes information on households' labor market integration (in green) lie in between.

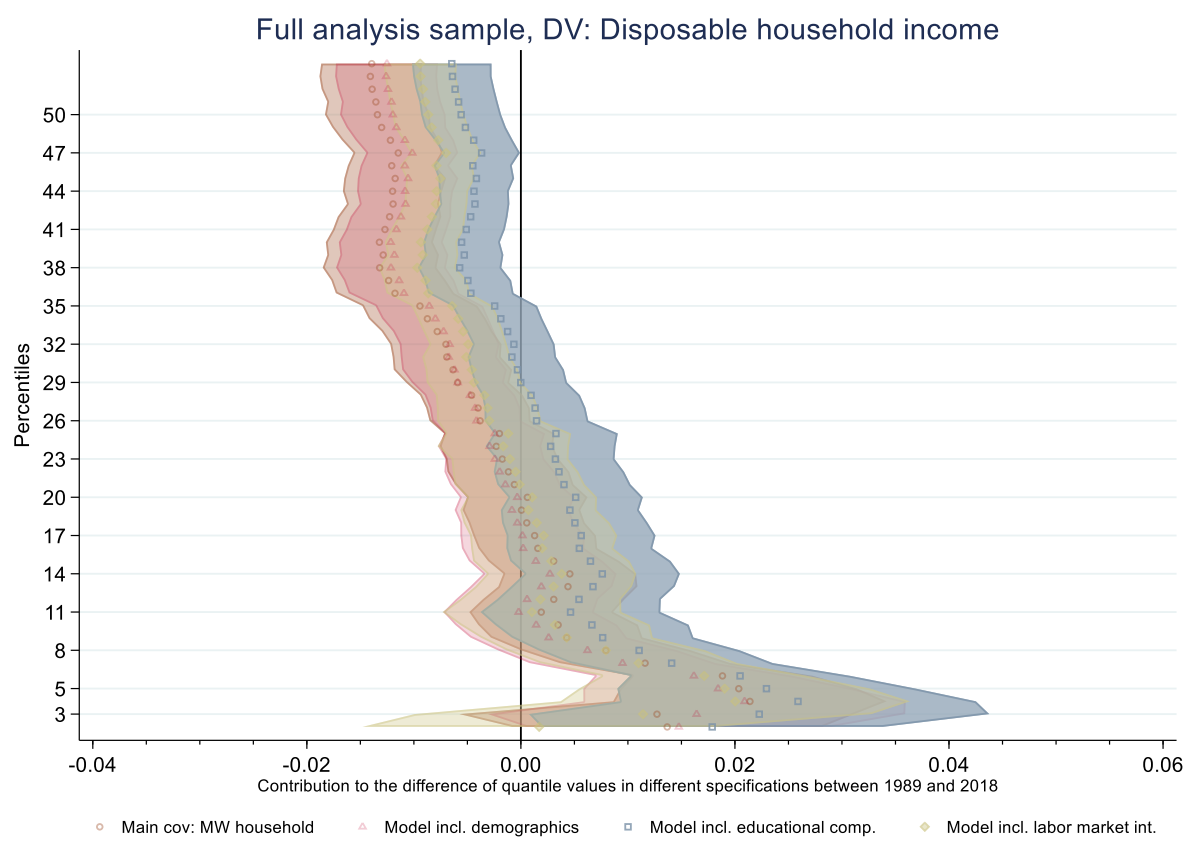


Figure 47: Results of OB-decompositions (income structure effects, unexplained part) estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income. The graph shows the coefficients for the main covariate of households with minimum wage earners for different model specifications, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications, where "Main cov: MW household" refers to the model which only includes the main covariate of households with minimum wage earners. "Model incl. demographics" includes the main covariate and control variables for households' demographics, family status, ethnicity, self-employment status. "Model incl. educational comp." is the model that additionally controls for the educational composition. "Model incl. labor market int." is the model that, in addition to all other mentioned variables, controls for households' labor market integration. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The results of the models that do not control for the educational composition in households indicate that part of the effect of households with minimum wage workers is based on the educational composition of these households. The full models showed that low education, whether in couples or in single-person households, is increasingly associated with income penalties. Households with minimum wage earners have on average a lower education (see also Table 5). This effect, which is confounded with the contribution of minimum wage households, appears to be reflected in a disadvantage particularly at the median, so that the contributions of households with minimum wage earners are more negative here. In comparison, minimum wage households appear to be relatively well positioned in terms of their labor market participation, which, even if the differences are not significant, mitigates this disadvantage somewhat.

10.2. The impact of changes in minimum wage policy on the inequality of household incomes – different income concepts

I argued that possible transfer cuts or rising tax liabilities of low-income households with members in minimum wage work should not necessarily serve as a counterargument against minimum wage increases. Instead, a better understanding of the interactions between the gains through minimum wage increases and rising marginal tax rates through cuts in public transfers or rising tax liabilities is needed. The research design of this thesis responds to this need. I estimate the impact of the minimum wage on the distribution of households' total market income, which disregards their transfer receipt, and on the distribution of households' total gross income, which disregards their tax liability (and their received tax refunds) in addition to looking at the evolution of the distribution of net household incomes.

Thus, in this section, I will present results of models using different income concepts as dependent variables to illustrate if and by how much increasing minimum wages have led to changes in the distribution of different income concepts over time. For example, this could indicate if the long-term changes in minimum wage policy have contributed to a decline in the inequality of labor incomes on household level, whereas this was not the case for the inequality of households' disposable income. Since the focus here is on the differences between different income concepts, the most strongly specified model specifications are used for each of them. This is to control for changes in other determinants which affect households' income level and which would systematically affect only certain outcome variables: For example, changes in the system of public transfers may interfere with how minimum wage households have contributed to changes in the inequality of gross household incomes, whereas this would not be the case when regarding their market-based income only, which does not include households' transfer income at all. With the full specification in each case, changes in the transfer system are controlled for. Therefore, the differences in the influence of minimum wage households on inequality of the different outcome variables in percentage terms reflect whether households with minimum wage earners changing income situation have translated more into the distribution of specific income types compared to other, irrespective of other determinants that may have led to changes in these distributions.

I will also compare the results of these different models after adjusting the analysis samples to make the results comparable: The broader income concepts such as households' total gross income allow for the inclusion of more households in the analysis as compared to the

investigation of total labor income, given that a sizable share of households does not have income from labor, such as the elderly or jobless households. These households are therefore excluded when estimating the impact of minimum wage households on the distribution of households' labor income.

Figure 48 illustrates the discussed results for changes in the distribution of the disposable income of households and additionally displays the contribution of households with minimum wage earners to changing quantile values of two different measures for gross household income. They distinguish from the measurement of households' disposable income by households' tax liability, which is deducted from their gross income, which is why the model specifications do not include households' tax liability. My standard measure for households' gross income includes the sum of tax refunds households receive after the tax year, which serve as an additional income source and function as a cash transfer for working families in today's welfare state. For this reason, the model specification that underlies the results for this measure includes the dummy variable that captures if households receive tax refunds to be able to control for changes of the generosity of the tax refund system, in addition to all other control variables and the variables that capture in how far households' total income depends on transfers. The alternative measure for gross income does not include the sum of these tax refunds and therefore they are not included in the used model specifications either. The side-by-side comparison of the results for these three different income concepts illustrates that the income range in which households with minimum wage workers contributed to changes in percentile values varies. The largest contributions of households with minimum wage workers to disposable household incomes are concentrated at the 5th percentile (blue dots), as described above. Regarding changes in the distribution of gross household income including tax refunds (red triangles), the positive contributions are similar in the lowest income range, but reach somewhat further up, with positive contributions found in the range between the 5th and 10th percentiles. Beyond that point, the estimates are not significantly different from zero. Considering that the positive contributions in the lowest income range are positive, inequality in the lower half of the distribution of gross household income (including tax refunds as an income source) declines slightly, similar to the case of disposable household income. The results for changes in the distribution of gross income excluding tax refunds are not significantly different from zero in the lower income range, which distinguishes this result from the other two income concepts. Furthermore, from the 35th to the 50th percentiles, households with minimum wage earners contributed to declines in quantile values by about 1%. The negative contributions around the median are likely the results of the reference category, which refers to households with higher-wage earners. When tax refunds are excluded as a source of income, the more favorable trends of higher wages appear to result in households with higher-earning members financially outpacing households with minimum-wage-level earners.

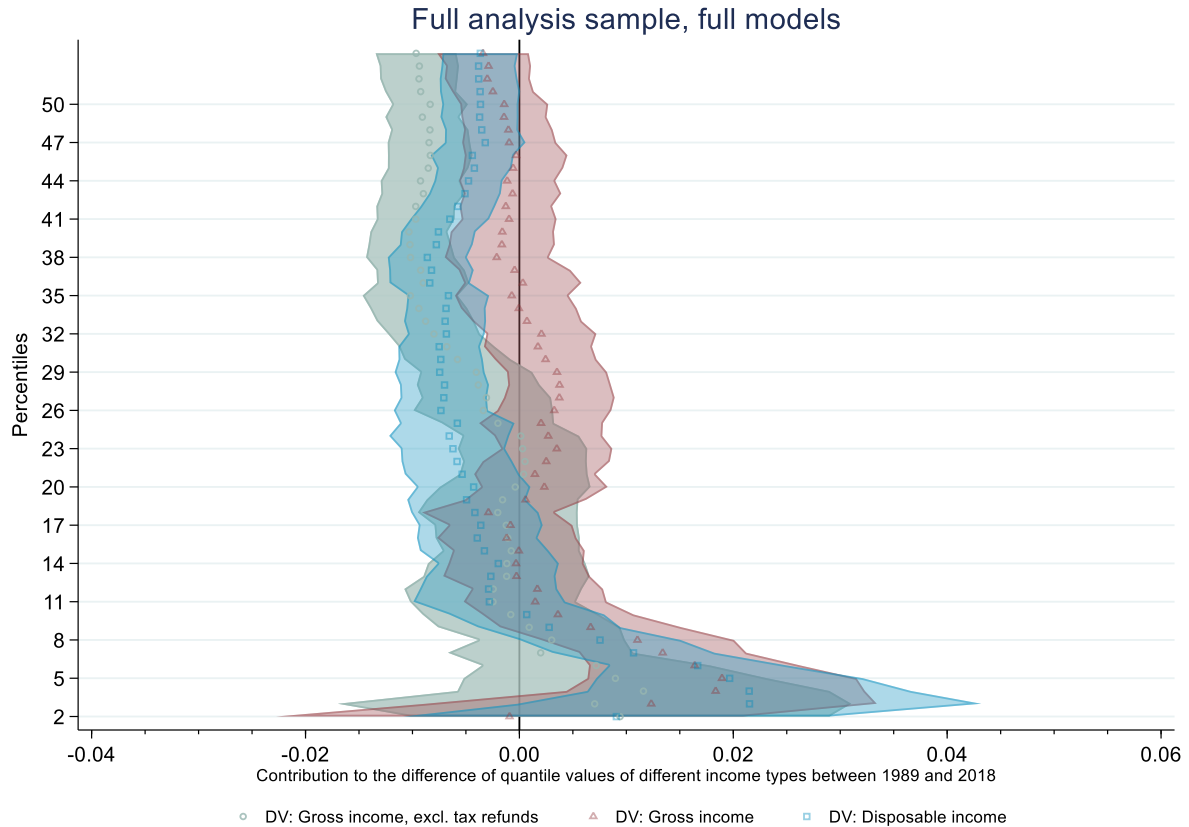


Figure 48: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of different income concepts (gross income, gross income excluding tax refunds, and disposable income).

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. The graph shows the coefficients for the main covariate of households with minimum wage earners of the full model specification including variables for redistribution (income tax, social security tax, and transfers), full analysis sample. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The lack of positive contributions in the lower income range for households' gross income excluding tax credits supports hypothesis H1b. I assumed that the inequality-reducing effect is more pronounced when income measures include tax refunds received as a source of income than for those that do not. However, I would maintain the null hypothesis for now, as the influence on inequality is not noticeably weaker compared to the other two income concepts, partly due to the negative effect at the median. These results also provide insights into the potential impact on the poverty rate. The official poverty measure (OPM) determines poverty based on households' gross income, not net income. According to the OPM, the poverty rate was 12.8% in 1989 and 11.8% in 2018. Since there is no positive contribution at the 12th or 13th percentile for any of the three income concepts, the results suggest that the poverty rate, as measured by the OPM, remains unaffected.

Figure 49 shows that the contribution of households with minimum wage earners to changing quantile values of households' total market and labor income is markedly larger compared to the previous results using the broader income concepts of households' gross or disposable income. What distinguishes these measures from households' gross income are all income

sources that are not market-based, such as various types of non-market-based pensions⁹², public transfers⁹³ or private transfers such as alimony payments, child support, or assistance from friends and relatives. Households' labor income is the sum of income from wages and salary of all household members. The results for these income concepts are based on model specifications that exclude variables related to redistribution, such as public transfers and households' tax liability. Additionally, these models are limited to households with positive market incomes, excluding around 7% of households.⁹⁴ When considering the distribution of labor income, the sample is limited to households with positive labor incomes, excluding households without income through salary, wages, and self-employment (approximately 21%).

For both the distribution of market and labor incomes, the contribution initially approaches zero at the 20th percentile and becomes negative from that point to the median. Similar to the broader income concepts, households with minimum wage workers contribute to positive changes in quantile values at the bottom of the distribution of market and labor incomes, with peaks at the 4th percentile. However, the coefficients for these income concepts are significantly larger than the coefficients for gross and disposable income, in particular with regard to the distribution of household market income. Starting from the bottom of the distribution, households with minimum wage earners increase their contribution from 5% to more than 13% at the 4th percentile. The positive contribution to changes in quantile values ranges between approximately 10% and 14% in the lowest income segments⁹⁵, and between 2% and 8% between 10th and 17th percentiles. The contributions to quantile values of household labor incomes range between 4% and 5% in the bottom of the distribution, and between 2% and 3% between 6th and 11th percentiles. The negative contributions are relatively stable at 2% between the 25th percentile and the median for households' market and labor income.

⁹² These include government retirement pensions, government survivor pensions, government disability pensions, without pensions from companies, unions, etc.

⁹³ These include government educational assistance, welfare, supplemental security income, income from veteran's benefits, housing subsidies, school lunch subsidies, food stamps, heating subsidies.

⁹⁴ The samples differ in that households without market income are excluded. These are mostly elderly, pensioners, and households living solely on transfers, with incomes from non-market-based pensions, public transfers, or private transfers. Thus, households relying solely on the public transfer system are excluded.

⁹⁵ I want to note that the lowest bottom of the income distribution of market income shows an extreme decline over time. The lowest 5 percentiles' values declined by more than 90%. The measure for market income is harmonized and includes the same income components in both years, so this is not the source of this drop. Also, the choice of the years for the comparison over time is not the source of the problem, as robustness checks with deviations in the start and end year lead to the same pattern. The data shows that it became increasingly common in the ASEC data to report very small amounts as income components, which led to an increasing number of observations with extremely low total incomes. It appears that this pattern becomes especially evident for the measure of market income, which must be based on the type of income components reported for this aggregate measure. The application of the RIF approach to a repeated cross-sectional setting is challenging for settings with extreme changes in the quantile values to be estimated. Because of this, I would like to interpret the relatively large estimates in this area with caution. However, when limiting this descriptive trend time in market incomes over time to the smaller subsample with positive labor income, there is no such extreme trend visible. Changes of percentile values for all income types and all analysis samples can be found in section B of the appendix.

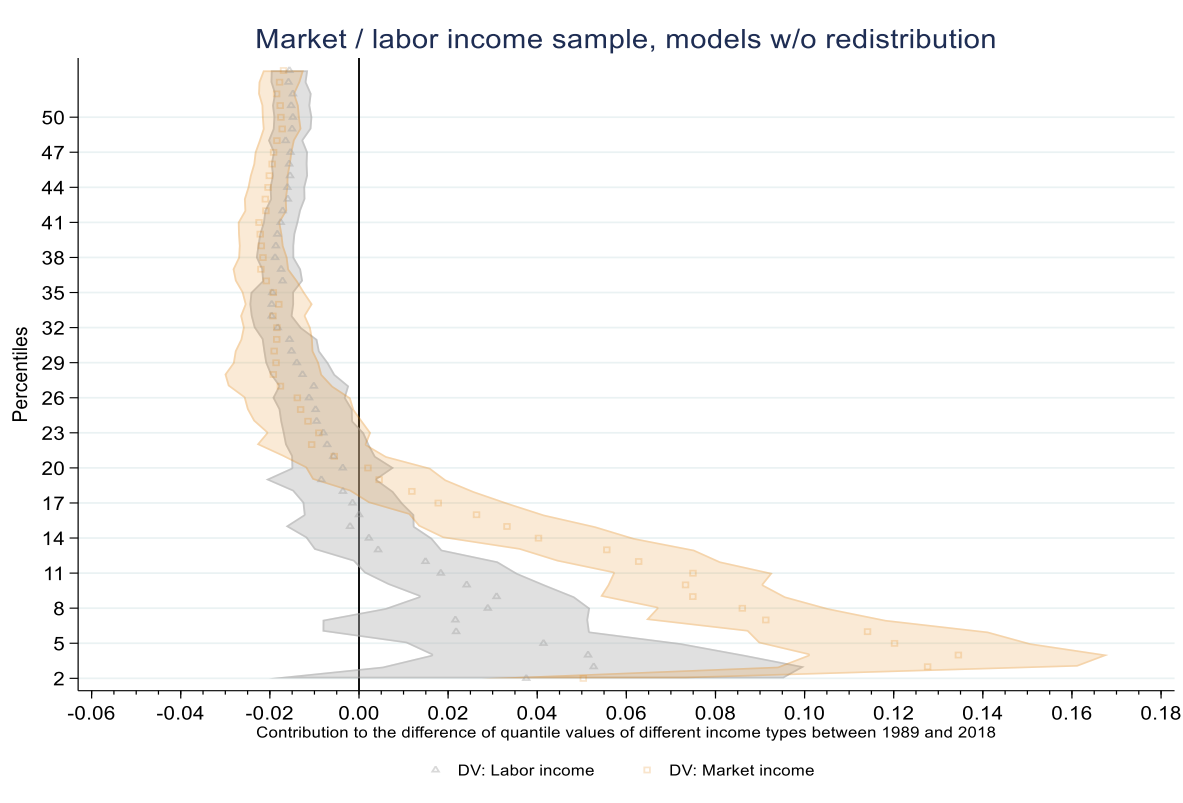


Figure 49: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of different income concepts (market income and labor income), for model specification excluding variables for redistribution (base model), full analysis sample for each income concept, i.e. market income sample and labor income sample. Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Contrary to this finding, which shows significantly stronger influences on the distribution of market income, I assumed that the relationship between minimum wage work and the distribution of labor income is the strongest. Since households without such income are systematically excluded when considering the distribution of labor income, the results in Figure 49 are not fully comparable. Figure 50 presents the results of the decomposition for the distribution of labor and market income, based on the same analysis sample including only households with positive labor incomes. It indicates that the differences observed between using the market income distribution and the labor income distribution as the outcome variable are due to the differing samples. The results for estimated changes in the distribution of market incomes now more closely resemble those for the distribution of labor incomes. Although the coefficients are smaller than those observed in the larger market income sample, they remain significant and positive at the bottom of the income distribution. Households with minimum wage earners contribute to increases in quantile values by 2% to 6% in the lowest 8 percentiles. In percentage terms, this is considerably less than the contribution to increases in the lowest percentiles by 8% to 13% when using the market income sample. Furthermore, the significant positive contributions reached further up in the distribution, up to the 20th percentile, when using the larger analysis sample. Among the population with labor income, the positive contributions are more concentrated at the lower end of the market income distribution. When the same analysis sample of the population with reported labor income is used, the percentage contribution of minimum wage households to the lower percentile values of both the market income distribution and the labor income distribution is ultimately similar.

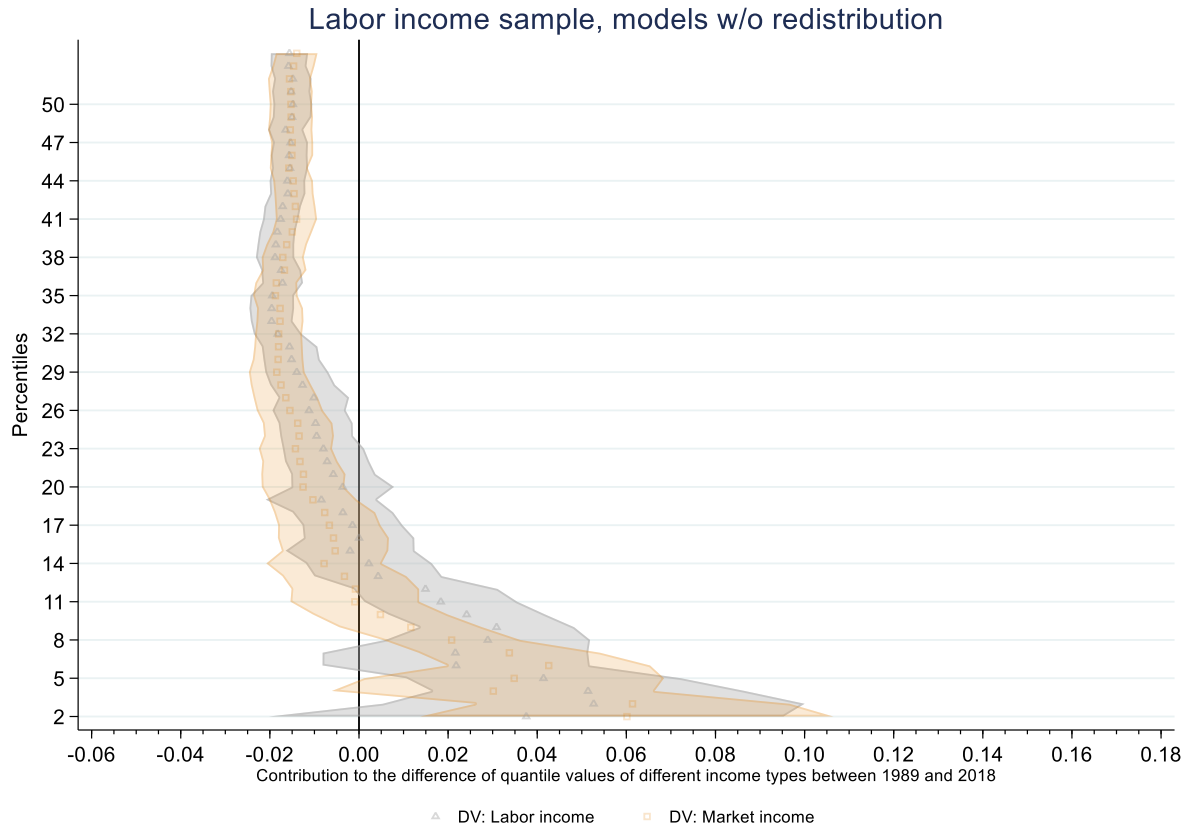


Figure 50: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of different income concepts (market income and labor income), for model specification excluding variables for redistribution (base model), labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

What distinguishes the samples from each other are households that do not have labor income but do have positive market incomes.⁹⁶ The number and variety of the different possible income sources suggest that the population that is included in this analysis sample, but not the labor income sample, can be quite diverse in terms of their socio-demographics. Households that are in the market income sample but not in the labor income sample are mostly elderly, with 92% of them categorized as pensioner households based on my definition of households' labor market (non-)activity. The remaining 8% of these households are identified as non-working households instead. This suggests that the markedly stronger results for the larger analyses sample may be rooted in the relative positioning of elderly and non-working households in the overall income distribution, who are not included when the broader market income sample is used. When they are included in the analyses, the *relative* improvement of households with minimum wage earners compared to households with higher-wage earners appears to play out more in the bottom of the income distribution, where also low-income elderly and low-income non-working households are located. Using the same sample for both outcome variables make

⁹⁶ Such incomes can be incomes from market-based pensions such as non-government retirement pensions, survivor pensions, disability pensions, retirement income from annuities, or income from worker's compensation. Other market income sources are unemployment benefits, interest, dividends, capital gains, income from rent, but also private transfers including income from child support or alimonies and other contributions from persons not living in the household. In the CPS-ASEC, market income also includes imputed return to home equity on owner-occupied housing (when available) and money not elsewhere classified.

them more easily comparable, also given that the overall trend in the distribution of the different income variables differs strongly when the different samples are used. When using the larger samples which also include groups without labor income, the lower percentiles declined strongly, whereas income among the population with labor incomes, incomes increased throughout the whole distribution. What remains is the finding that the percentage contribution of minimum wage households to lower percentile values is greater when the narrower concepts of market and labor income are used as outcome variables. It is plausible that this is due to the fact that these two outcome variables cancel out the system of redistribution as a whole.

For better comparability, the contribution of households with minimum wage earners to changes in the distribution of *gross* and *disposable* income is re-estimated for the limited samples. Figure 51 shows the results for the market income sample and the labor income sample for the broader income concepts using the full model specification to control for possible changes over time which systematically affect the broader outcome variables only. The coefficients for the distribution of disposable income in the lower middle are shifted slightly to the left, which is most notable for the smaller 79% subsample with positive labor income. The estimates reach lows of 1.6%, i.e. households with minimum wage earners contribute to a significant decline of 1.6% of quantile values between the 6th and 9th percentiles. However, contrarily, the smaller subsample with positive labor incomes is where the contributions to quantile values in the lower middle are higher and positive when regarding the distribution of gross household income. At the 20th percentile, households with minimum wage earners contributed to a significant increase in the quantile value by about 1%. The estimates in the very bottom of the distribution are very imprecise but point towards a positive contribution. Altogether, this means that when regarding households with at least one person in the labor market (proxied by positive labor income) and controlling for the changing impact of the tax and transfer systems, the impact of minimum wages appears to be the least favorable.

This suggests that the positive effects in the lower income range found for the distribution of disposable household income were at least partly rooted in the inclusion of households without income from labor in the analysis sample. The income situation of households with minimum wage earners regarding their net household income has improved compared to higher-wage earners (as this is the reference category) but this appears to play out only when viewing it as a population-level influence, considering the whole population, and not only households with income from work. The way in which households with no income from gainful employment are located in the income distribution add to the positive contributions found in the lower income ranges. These results also underline that the larger impact on the distribution of market and labor income (in percentage terms) cannot be explained by differing analysis samples.

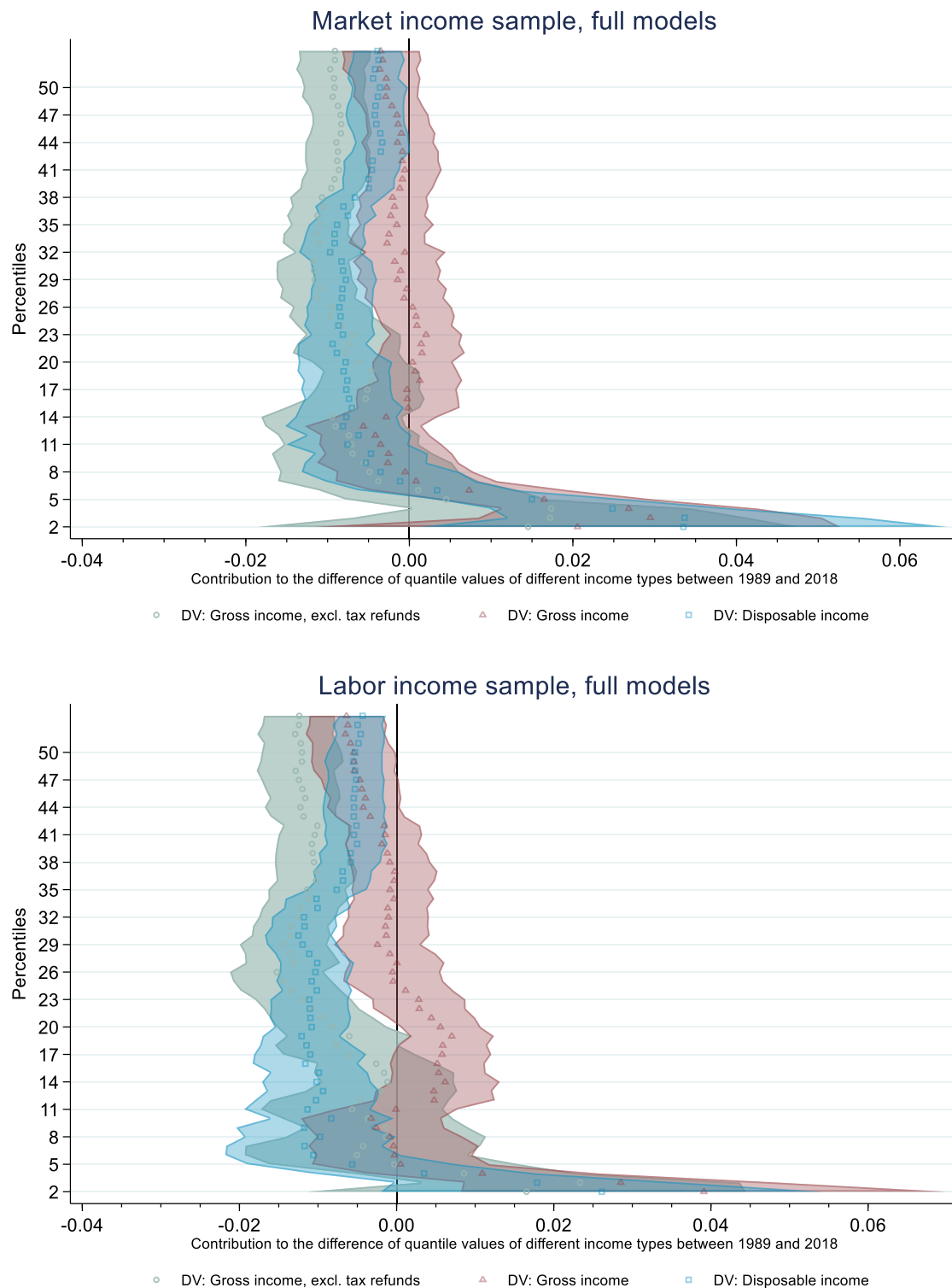


Figure 51: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of different income concepts (gross income, gross income excluding tax refunds, and disposable income), for model specification excluding variables for redistribution, market income sample and labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

in the base model (without variables for transfers and taxes) is estimated again based on more limited analyses samples to resemble the analysis samples of the estimations for the distribution of total market or labor income in households. The differences between the results of the limited samples (see section E of the appendix) and the full sample are overall negligible. The pattern of the coefficients along the income distribution remains largely unchanged. In the lowest percentiles, the contributions are now about 1 percentage point higher, with more than three% when the sample with positive market incomes is used, which is a 93% subsample of the full analysis sample that includes all households positive gross (and disposable) income. The coefficients in the lower middle for gross household income are shifted slightly to the left, i.e. the contributions are slightly more negative. However, the results become a bit less precise (in particular for the labor income sample, which is a 79% subsample), and the differences are overall not significant.

To sum up, when comparing different outcome variables, the notable differences lie in the effect sizes and the variation in income ranges in which households with minimum wage workers contributed to changes in percentile values. The contribution of households with minimum wage earners on changes in the distribution of households' labor and market incomes are larger than their contribution to changes in the distribution of the broader income concepts, namely the two measures for total gross income of households and the disposable income of households. Households with minimum wage workers at the lowest end of the income distribution are better off over time compared to households with higher-wage earners (controlling for education, labor force status, demographics, and region), which has led to increasing quantile values in the bottom of the income distribution. In the case of the distribution of market incomes, they have contributed with a 7 to 14% change in the bottom 10 percentiles (3 to 4.5% when using the limited analysis sample of households with positive labor incomes). The contributions to gross and disposable household incomes range between 1 and 3% in the bottom 10 percentiles. These differences in the size of the contribution are still observable when the analysis of changes in the distribution of gross and disposable household income are limited to the sample with positive market incomes or labor incomes. The strongest positive contribution of minimum wage households can be observed for household market income when looking at a fuller picture of the population and not just households integrated into the labor market: The improved income situation of minimum-wage households has contributed most strongly to lower percentile values - in percentage terms - when regarding the population with market incomes, which likely is a relatively heterogeneous group in the lower income strata, and not just low-income households in which at least one person reported income from employment.

The variation in the results for the different outcome variables reflect the interplay between minimum wage policy and the redistributive system, both regarding the system of public transfers and the tax system. When regarding the distribution of household market income, the results suggest that households with at least one minimum wage earner have experienced relatively higher income growth compared to households with higher-wage earners in the lower income range and have therefore contributed to a decline in market income inequality. This positive contribution disappears if the distribution of household gross income is used as an outcome variable instead, which also includes income from *transfers* as a source of income that is not part of households' market income. The positive influence of minimum wages therefore

appears to be canceled out by their interaction with income from public transfers. This confirms hypothesis H1a. I assumed that the inequality-decreasing impact is more pronounced for the distribution of narrower definitions of household income than for the distribution of households' gross or disposable income. I expected that this may be due to the unfavorable interaction with public transfers, which is supported by the analyses that additionally limit the analyses samples for the broader income concepts to make the results comparable.

The use of the broader outcome variable of disposable household income captures the interplay of minimum wage policy with the *tax system*. The difference between the results of the models estimating changes in the distribution of the basic measure of gross income and the distribution of the standard measure of gross household income which includes tax refunds as an income source captures the interaction with the system of tax refunds. The difference to the distribution of disposable household income finally captures the interaction with the overall tax system and the redistributive mechanisms of households' income tax and social security tax liability. I find small but positive significant effects for the distribution of households' disposable income as well as the comprehensive measure of households' gross income at the very bottom of the income distribution. When using the "simple" measure of households' gross income which excludes tax refunds as an income source, the results are not significant. This suggests that the positive effects of the minimum wage only arise through interaction with the progressive tax system when comprehensive income concepts (as opposed to households' market income) are considered, as these offset the unfavorable interaction effects with the "classic" system of public transfers. In particular, tax refunds appear to play a major role: The positive contributions at the lower end are just as visible here as with the fully comprehensive variable for households' disposable income. In addition, positive contributions can also be found here in slightly higher income brackets, which seem to arise in particular from households that benefit from tax credits and have no other tax obligations. This finding is in line with the arguments and empirical findings in the literature which highlight the interplay between minimum wage policy and tax policy such as the EITC.

However, positive contributions in the lower percentile range are not sufficient to affect income *inequality* in the lower half of the distribution for different income concepts. Changes in inequality depend on the changes in percentile values in the bottom area *relative to* changes in percentile values around the median. The inequality of disposable household incomes in the lower half of the income distribution technically declines when the lowest percentile values increase relatively more (by a higher percentage) than the value of the median. It remains unchanged when for example positive contributions in the bottom of the distribution are outweighed by negative contributions at the median. I find considerable differences in these patterns between the models estimating changes in the distribution of the different income concepts. The most favorable towards reducing inequality can be observed in the distribution of market incomes. The large positive contributions at the bottom (described above, between 7 and 14 percent) stand in contrast with a negative contribution of about 2% at the median. This means that the inequality of households' market income has declined over time due to the contribution of households with minimum wage earners to a considerable extent. The picture looks different for the models that estimate changes in the distribution of gross and disposable household incomes. The inequality-reducing effect is much smaller, as the positive contributions at the bottom of the income distribution are relatively small. Positive

contributions of minimum wage households can be observed only for the distribution of disposable household income and gross household income including tax refunds. The ratio between the median and the lowest percentiles declines for all three outcome variables due to the negative contributions around the median for the simple measure of gross income. Overall, the inequality-reducing effect is small, but visible for all three measures and all samples.

Different impacts of minimum wage policy on different outcome variables can be rooted in two different factors: In one scenario, increasing minimum wages translate more directly into higher household labor or market incomes, whereas their impact on total gross household income of households may be confounded due to public transfers as an additional income source that comes into play. Following this argument, increasing minimum wages may only lead to changes in the distribution of the narrower income concept over time. However, another scenario would be that the impacts of other income sources that distinguish market income from gross income (or net income), most importantly public transfers (and tax liability), have changed over time. Up to this point, I controlled for such changes, since they would systematically affect only the broader income concepts. Thus, the varying results between the different outcomes reflect the contribution of minimum wage households assuming that, when regarding the broader income concepts, nothing would have changed in the transfer and tax systems. This ensures that the found differences do not arise because certain policies changed which systematically had an influence on the broader income concepts only.

I will discuss the interplay of minimum wage receipt and changes in the system of public transfers and taxes over time in detail in the next section. Changes in the systems of public transfers and taxes will interfere with the impact of the minimum wage if they are not included in the model specification, i.e. when omitting them from the estimations.⁹⁷ Estimations of the contribution of minimum wage households using different model specifications will include control variables for the impact of the transfer and tax systems over time stepwise.

10.3. The interplay of changes in minimum wage policy and the systems of public transfers and taxes over time

The comparison of results using different income concepts has shown that the inclusion of additional income sources in the dependent variable alters how minimum wages translate into changes in their distribution. For example, the comparison of the two alternative measures for gross household income showed that households with minimum wage earners have only had a significant contribution to changes in the distribution of gross household income when their measurement includes tax refunds as an additional income source, whereas the results are not significant when using the “traditional” measurement of gross incomes as the explained variable.

In what follows, I will build on the above discussed results and elaborate on the interplay of changes in minimum wage policy and changes in the systems of public transfers and taxes over time. A comparison between the results for different income concepts suggested that minimum wages translate much less into changes in households’ gross and disposable income, likely due

⁹⁷ Technically, they are part of the residual when omitted, which is why their impact, respectively the change in their impact over time, is not unobserved and can interfere with the changing impact of minimum wage policy.

to interactions with the transfer and tax systems. In the above section, I used model specifications which included control variables for public transfers, tax refunds and tax liability, since changes over time would systematically affect only the broader income concepts. However, the system of redistribution has changed, and it may be possible that these changes have led to a stronger or weaker possible contribution of minimum wage households on the distribution of gross or disposable household income.

In this section, I will compare results obtained from estimations based on different model specifications, which allows for a stepwise inclusion of the impact of changes in the system of public transfers and the impact of changes in the systems of income taxation and social security taxation when estimating changes in the distribution of households' total gross or net income. This approach aims to examine whether changes in the public transfer or tax system have supported the impact of minimum wage policy on inequality. Models that omit these factors let changes in the redistributive system interfere with changes in minimum wage policy, whereas model specifications that include them control for the impact of changes in public redistribution and allows the estimation of the contribution of minimum wage households free from their correlation with the changed tax and transfer system.

In analyzing the minimum wage's impact on the distribution of gross or net household incomes, I use different model specifications: the "less specified" models omit the variables that capture the contribution of households with varying transfer receipt and tax liability to changes in the income distribution and therefore allow them to interfere with the impact of the minimum wage as part of the residual. Other model specifications include these factors to control for the impact of changes in the redistributive system. When included, variables on the share of transfers in total household income or the amount of paid taxes as a share of total household income create counterfactual scenarios. In these models, the contribution of minimum wage households to quantile value changes is free from the influence of changes in the income situation of households targeted by tax and transfer policies. Thus, the way changes in the redistributive system have affected the income distribution is separated from the impact of households with minimum wage earners on changes in quantile values. This is important because minimum wage households may be affected not only by minimum wage policy but also, for example, by changes in income tax policy such as the increasingly generous system of tax credits and refunds. The coefficients for the income structure effects therefore refer to the estimation of how much a respective quantile value would have changed if everything else had remained constant and only the income situation of households with minimum wage earners had changed. In another model specification, I include interaction effects between the minimum wage receipt of households and their tax liability, because the literature suggests that the expanded system of (refundable) tax credits may interact with rising minimum wages in a particularly beneficial way for low-income households.

The previously shown results do not only differ with regard to the used income concept as a dependent variable and the used analysis samples, but also in terms of the used model specifications. For a better understanding of the difference between the results for the broad income concepts and the results for the distribution of market and labor income, I first discuss the results for gross and disposable household income based on alternative model specifications, which omit the variables for households' tax liability, received tax refunds, and received public transfers.

Figure 52 shows the results for different income concepts used as dependent variables side by side for 1) the base model specification that disregards changes in redistribution (upper left, excluding households' transfer receipt and households' income tax and social security tax liability), 2) the model specification that includes households' transfer receipt but excludes all variables on households' tax liability and received tax refunds (upper right), 3) the model specification that includes variables on transfer receipt and the dummy variable on the receipt of tax refunds (bottom left), and 4) the full model specification (bottom right). This illustration shows that the contribution of minimum wage households on the distribution of the different income concepts varies only slightly when the specifications without variables for households' transfer income and without their tax liability is used (top left), or when the models include variables on households' transfer income only (top right).

I will first discuss the results for the same base model that underlies the results for changes in the distribution of households' market (or labor) income (shown in the previous section). This model omits the covariates for the receipt of public transfers and the covariates for households' income tax and social security tax liability. For all three measures, the contributions of households with minimum wage workers peak around the 5th percentile. The positive contributions to quantile values in the lower income segments diminish to zero for the distribution of disposable household income (in blue) and gross household income excluding tax refunds (in green) around the 10th to 15th percentiles, whereas the contributions approach zero at the 30th percentile and turns negative only above that point for the distribution of gross household income including tax refunds (in red). Above that point, the negative contributions are of the same size for all three measures, ranging between 0.5 and 1%. Due to these negative contributions in combination with the positive ones around the 10th percentile for all three income concepts, the 50/10 percentile ratio increases slightly for each. In general, based on the base model specification, the results for the distribution of disposable household income and those for the distribution of gross household income become more alike. The results for changes in the distribution of gross income excluding tax refunds are not significantly different from zero in the lower income range, which clearly distinguishes this result from the other two income concepts. Altogether, these results largely resemble the results based on the full models that include the receipt of public transfers for the estimation of contributions to changes in gross household income, and additionally the tax liability of households for the estimation of contributions to changes in disposable household income. One exception is that the contribution to quantile values approaches zero for the distribution of disposable household income towards the median in the full model specification, whereas this is not the case in the models that do not control for changes in the impact of public transfers and tax liability. The large difference between the results for these three broader income concepts and the results for labor or market income are therefore not rooted in *changes* of the tax and transfer system. Still, these model specifications only control for *changes* in the contribution of households with varying amounts of received social transfers and different tax liabilities, assuming a counterfactual scenario in which their contribution has not changed between 1989 and 2018. They do not disregard their impact in general, which means that their unfavorable interplay with higher minimum wages may still be a factor behind the differences in the results for different income concepts.

When including the dummy on received tax refunds for the estimations for the two broader income concepts which include tax refunds as an income source, the results for the different

income concepts differ more. The coefficients for the two broader income concepts are shifted slightly to the right compared to the results for changes in the distribution of the measure of gross household income which excludes tax refunds (in green, bottom left). When using the full specification including variables on households' tax liability (possible only for the distribution of disposable household income, since it is the only income concept that are inclusive of tax liability), the results for the distribution of disposable income changes again, particularly in the lower middle. It appears that overall, some of the variation in results patterns stems from the different model specifications that can be used for the different dependent variables. Overall, the differences do not depend strongly on the chosen model specification, not even for the estimation of disposable household income which allows for all four different specifications.

When using model specifications without variables for households' transfer receipt, tax refunds and tax liability, I find negative contributions around the median in contrast to positive contributions in the bottom, which means that in sum, inequality between the lowest percentiles and the median is reduced.

It appears that changes in the transfer system have not altered the way in which households with minimum wage earners contributed to inequality in gross or disposable household income. Changes in the system of tax refunds led to less favorable situation above the 30th percentile but did not affect low-income households. This is evident as controlling for these changes shifts the coefficients above the 30th percentile to the right. Changes in households' tax liability (e.g., due to changes in the tax credit system or lower marginal tax rates) seem to have led to a more favorable pattern in the lower middle. When controlling for these changes, the contributions in this income area are negative, which is not the case when omitting those variables. The results partly confirm hypothesis H2. I hypothesized that the contribution of households with minimum wage earners to lower percentile values is more positive when considered in the setting of the changed income tax system than when these changes are controlled for. The support of this hypothesis is however limited, as this does not hold for the lowest percentiles. When controlling for changes in the tax system altogether, i.e. including the tax liability of households in the model specification, the contribution of households with minimum wage earners is indeed less positive, mostly around the 35th percentile. In the lower income range, this is not the case, so I would maintain the null hypothesis for now.

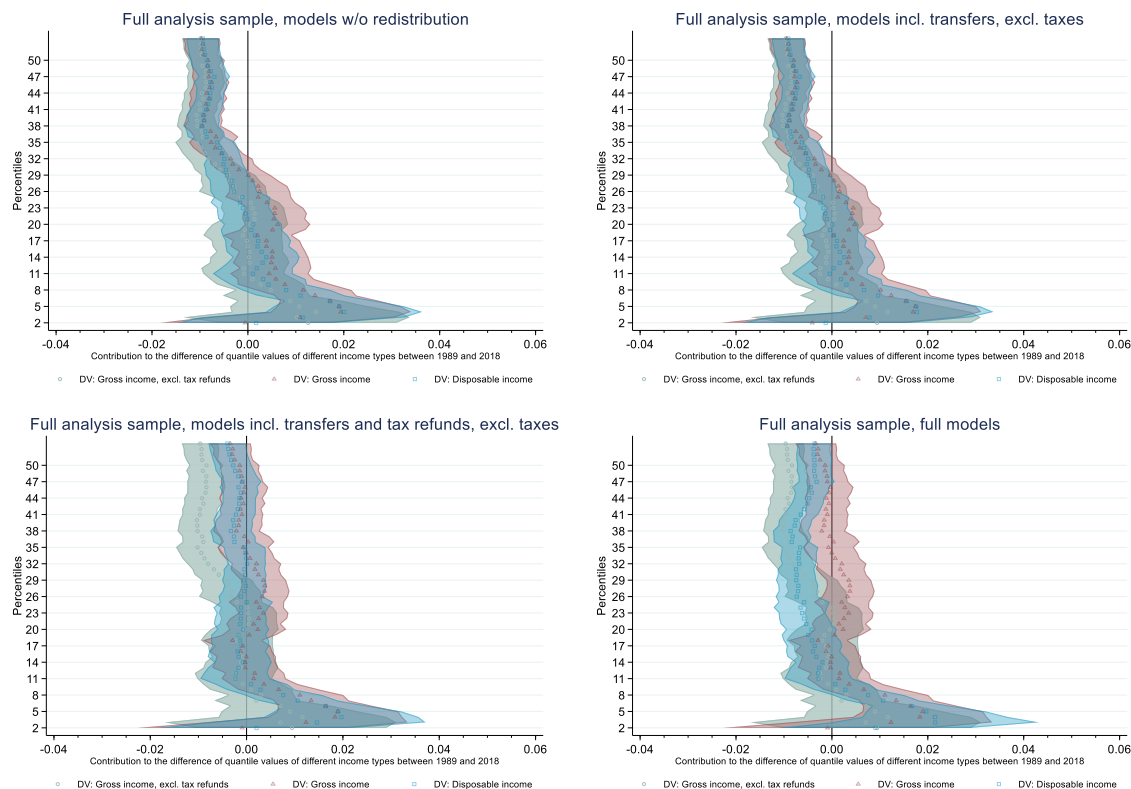


Figure 52: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of gross and disposable income, for different model specifications, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The same estimations based on the more limited market income sample yield very similar results (see section F of the appendix). When limiting the sample to households with positive labor income (Figure 53), the comparison among model specifications suggests that changes in the tax system improved the situation for households with minimum wage workers compared to households with higher-wage earners. Controlling for such changes in the full model specification yields the results that speak for the least favorable situation. For this analysis sample, the results more strongly support hypothesis H2. For the population that is integrated in the labor force (proxied by income from labor), the changes in the tax system between 1989 and 2018 have been particularly important to let them benefit from minimum wage increases. These results should however not be compared to the results based on the full sample, as they represent another population on which the impact is estimated on. The most vulnerable in society are not included in this sample, and thus especially the bottom of the distribution may be composed of another group of households, whereas households without any income from labor are not included and thus not represented in this picture of the distribution.

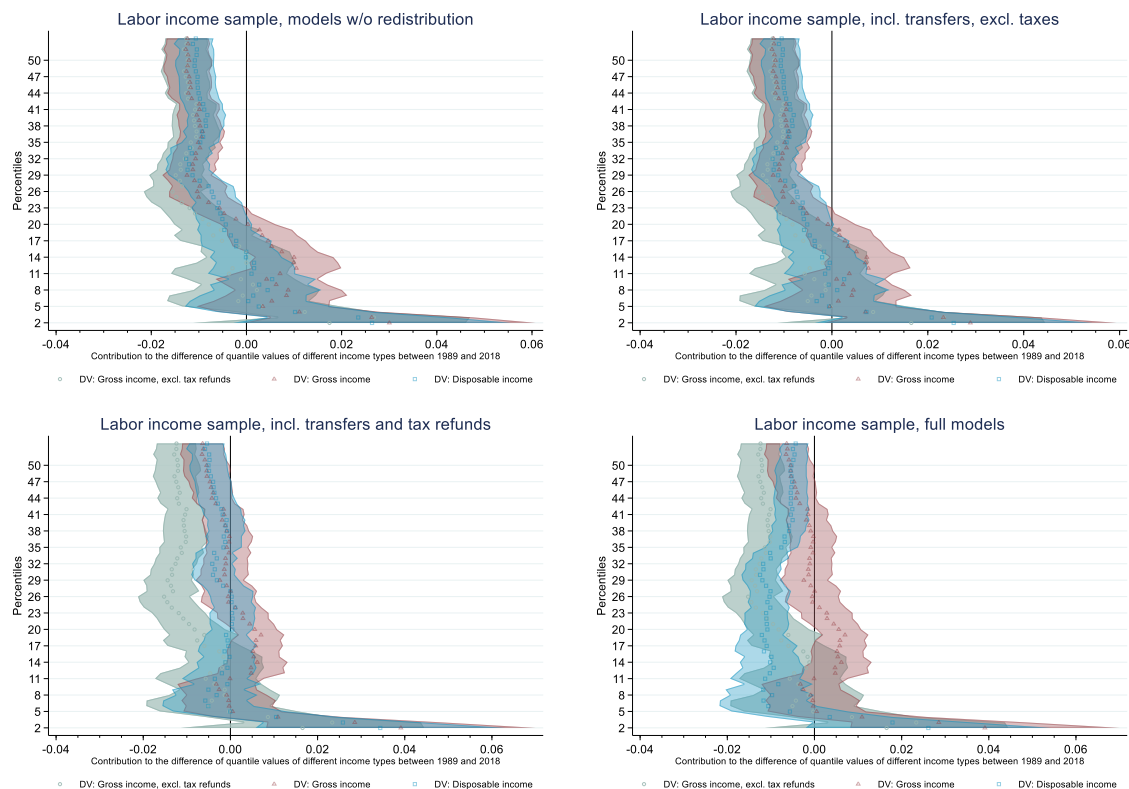


Figure 53: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of gross and disposable income, for different model specifications, labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

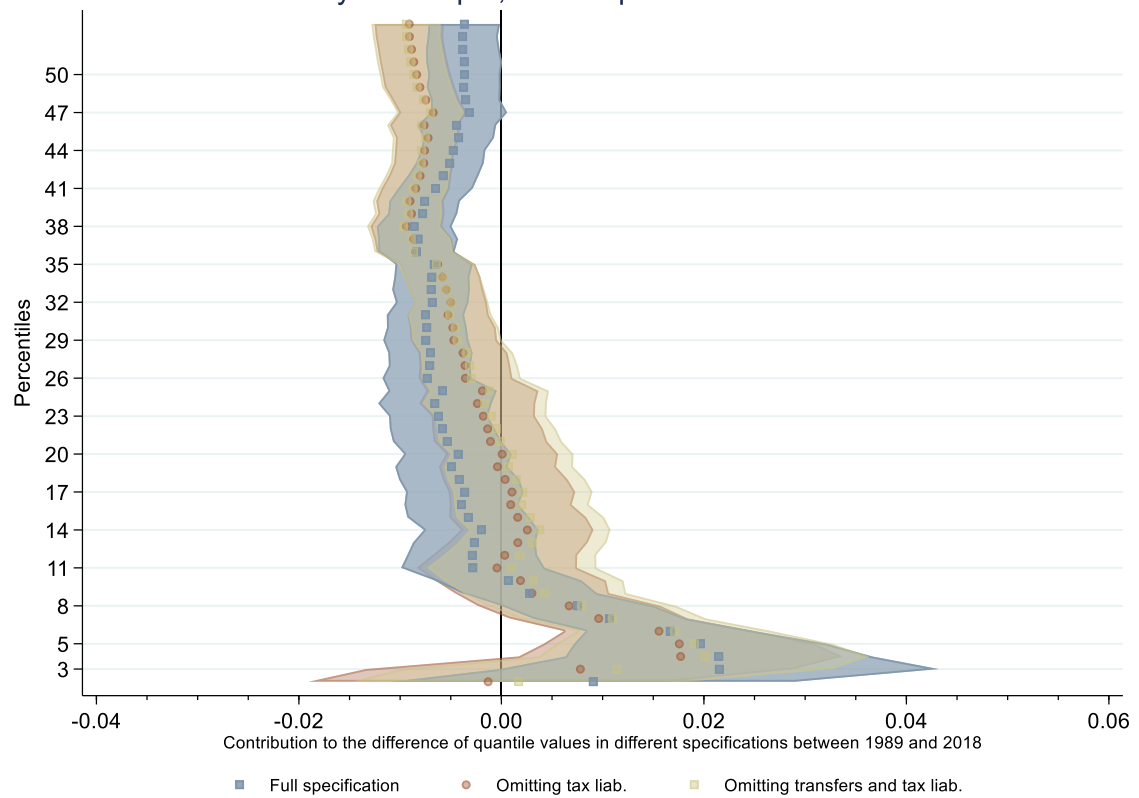
In what follows, I will present the results for the different model specifications side-by-side and focus on them, rather than on the differences between the income concepts used as dependent variables.

Figure 54 shows the results of the decomposition analysis for the distribution of disposable household income using four different model specifications. It includes the main result on the contribution of households with minimum wage earners to changes in the distribution of disposable household income using the full model specification which includes the variables for households' transfer receipt and tax liability (shown in blue). In addition, the top panel shows the coefficients for two less specified model specifications. The base specification includes households' socio-demographics (i.e. households' educational composition, labor force composition, family status, demographics, and their census region), but omits variables for households' tax liability and transfer income (in light green). This model specification disregards impacts of changes in the redistributive system over time altogether. The third model specification includes households' transfer income, but omits households' tax liability (in orange), and therefore controls for changes in the public transfer system, but not the tax system.

The results based on the two less specified model specifications are almost identical. They also differ slightly from the results for the full specification. The positive contribution of households with minimum wage earners to percentile values in the lower end of the distribution largely persists when the impact of changes in the tax system and the public transfer system is omitted

from the full model specification (top panel, comparing the full specification, in blue, with the other two specifications, in orange and light green). Starting from the 11th percentile, the results slightly diverge from the results using the full specification, where the less specified models do not show negative contributions of minimum wage households. This changes from the 37th percentile upwards, where the contribution of households with minimum wage earners to quantile values is negative and significant for the model specifications without variables for taxes and transfers. Because the estimated contributions are negative at the median, inequality between the lowest bottom of the distribution and the median declines. This appears plausible as households around the median of the distribution of disposable household incomes may benefit in particular from the growing generosity of the income tax system and its tax credit systems reaching up higher into the income distribution (but at the same time, requiring sufficiently high earned income, likely from employment at higher hourly wages).

Full analysis sample, DV: Disposable household income



Full analysis sample, DV: Disposable household income

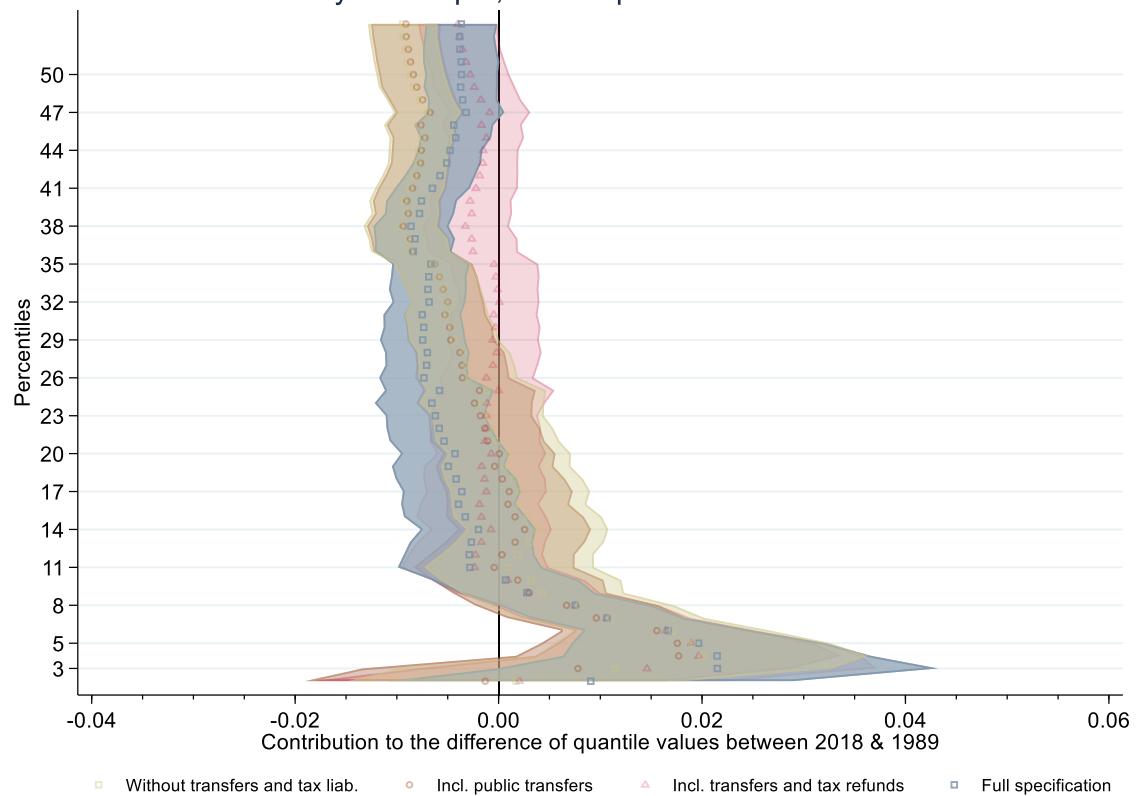


Figure 54: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of total net household income, for different model specifications (full specification and less specified models), full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications. The three model specifications in the top panel are shown again in the lower panel (keeping the color labeling). Labels in the legend are presented in reverse order (and slightly different label names) to ease interpretation starting at the base model without transfers and tax liabilities of households to the full specification with a stepwise inclusion of covariates. Labels are chosen according to gradually omitting of variables starting from the full model specification, or gradually including variables starting from the base model without variables on redistributive impacts. Thus, "Without transfers and tax liab." equals "Omitting transfers and tax. liab.", "Incl. public transfers" equals "Omitting tax liability". IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

As an in-between step, the lower panel shows the results for the model specification that omits the variables on households' tax liability, except for the dummy that indicates if a household receives tax refunds (shown in red). This specification was used in the previous section when estimating changes in the distribution of gross household income to control for the possible impact of tax refunds, as these are included in this income concept. This scenario is a counterfactual: it controls for changes through the receipt of tax refunds, but not for changes through households' income tax or social security tax liability. This allows to interpret the contribution of minimum wage households as if the transfer system – including the income support through tax refunds – would not have changed over time. This specification is consistent with the idea that tax refunds act as a form of public income support, so in this scenario the effects of the changing transfer system and those of tax refunds are controlled for together.

The inclusion of households' transfer receipt (in orange) makes essentially no difference compared to the results based on model specifications that disregard changes in redistribution as a whole (specifications without households' transfer receipt and tax liability, in light green, overlapping with the orange area). This means that the stand-alone change in social benefits did not affect the potential of the minimum wage to influence the income distribution. When additionally controlling for the receipt of tax refunds as an additional channel of public assistance (in red), the results change slightly, with visible differences between the 30th and the 50th percentiles. The negative contribution of households with minimum wage earners vanishes, which underlines that changes in tax refunds led to a situation in which households with minimum wage earners did not contribute to declines in percentiles as they would if the system of tax refunds had not changed. The change in the results from the model specification with the dummy for tax refunds to the full model specification is based on the additional control of changes in the income tax system. Figure 55 additionally shows the results based on a model specification used as a robustness check which includes only the variables for the income tax liability of households in addition to the dummy for tax refunds, but not the variables for the social security tax liability. These results are almost identical (grey and blue), which indicates that it is in fact the changes in the income tax system which were beneficial for the lower middle income strata between the 20th and 40th percentiles.

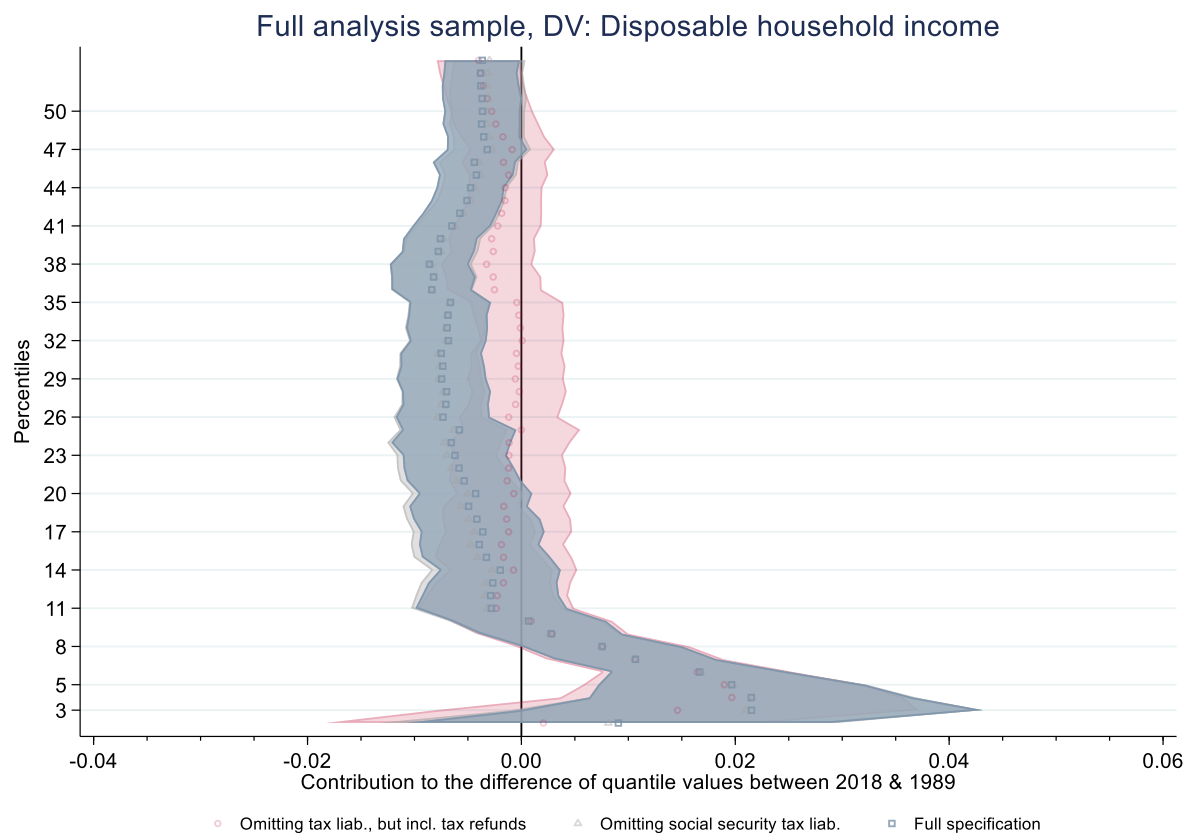


Figure 55: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income, for different model specifications (full specification including transfers and tax liability, model specification omitting tax liability but including tax refunds, model specification omitting social security tax liability but including income tax liability as well as tax refunds), full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Figure 56 shows the results of different model specifications for the estimation of changes in the distribution of my standard measure for households' gross income, based on the full analysis sample. The measurement of gross household income includes the sum of tax refunds households receive after the tax year, which serve as an additional income source and function as a cash transfer for working families. The figure shows the results on basis of the base specification with households' socio-demographics, the specification which additionally includes variables on households' transfer income, and the most strongly specified specification for this dependent variable which additionally includes the dummy variable that indicates the receipt of tax refunds. The inclusion of households' transfer receipt (orange hollow dots) makes essentially no difference to the model specification that disregards changes in redistribution overall (specifications without households' transfer receipt and tax liability, in yellow hollow squares). The models in which I additionally control for the receipt of tax refunds (red triangles), the results in the lowest area of the distribution stay the same and estimates between the 30th and 50th percentiles are around 0.8 percentage points larger, similar to the found model differences for estimations of changes in the distribution of disposable household income (see Figure 54). The differences among model specifications are very similar to the found differences between these three model specifications when estimating changes in the distribution of *disposable* income.

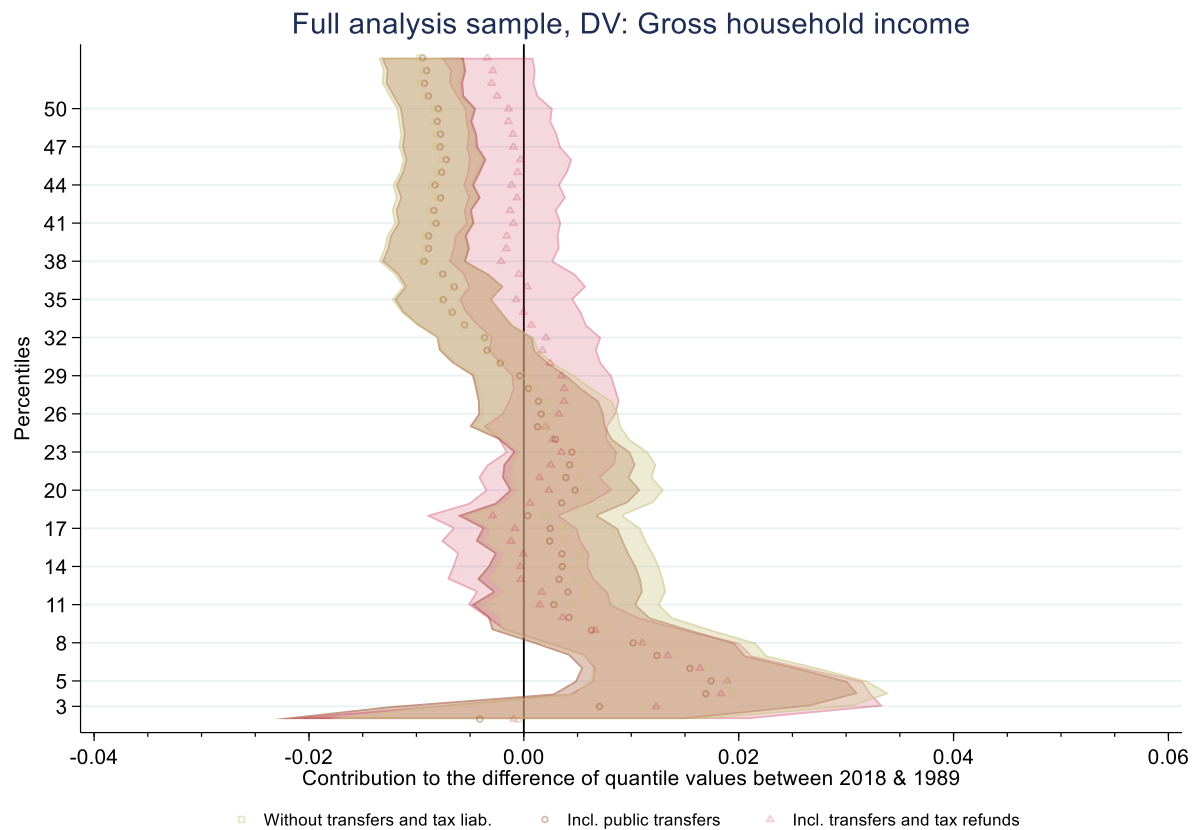


Figure 56: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of total gross household income, for different model specifications (without transfers and tax liability, including public transfers, and including public transfers and refunds), full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The picture changes when estimating changes over time in the alternative measure for gross household income which excludes tax refunds as an income source (see Figure 57). Estimates for the contribution to changes in percentile values above the 10th percentile resemble the previous results, but the estimates below that are smaller and less precise, meaning that no significant positive contributions can be observed for this income concept used to study income inequality. Still, as the contributions around the median are negative, inequality between the median and the lower end declines slightly.

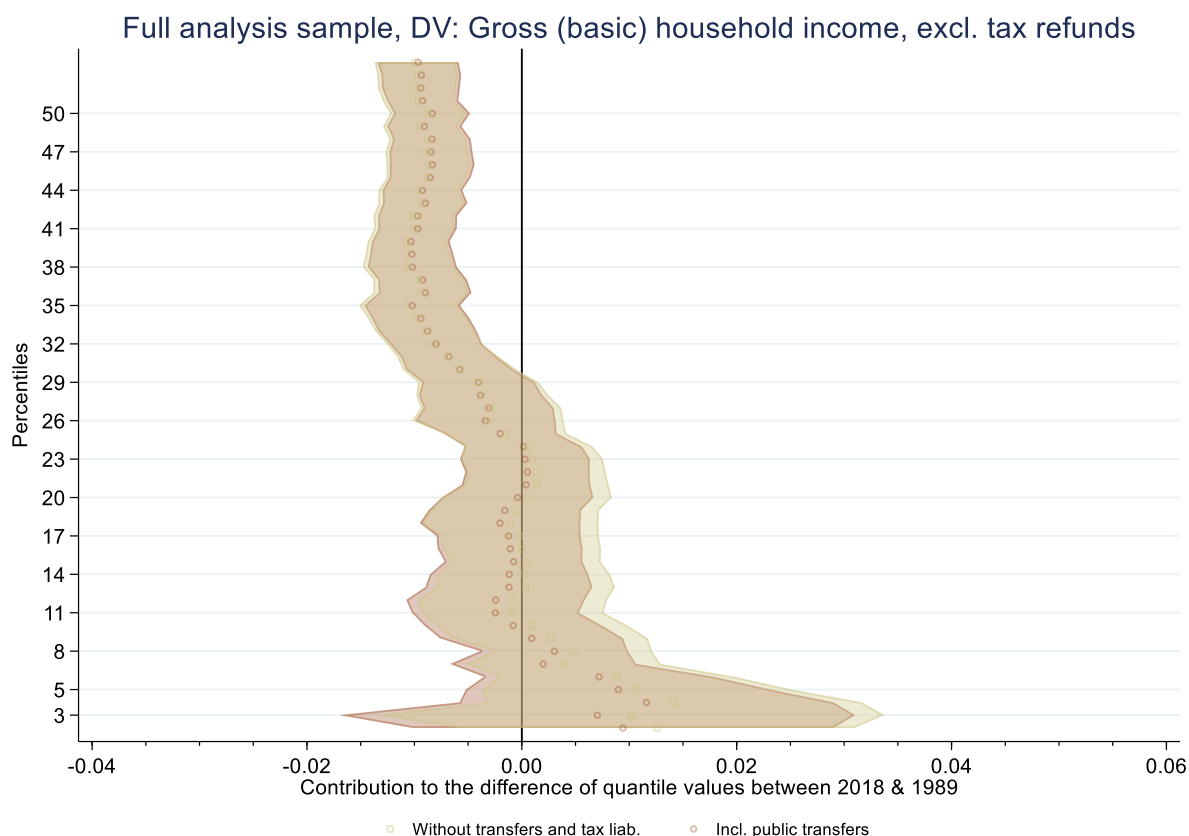


Figure 57: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of total gross household income, for different model specifications (without transfers and tax liability, including public transfers), full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Figure 58 presents the same set of results for a limited analysis sample that only includes households with positive market incomes. It shows the coefficients for households with minimum wage earners from estimations based on the four different specifications using disposable household income as dependent variable, three different model specifications using gross household income as dependent variable, and two different model specifications using the narrower definition of gross household income, excluding the additional income source of households through lump-sum tax refunds. The result patterns are quite similar when limiting the sample to the population with positive labor incomes. In the lowest bottom, the coefficients are somewhat larger, but also less precise and more strongly concentrated in the bottom 5% of the population with positive market income. This appears plausible as it is likely that the slightly smaller sample excludes the most vulnerable in society without any sort of market-based income. By this, the positive contributions diminish at a lower starting point in the distribution. This is the case for all three income concepts used as a dependent variable (top, middle, and bottom panel). The coefficients for the basic gross household income measure used as a dependent variable (bottom panel) are shifted to the left by one percentage point compared to the results based on the full sample. This illustrates that the switch from the full analysis sample to the market income sample makes only a limited difference regarding the extent to which the model specification plays a role for the results among the broad income concepts of gross and

disposable household income. In both cases, the changes in the transfer and tax system led to a situation with a stronger inequality-reducing contribution through minimum wages. This is reflected by more limited inequality-reducing contributions when such changes are controlled for in the full specification. Until this point, the largest difference in results until this point was due to the difference between these broad income concepts and the narrower ones – the distribution of households' market income and labor income.

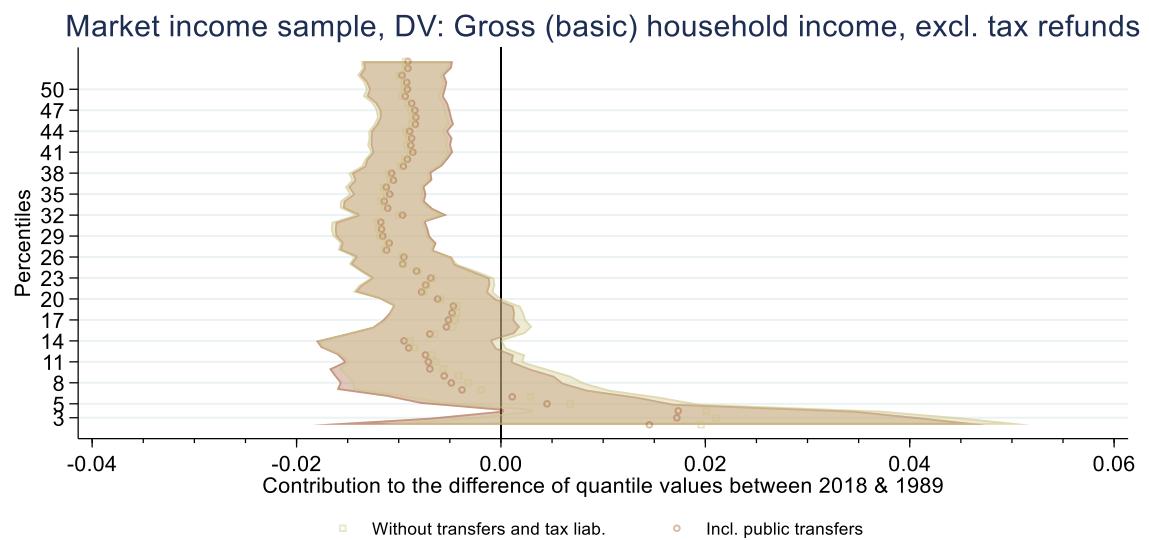
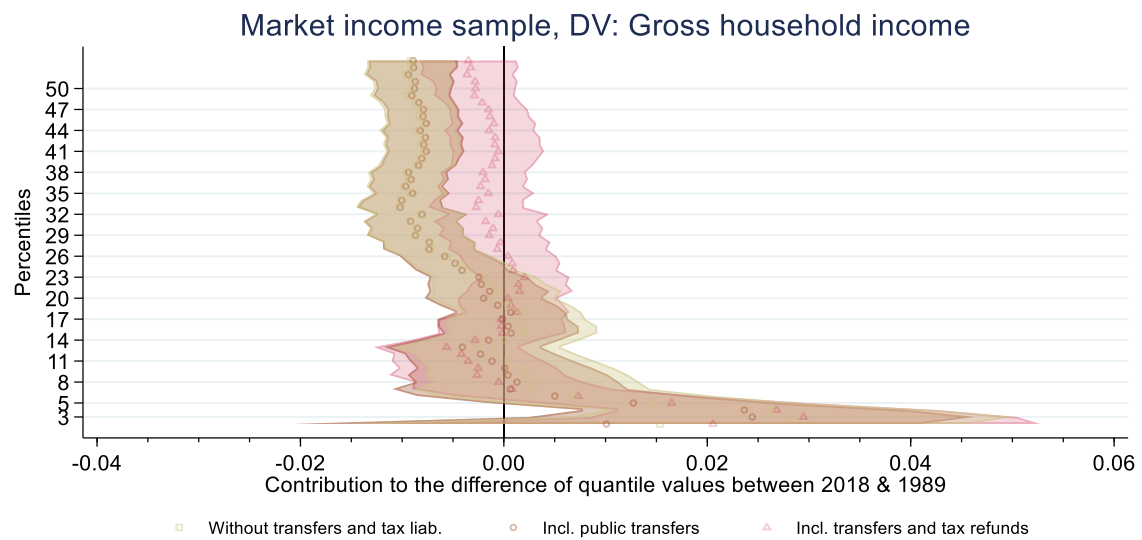
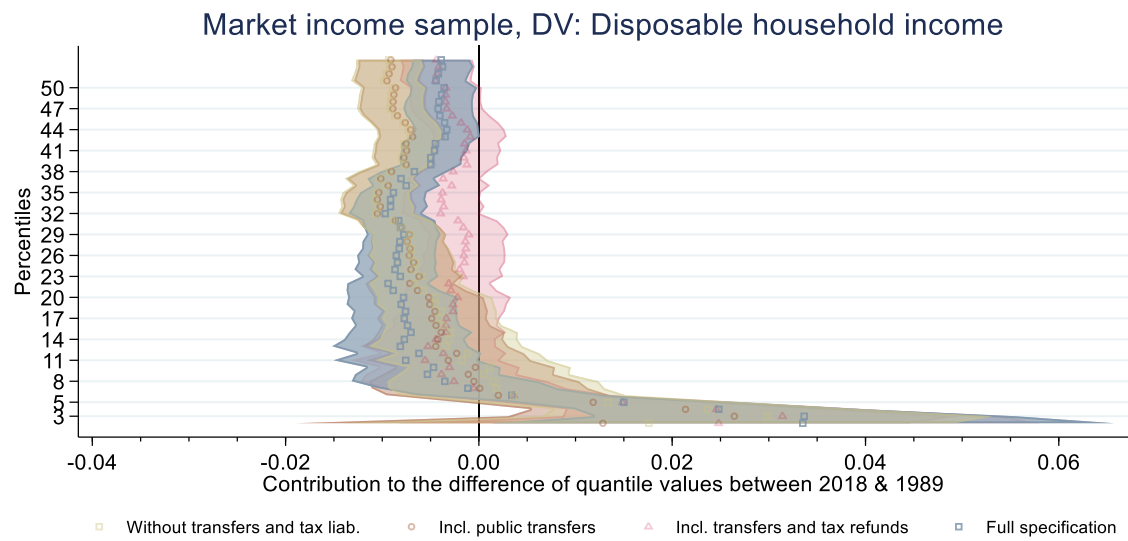


Figure 58: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications (full specification and less specified models), market income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Compared to the results based on the full analysis sample and the sample with positive market income, different model specifications result in a larger variation in coefficients when studying the distribution of disposable household income and limiting the analysis sample to the sample with positive labor income (Figure 59). However, this is mostly based on the results using the full specification. Starting from the 6th percentile upwards, households with minimum wage earners contributed to declines of more than 1% in percentile values. The coefficients below that are not significantly different from zero, and no positive contributions can be observed here. Except for the specification including transfers and tax refunds (in red), all results are shifted very slightly to the left. Thus, the chosen model specification appears to matter most in this case and between the 10th and 30th percentiles.

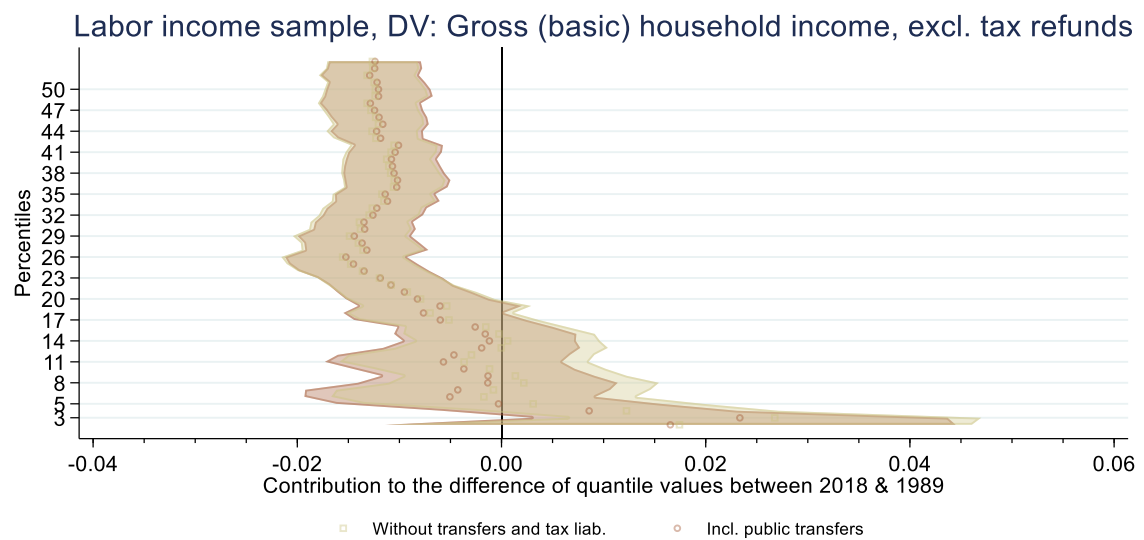
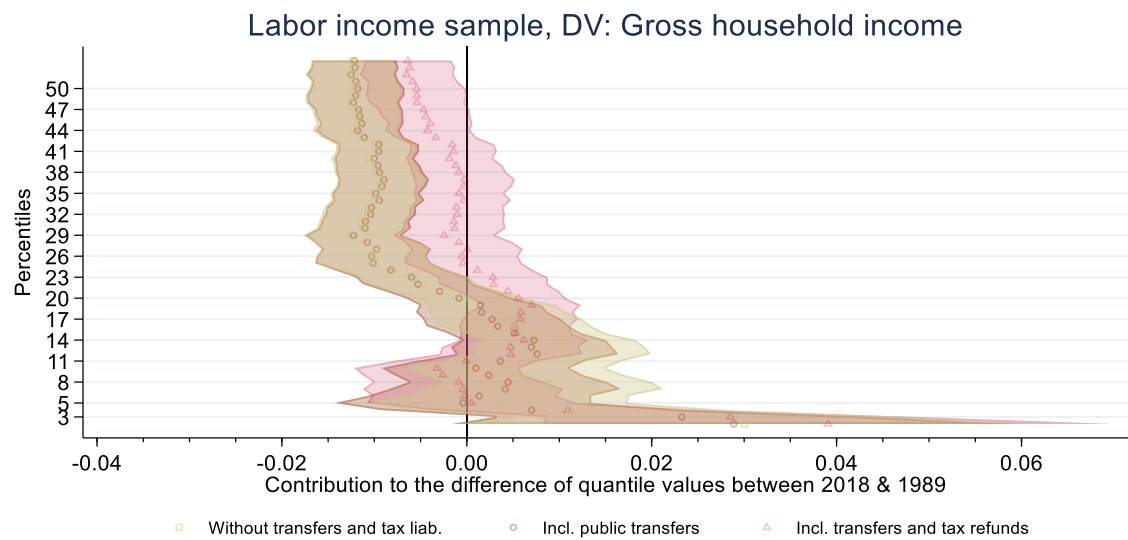
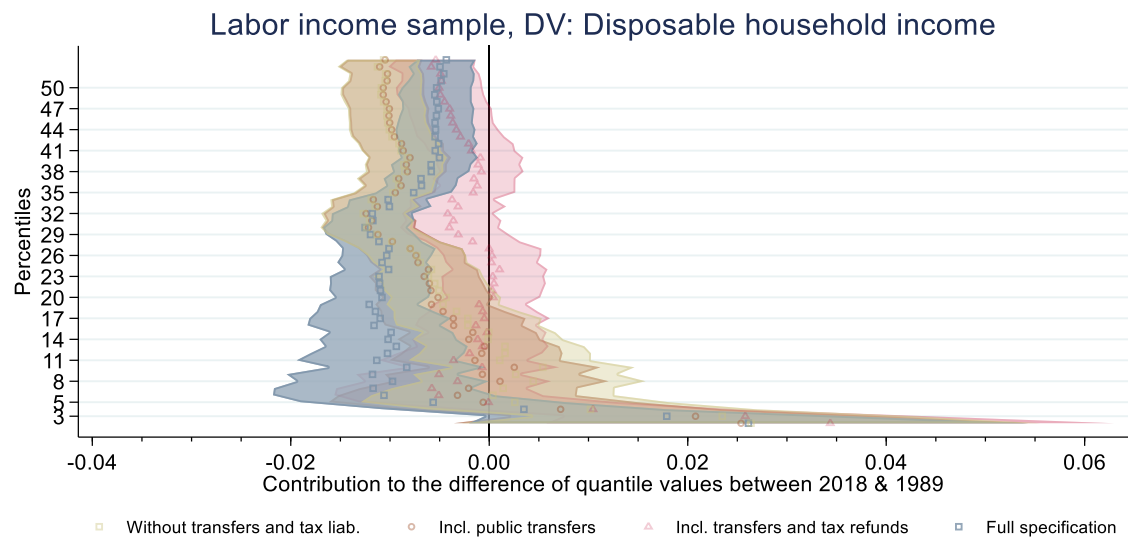


Figure 59: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications (full specification and less specified models), labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Thus, when the sample is restricted to households with positive labor income, the positive contributions in the first decile can no longer be found. The reference group to which the coefficients refer is clearly defined as households with higher-wage earners and is not affected by the restriction of the sample. Thus, the differences in results by the chosen analysis sample can only be explained by the exclusion of households without earned income, which leads to another overall distribution with another overall composition. A different distribution or total population, on which the contributions are now estimated, means that minimum wage households in particular have no such advantage as before compared to higher wage households in the lower income range of this altered total distribution. This is also reinforced by the results of robustness checks using normalized coefficients (Yun 2005).⁹⁸ Instead of the coefficients for households with minimum wage earners now referring to the reference group of households with higher-wage earners, they are based on the deviation from the "grand mean", i.e. the development of all other households besides households with minimum wage earners. In this case, this is the sum of households with higher-wage earners and inactive households with no one in employment. The results of the robustness checks (see section I of the appendix) show that compared to this grand mean, households with minimum wage earners contribute significantly more to rising percentile values in the lower income range, but only if the larger analysis samples are used. The fact that the contributions in the larger samples are significantly more positive shows that this income range is composed also by households without labor income who are then excluded when the analysis sample is restricted. This explains the initial differences between the results based on the different samples. At the 2nd percentile, households with minimum wage earners contribute to increases in the percentile value by about 10%, at the 3rd percentile by 7 to 8%, and at the 5th percentile by 5%. If only the sample with households with positive earned income is used, the results remain relatively unchanged. The change in the reference group does not really play a role here, as inactive people (who generally have no earned income) do not occur in this population and the "grand mean" is therefore (almost completely) determined by the group of households with higher-wage earners.

In sum, the investigation of differences between model specifications for different dependent variables and samples shows that altogether, the variation in results is limited when regarding only changes in the distribution of gross and disposable income.

The stand-alone change in social benefits did not affect the potential of the minimum wage to influence the income distribution. Changes in the system of tax refunds have altered the way in

⁹⁸ The results based on an OB-decomposition are highly dependent on the omitted base category. In robustness checks, I compute the decomposition based on "normalized" effects, i.e. effects that are expressed as deviation contrasts from the grand mean using normalized beta coefficients as proposed by Yun (2005). This can ease interpretation and helps to rule out that the results are an artefact of the choice of the reference category. Yun (2005) shows that one can estimate separate models, using one "household wage status" category (households with minimum wage earners, households with higher-wage earners, households with no one active in the labor market) as a reference in each. Afterwards, one can average the results of the beta-coefficients, which sum to zero across all household wage status groups. This identifies all differences across the household wage status groups and does not refer to one specific reference group.

which households with minimum wage workers contribute to the percentiles of the distribution of disposable and gross household income around the 30th and 40th percentiles. Around the median, it was not the changes in the tax refunds, but instead the changes in households' tax liability that played a role. These changes have led to a less beneficial situation around the median. Households' tax burden has increased in this area, which makes this a plausible result. The results in the lowest bottom are robust to the choice of the model specification when estimating changes in the distribution of disposable and gross household income (the measure that includes tax refunds) and when using the full analysis sample. The specification-independent results suggest that this is not where changes in the tax and transfer system have affected the potential impact of minimum wages on the disposable income distribution. The differences between results are fairly small, but clearly most pronounced in the lower middle of the distribution, where the results are the least favorable for the full specification when controlling for changes in the tax system. This means that changes in the tax systems led to a context in which minimum wage households could contribute more to increases in percentile values. This may suggest that the lower tax burden of households in relation to their household income effectively leads to higher net income growth: The degree to which additional labor income leads to higher tax liability is mitigated by more progressive tax rates and refundable and non-refundable tax credits.

The switch from the full analysis sample to the market income sample made only a limited difference regarding the extent to which the model specification plays a role for the results among the broad income concepts of gross and disposable household income. The switch to the smaller sample of households with positive labor income led to larger variation in coefficients between model specifications when studying the distribution of disposable household income.

These analyses were limited to the study of changes in the distribution of gross and disposable household income. We saw before that for changes in the distribution of *market income*, the underlying analysis sample is highly important. For this income concept, however, the interplay of changes in minimum wage and the system of public transfers and taxes is irrelevant, as market incomes are not (directly) affected by these income sources. Thus, the distribution of market income is not under consideration in this and the following section that study the interplay of changes in minimum wages and the tax and transfer system.

10.4. Do households with minimum wage earners benefit from tax policy supporting low-income households?

I computed models using i) households' disposable income as the dependent variable, and using ii) households' gross income including the amount of tax refunds they are eligible for due to refundable tax credits, which function as an additional income source just like other cash transfers as the dependent variable. I used a) a full specification with interaction effects, which is the full specification with households' educational composition, labor force composition, family status, demographics, their census region, their transfer receipt, their income and payroll tax liability, and the interaction terms for households with minimum wage earners and tax refunds and households with minimum wage earners and low tax liability. Second, I used a specification b) that mirrors the "gross" specification. As before, this specification omits the variables for households' income tax and payroll tax liability but includes a dummy variable

indicating if a household is eligible for tax refunds. In this case, only one interaction term is introduced for households with minimum wage earners who receive tax refunds.

Both model specifications include all main effects for the variables included in the interaction term(s). In the limited model specification, which only includes the dummy on households' tax refunds one interaction term, the interaction term for minimum wage households and households receiving tax refunds indicates how much greater the contribution of households with minimum wage earners to a percentile value is when the households receive tax refunds instead of being in another tax category. This is *in addition* to the main effect's contribution, i.e. in addition to the contribution coming from households with minimum wage earners who do not receive tax refunds. The sum of these two coefficients, computed as a linear combination of the main effect and the interaction effect (including their standard errors), represents the contribution of minimum wage households receiving tax refunds. The model also includes the main effect for the receipt of tax refunds, capturing the contribution from households receiving tax refunds where no one works for the minimum wage. In the model that additionally includes the interaction term for households with minimum wage earners who have a low tax liability, the main effect for minimum wage households reflects the contribution from households with minimum wage earners who do not receive tax refunds and who do not have a low tax liability (when both interaction terms are zero, i.e. when the dummy variable for households receiving tax refunds and the dummy variable for households with a low tax liability are zero). Accordingly, for the interaction term for minimum wage households and low tax liability, the linear combination represents the contribution of households with a low tax liability.

The reference group are households with higher-wage earners who do not receive tax refunds, and, when using the full specification that includes all tax liability variables, who further do not have a low tax liability. The coefficients of the linear combination of the main effect for minimum wage households and their interaction with tax refunds or low tax liability, must be interpreted with reference to this group.

For the study of changes in the distribution of disposable household income, both specifications are used (specifications a and b). When changes in the distribution of gross household income is studied, only the specification without households' income tax and social security tax liability is used (specification b).

Figure 60 shows the results of the decomposition using the full specifications with interaction effects to estimate changes in the distribution of disposable household income for the full analysis sample. The upper and lower panels show the results of the same estimation separately for readability. The upper panel shows the coefficients of the main effects of households with minimum wage earners, the coefficients of the interaction term with tax refunds, and their linear combination, i.e. the contribution of households with minimum wage earners who receive tax refunds.

The coefficients of the main effect differ from the prior results for the contribution of minimum wage households in the model specifications without interaction effects. This is plausible, as they now reflect the contribution of minimum wage households that do not receive tax refunds and do not have a low tax liability. In this scenario, which assumes that the transfer and tax systems remained unchanged between 1989 and 2018, the contribution of these households is not significantly different from zero. There is no positive contribution in the lower end of the

distribution. This stands in contrast to the positive impact that was visible in the model without interaction effects. The estimates are very imprecise in this income strata, but rather point towards a negative impact. The interaction term itself has no impact above the 10th percentile. Below that, it has a positive contribution, meaning that the contribution of households with minimum wage earners to percentile values in this income range is greater when households receive tax refunds (instead of being in another tax category), by 1 to 1.5 percentage points. The linear combination of the main effect and the interaction term yields a small positive contribution of about 1% around the 5th percentile (not significantly different from zero).⁹⁹ The results tentatively support hypothesis H3, indicating that households with a minimum wage earner who also receive tax refunds may have contributed more to positive changes in the lower percentile values of the net household income distribution compared to those without tax refunds. However, the estimates lack precision, and therefore, this hypothesis cannot be confirmed definitively.

The lower panel again shows the coefficients of the main effect of households with minimum wage earners. Instead of the interactions with tax refunds, it shows the coefficients of the interaction term with a low tax liability, and their linear combination, i.e. the contribution of households with minimum wage earners who have a low tax liability. Their reference category are higher-wage earners who neither have a low tax liability nor receive tax refunds. Around the median, the interaction term itself is negative, indicating that when minimum wage households have a low tax liability, their contribution is less positive. The linear combination therefore indicates a contribution around zero at this point of the distribution. Below the 35th percentile, the interaction term is slightly positive but not significant. In the first decile, their linear combination does not suggest a positive contribution.

⁹⁹ As in the previous analyses, robustness checks were again carried out based on normalized coefficients (see section I of the appendix). They confirm the picture that the normalized coefficients show significantly more positive contributions at the lower end of the distribution, as they refer to the grand mean of all other categories of "households' minimum wage affectedness", i.e. to the grand mean of households with people with higher hourly wages and households that are inactive, instead of referring only to the reference group of households with higher hourly wages. As the main effect is therefore notably more positive, the linear combination is also more positive. The interaction term itself, on the other hand, does not differ noticeably from the results based on non-normalized coefficients.

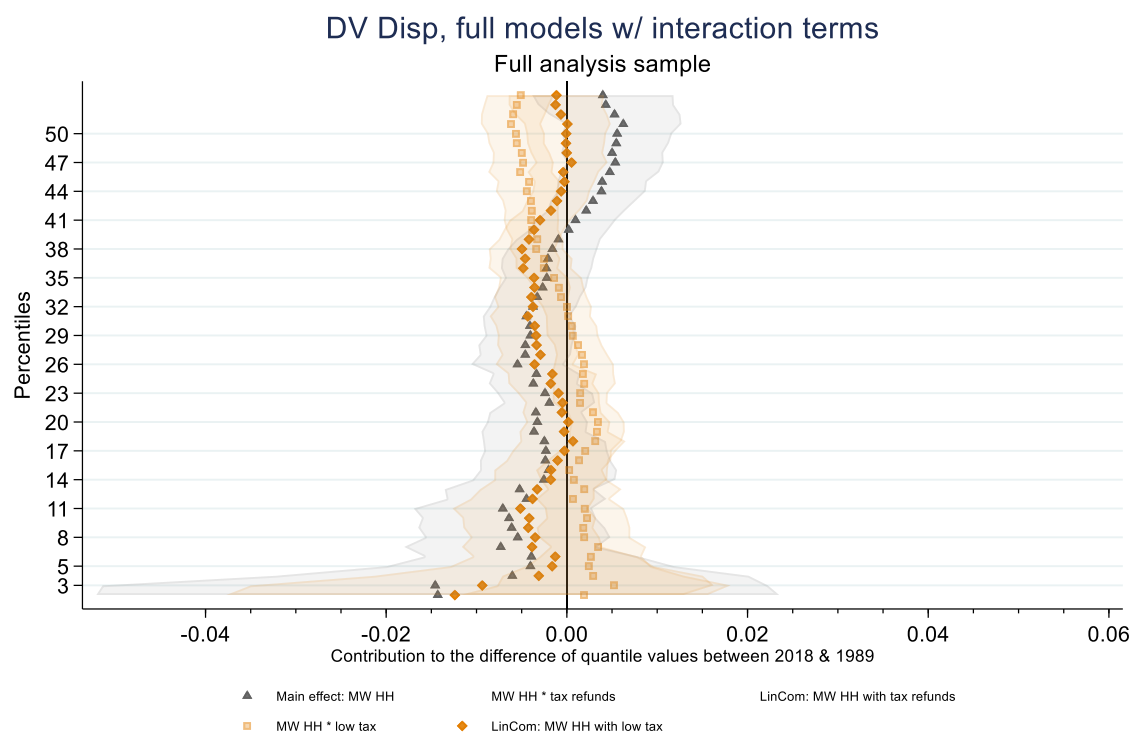
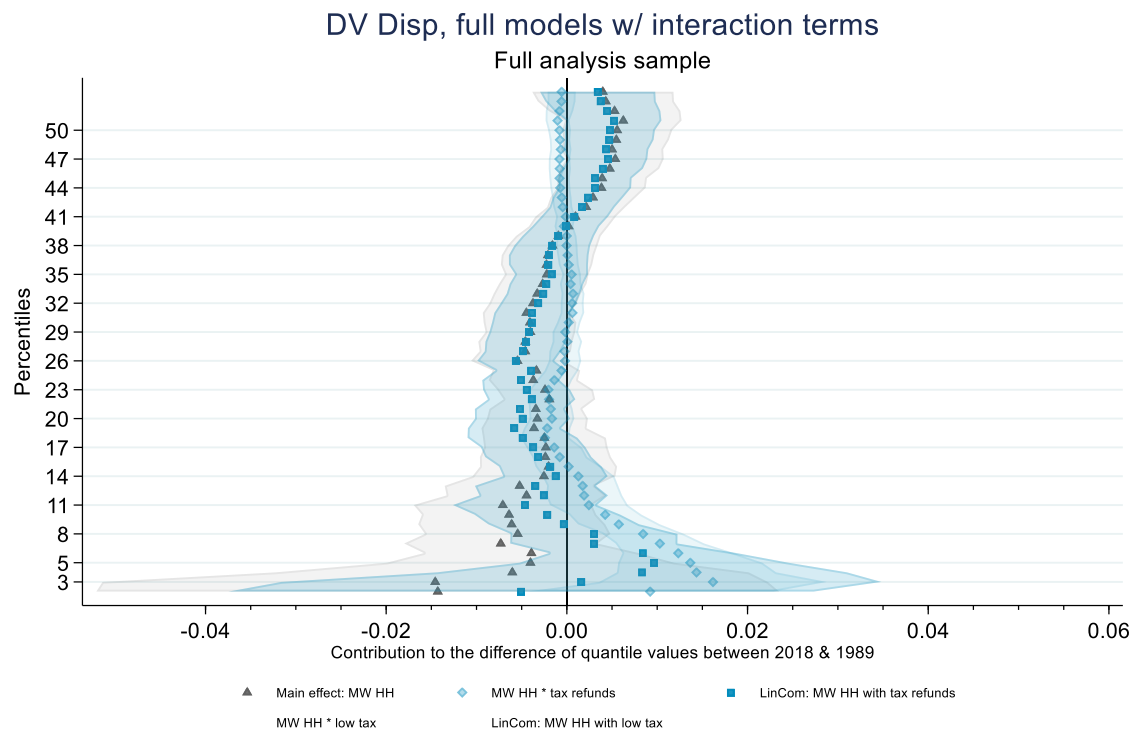


Figure 60: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, full analysis sample. Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Figure 61 shows all coefficients at once, for a model specification without variables for the social security tax liability of households and with interaction effects. As in the corresponding

robustness check presented in Figure 55, the results are almost identical to the ones based on the full model with interaction effects. This indicates that changes in the social security tax system were not meaningful for the contribution of households with minimum wage earners in different tax categories. This is again plausible as there have been essentially no policy changes regarding the social security tax system.

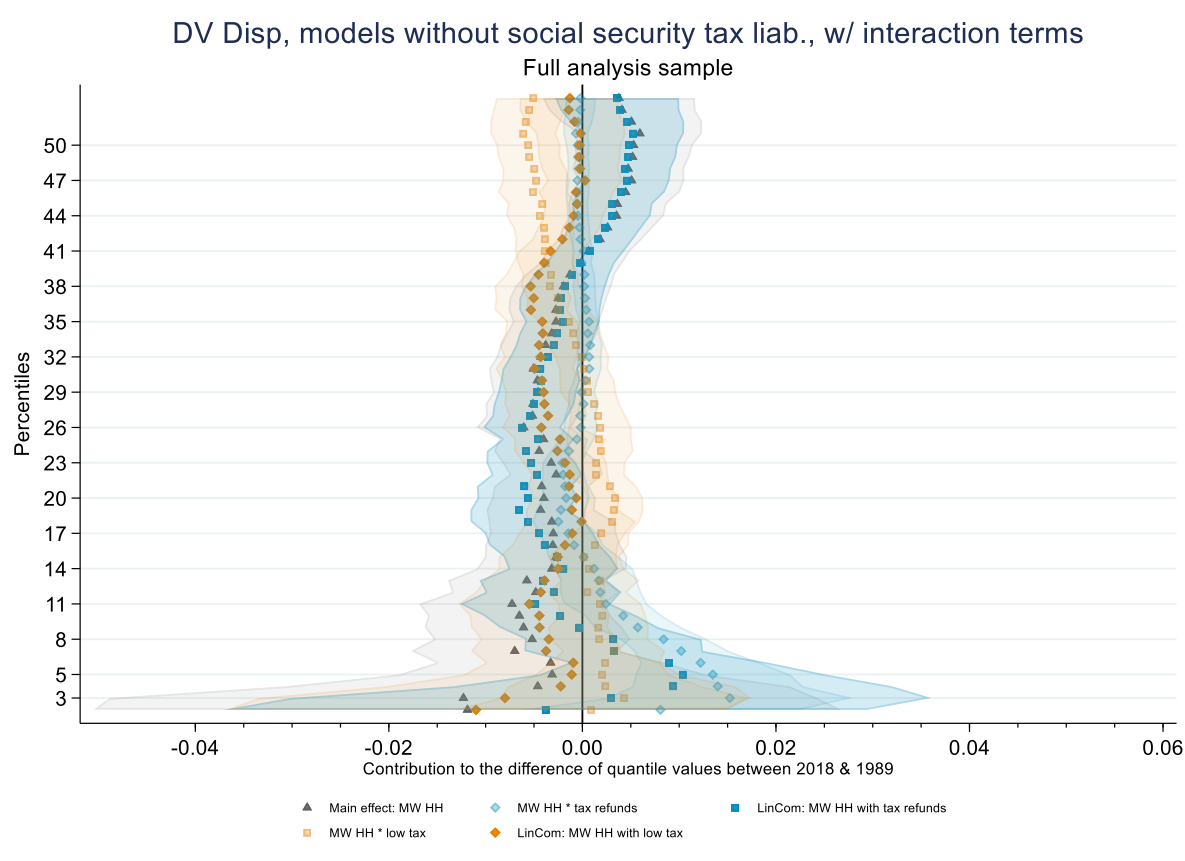


Figure 61: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income, based on model specification without social security tax liability of households, with interaction effects, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

The results change when using a model specification that does not control for changes in the tax systems but includes a dummy variable for the receipt of tax refunds. Figure 62 shows that the linear combinations yield positive coefficients in the first decile. Around the 5th percentile, households with minimum wage earners who received tax refunds contributed to increasing percentile values by 1.5%, compared to households with higher-wage earners in any other tax category. The contributions above the 35th percentile are negative, and households contributed do declines in the median value by 1 percent. Overall, these results very closely resemble the results in the corresponding model specification without the interaction term. The interaction term is not different from zero above the 30th percentile. However, below that point, it results in more negative contributions compared to the main effect between the 15th and 25th percentiles, whereas it results in more positive contributions in the first decile. Thus, receiving tax refunds strengthens the increasing contribution of minimum wage households on the percentile values in the lowest 10 percentiles. The difference to the more strongly specified

model specifications is that the main effect itself is positive when omitting variables for households' tax liability and therefore not controlling for changes in the tax system apart from the receipt of tax refunds. The main effect reflects the contribution of households with minimum wage earners who do not receive tax refunds. It appears that changes in the tax system have enabled these households to benefit from changes in minimum wage policy too, which is not the case when changes in the tax system are controlled for. This could be due to the fact that the tax system became more progressive over time also for those who do not receive tax refunds. Again, the results tentatively support hypothesis H3, but the estimates lack precision. Therefore, these results cannot definitively confirm the hypothesis that households with a minimum wage earner who also receive tax refunds have contributed more to positive changes in the lower percentile values of the net household income distribution compared to those without tax refunds either. There are more households that either do not owe tax due to higher standard deductions and credits or have a lower tax liability as a result.

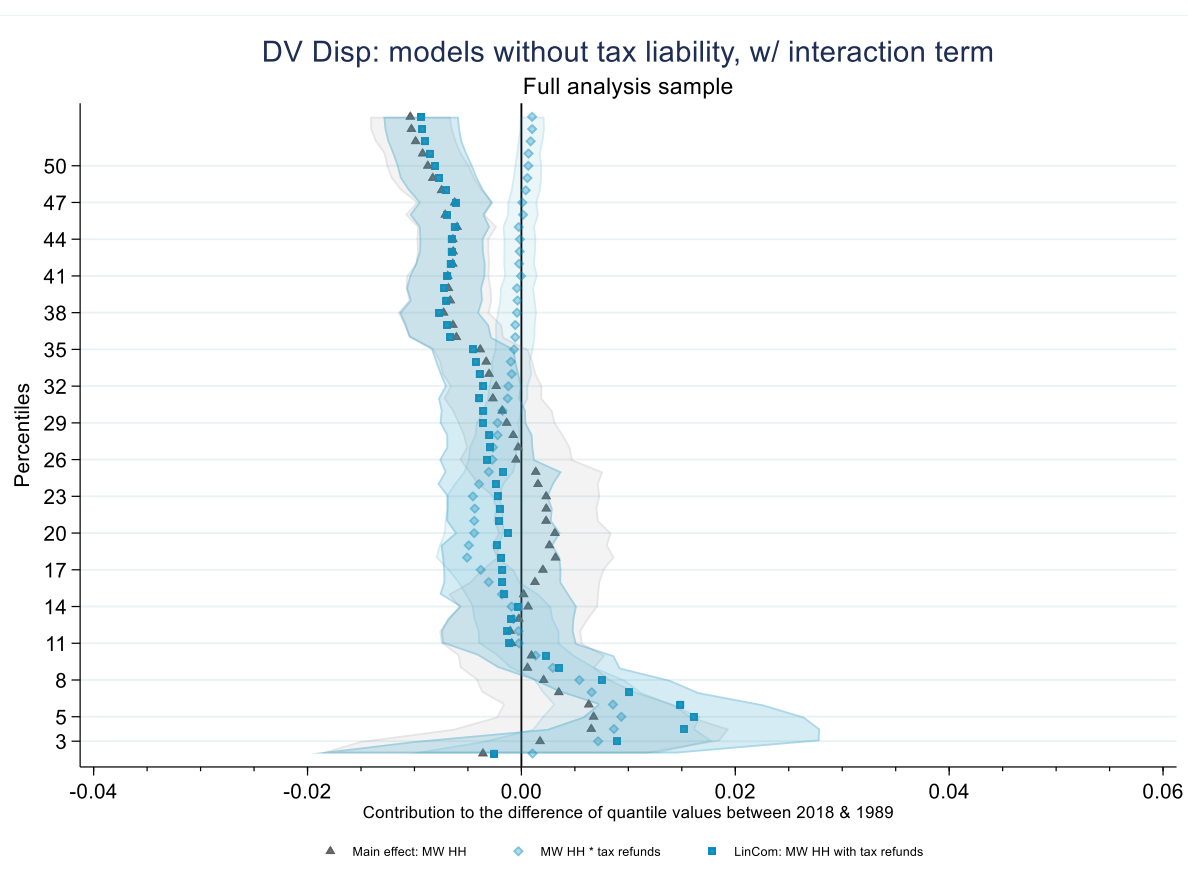


Figure 62: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income, based on model specification without tax liability of households, but including dummy for tax refunds, with interaction effect, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Figure 63 shows the results for the same model specification but for changes in the distribution of gross household income (measure including tax refunds as an income source in households). The results patterns are quite similar to the ones for the distribution of disposable household income around the median and in the bottom of the distribution. The results deviate in the lower middle of the distribution. The contribution based on the main effect which indicates the

contribution of households with minimum wage earners who do not receive tax refunds is positive between the 20th and 30th percentiles, where these households contributed to increasing percentile values 0.8 percent. In the same area, the interaction term itself is negative. When minimum wage households receive tax refunds, this lessens their positive contribution. Together, this results in a linear combination which indicates that these households have no contribution to percentile value changes in this area. This pattern was less pronounced for the distribution of disposable household income mostly because the main effect did not result in positive contributions. It appears that when disregarding households' tax liability (since they are not included in the measurement of gross household income), the improving situation of households with minimum wage earners who did not receive tax refunds translates into positive contributions in this income area, whereas this is not the case when the tax liability of households is included in disposable household income and their distribution.

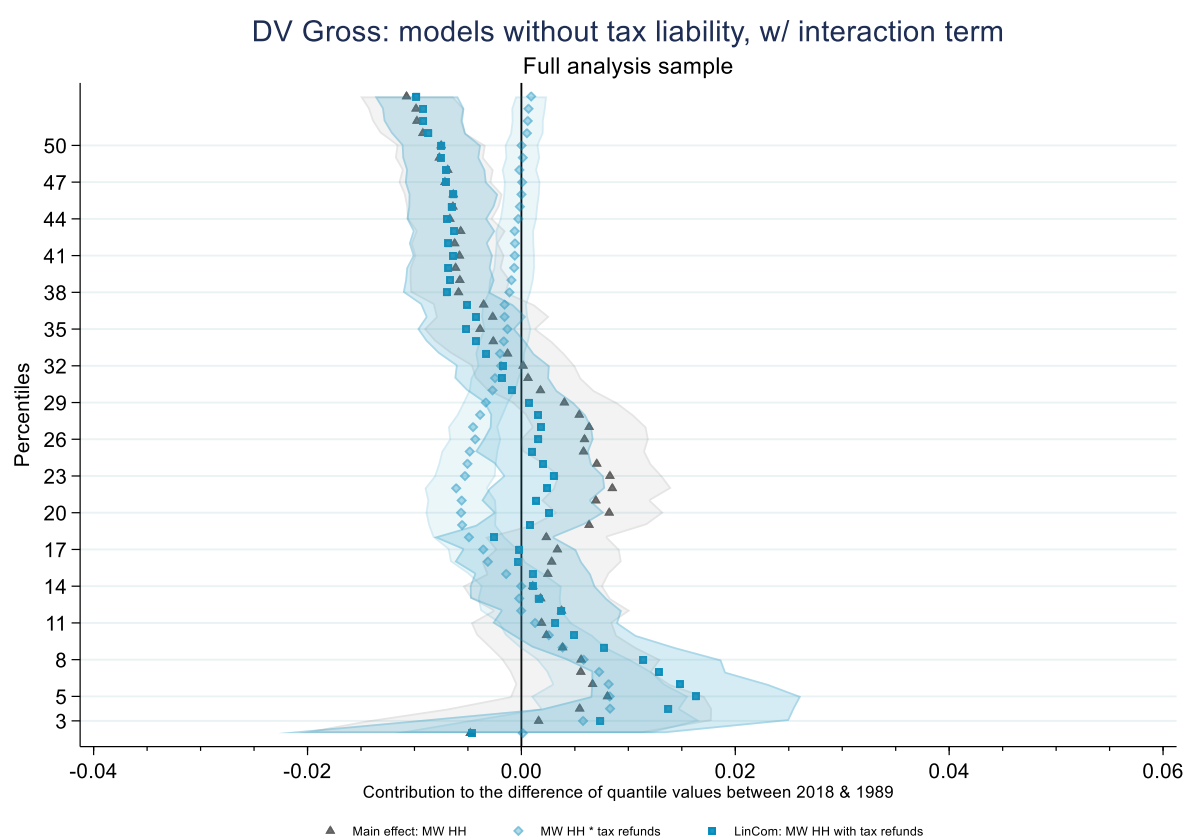


Figure 63: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of gross household income (measure including tax refunds as an income source), based on model specification without tax liability of households, but including dummy for tax refunds, with interaction effect, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

In line with the procedure in section 10.3, the analysis sample was also restricted here in order to uncover possible differences in the results. The restriction to the sample with positive market income had hardly any effect on the pattern of results (figures can be found in section F of the appendix). Restricting to the sample with positive labor income results in small but notable differences as long as the limited model specifications are used. Figure 64 shows the results for changes in the distribution of disposable household income of the model specification that does

not control for the tax liability of households but includes the dummy for tax refunds and its interaction term with the variable for being affected by the minimum wage. Overall, a slight shift towards stronger negative contributions can be observed. Similar to the results in section 10.3, the results appear to be “cut off” towards the bottom. The exclusion of households without earned income in the labor income sample results in another overall distribution with another overall composition in which the positive contributions appear to be more concentrated in the lower range than in the full analysis sample. This is the case for both the estimates of contributions to changes in net income and gross income (see Figure 65).

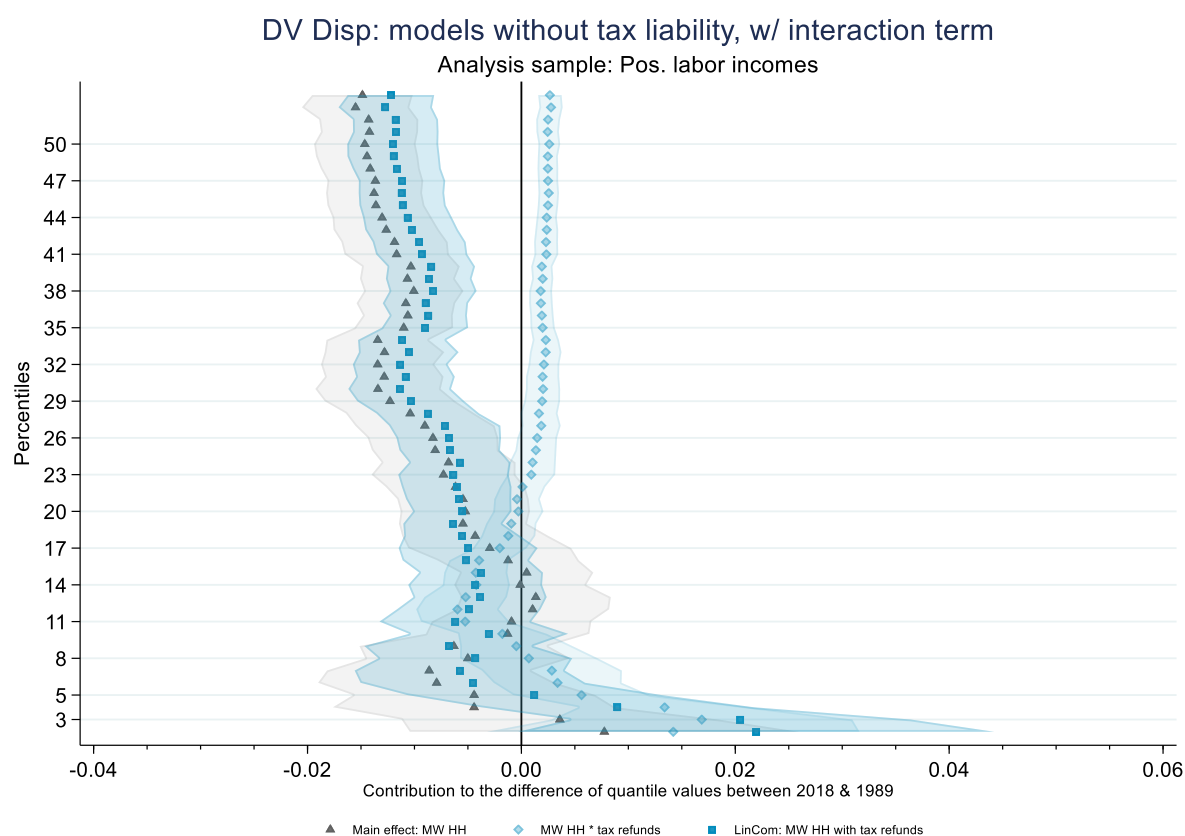


Figure 64: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income, based on model specification without tax liability of households, but including dummy for tax refunds, with interaction effect, labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

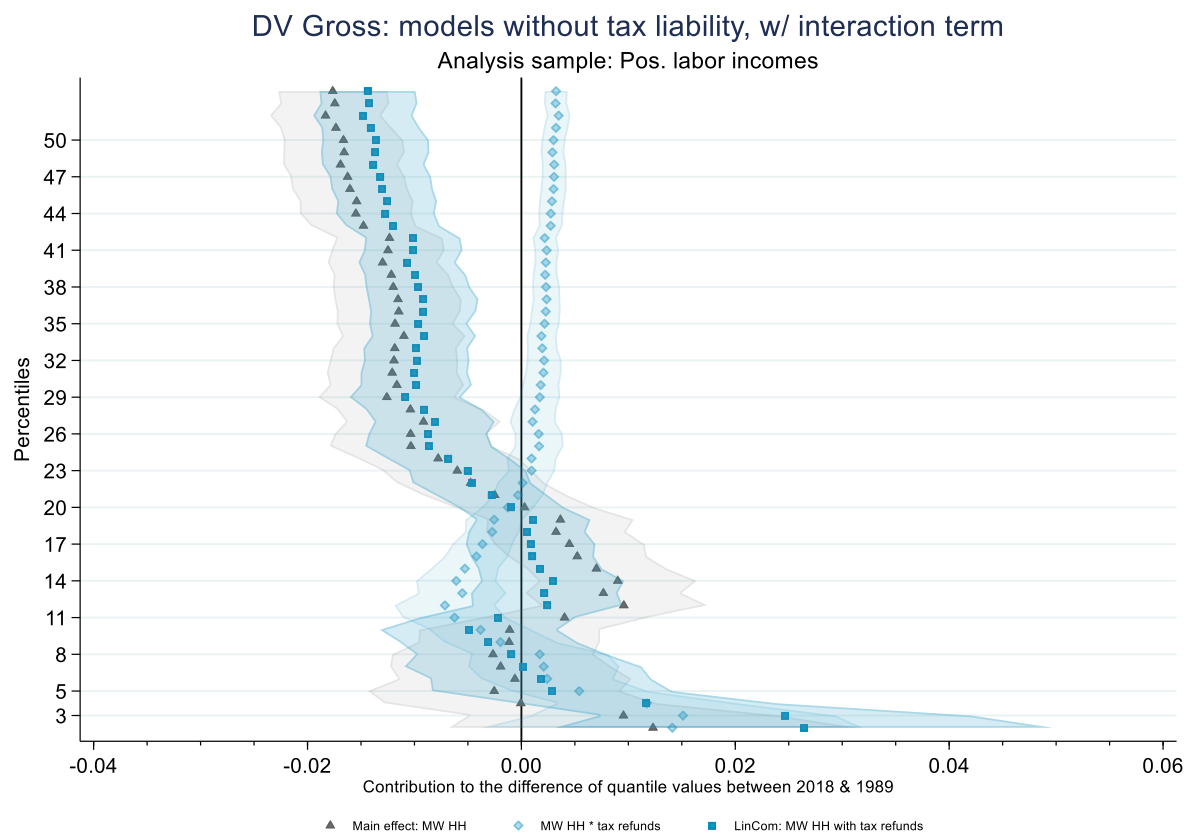


Figure 65: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of gross household income (measure including tax refunds as an income source), based on model specification without tax liability of households, but including dummy for tax refunds, with interaction effect, labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Larger differences between the results based on the different analysis samples are most pronounced as soon as households' income tax liability is controlled for (see Figure 66).¹⁰⁰

When the income tax and social security tax liability of households is included in the model specification, there are no longer any positive trends regarding the coefficients for the linear combination with tax refunds in the bottom of the distribution of disposable household income. This is primarily because the main effect for households with minimum wage earners who do not receive tax refunds is significantly more negative. Thus, regarding the population with positive labor income, the results suggest that minimum wage households who do not receive tax refunds contribute to declines in values of the lower 10 percentiles. However, the estimates are quite imprecise and not significantly different from zero. This may suggest that these households face a greater disadvantage compared to higher-wage households without tax refunds in this altered total distribution, which excludes some of the most vulnerable households. However, it is important to consider that these coefficients are relatively imprecise for both the entire analysis sample and the limited one.

¹⁰⁰ Robustness checks with a stepwise inclusion of variables for income tax liability and social security tax liability show that controlling for social security tax liability beyond households' income tax liability no longer makes a difference. Therefore, it is the change in the income tax system that is decisive, as in the case of the previous analyses.

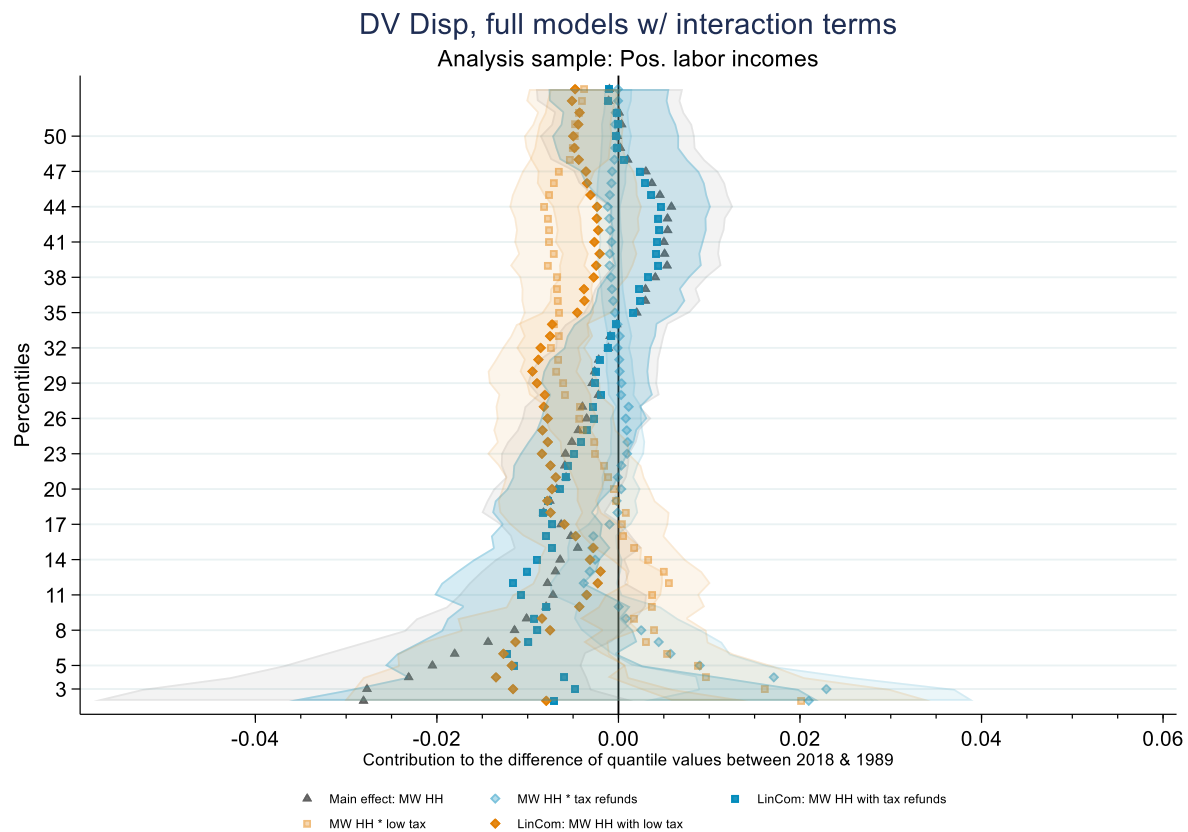


Figure 66: Results of OB-decompositions estimating the contribution of minimum wage households on percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

In sum, the results for the full sample indicate that households with minimum wage earners who receive tax refunds contribute positively in the first decile of the distributions of disposable and gross household income when using the model specification that includes the variable for the receipt of tax refunds but excludes the dummy variables for households' tax liability. Specifically, around the 5th percentile, these households contributed to increasing percentile values by 1.5% compared to households with higher-wage earners in any other tax category. Contributions above the 35th percentile are negative, with these households contributing to a decline in the median value by 1 percent. There was no such positive effect at the lower end of the distribution when using the full model specification or the model specification that only omits households' social security tax liability. The positive contribution in the model that omits variables for households' tax liability is primarily due to the more positive contribution through the main effect. Combined with the positive interaction term, the linear combination becomes significantly positive, which was not the case before. Thus, when not controlling for changes in the tax system, the benefits for households with minimum wage earners are more evident.

The switch to the smaller sample of households with positive labor income led to larger variation in coefficients of the linear combination for households receiving tax refunds between the different model specifications when studying the distribution of disposable household income. This is similar to the larger variation in results by model specification in the prior

results in section 10.3 when the analysis sample was limited. But again, as in the section before, I want to note that these comparisons are limited to the study of changes in the distribution of gross and disposable household income. In section 10.2 we saw that the underlying analysis sample is highly important for changes in the distribution of market income. However, this income concept is not considered here since market incomes are not (directly) affected by the interplay of minimum wage policy with tax policy as it disregards households' tax liability. Overall, the estimated contributions for households with minimum wage workers appear very robust since the found patterns of contributions across the income distribution do not differ strongly between models that include interaction terms and those that do not. The models with interaction terms suggest that at least part of the positive contribution found for households with minimum wage earners is based on the beneficial interplay between the receipt of (on average) increasing minimum wages and the receipt of tax refunds through a more generous system of refundable tax credits over time.

In the following, I will briefly discuss the findings on the variables that capture the receipt of tax refunds and the low tax liability of households, which are part of the interaction terms already discussed. The contribution of households with different tax burdens to changes in inequality is not the focus of the study, but they help to place the findings on households with minimum wage earners in a larger picture.

Figure 67 shows the coefficients for households receiving tax refunds and households with a low tax liability and their interaction with the variable that captures the affectedness of households by the minimum wage. They are the result of the same decomposition analyses for which the coefficients with a focus on minimum wage households were presented in Figure 60. It uses the full specification with interaction effects to estimate changes in the distribution of disposable household income for the full analysis sample. It again shows the coefficients of the main effects for households with minimum wage earners, and additionally, the coefficients of the main effects for households receiving tax refunds and households with a low tax liability. Furthermore, it shows the coefficients of the interaction terms, and their linear combination with the main effect for the different income tax categories.

As before, the main effect for minimum wage households reflects the contribution from households with minimum wage earners who do not receive tax refunds and who do not have a low tax liability. The main effect for households receiving tax refunds reflects the contribution of such households when no one in the household works for the minimum wage. The main effect for households with a low tax liability reflects the contribution of such households when none of the household members works for the minimum wage. The linear combinations of these main effects and their interaction terms with minimum wage households represent the contribution of households receiving tax refunds and in which at least one household member works for the minimum wage. The difference to the previously shown results is the reference group: The reference group are households that do not receive tax refunds (or who have a low tax liability) with no one working for the minimum wage (i.e. in which members are either higher-wage earners or inactive). The coefficients of the linear combination must be interpreted with reference to this group. The graph shows that the contribution from households receiving tax refunds and households with a low tax liability are quite large. The main effects, which refer to such households when no one is working for the minimum wage, peak at the 15th percentile for households receiving tax refunds and at the 30th percentile for households with a low tax

liability. If these households have a minimum wage earner or not does not appear to play a meaningful role: the interaction terms for both cases fluctuate around zero, meaning that having a minimum wage worker does not alter their contributions. Ultimately, the linear combinations are almost identical to the main effect. Households receiving tax refunds contribute to increases in percentile values between the 5th and the 35th percentiles. Between the 10th and 26th percentiles, they contribute to increases by more than 4 percent. At the 15th percentile, they contribute to increasing percentile values by more than 6 percent. Households with a low tax liability contribute to increases in percentile values between the 8th and the 42nd percentiles. Between the 15th and 40th percentiles, they contribute to increases by more than 5 percent. At the 30th percentile, they contribute to increasing percentile values by more than 11 percent. These are substantial impacts on a broad range of the lower half of the income distribution, but they have to be viewed taking into account the reference group, which are households with a medium-level tax liability.¹⁰¹Figure 67

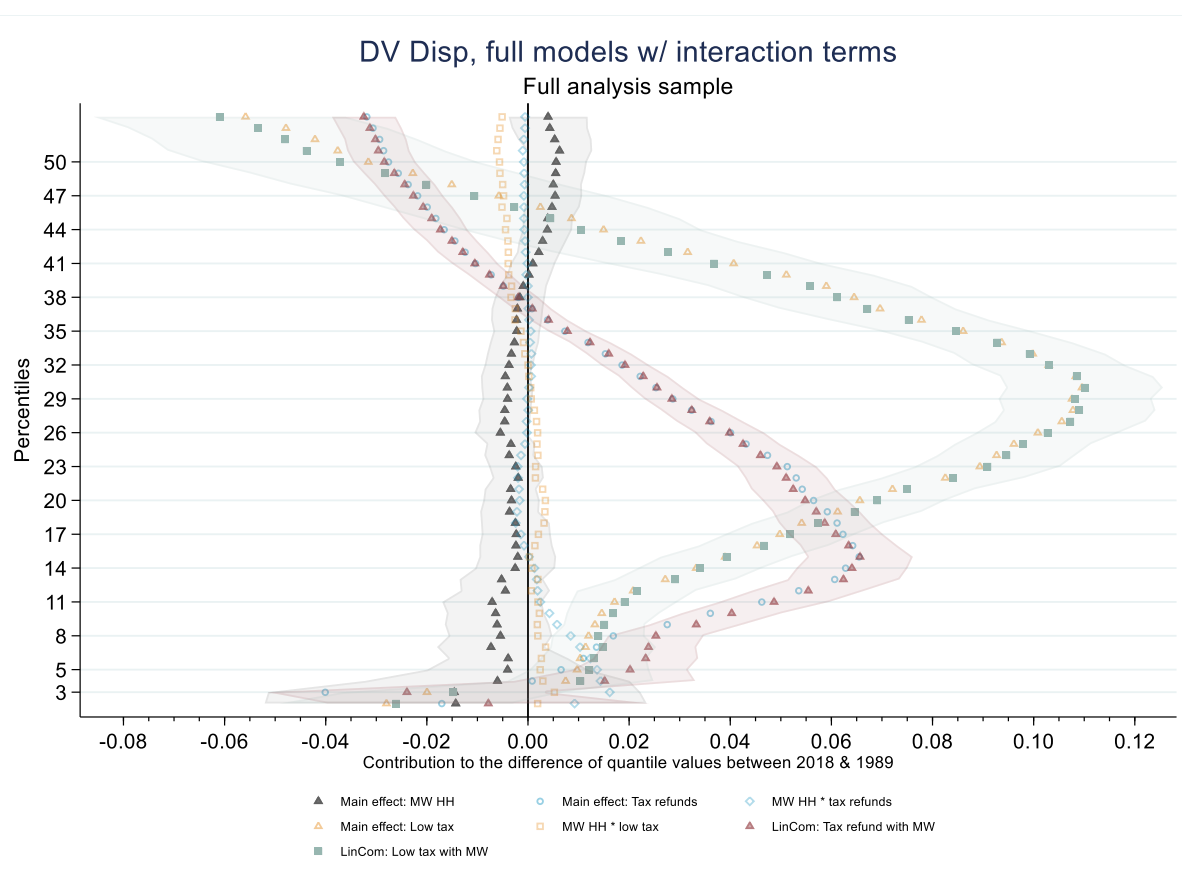


Figure 67: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households receiving tax refunds or have a low tax liability on percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

¹⁰¹ Robustness checks based on normalized coefficients show that the found contributions of households with tax refunds are relatively robust, independent of the chosen reference category. Households with a low tax liability, however, contribute to increasing percentile values starting from the 25th percentile. Below that point, contributions are negative, around 5% between the 10th and 15th percentiles. Thus, in the lower income strata, the positive contribution is based on the relative disadvantage of households with a medium-level income tax liability.

In contrast to the results for households with minimum wage workers, the results for households that receive tax refunds and households with a low tax burden clearly show positive effects on the poverty rate. Households receiving tax refunds (blue dots) and households with a low tax liability (yellow triangles) contributed to a substantial decline in the gap between the median and the lower income range in which the poverty threshold lies for relative income poverty using the poverty line at 50% or 60% of median disposable household income. Therefore, improvements in the income situation of households that benefitted from the increasingly generous tax credits led to a decline in relative income poverty.

The patterns found are robust to the choice of model specification. Based on the model excluding the covariates for social security tax liability (see section G of the appendix), the patterns of results are almost identical, which is consistent with the previous results. The results for the models without covariates for household income tax liability for both the distribution of disposable income and gross income are consistent with the results for households receiving tax refunds (see Figure 68 and Figure 69).

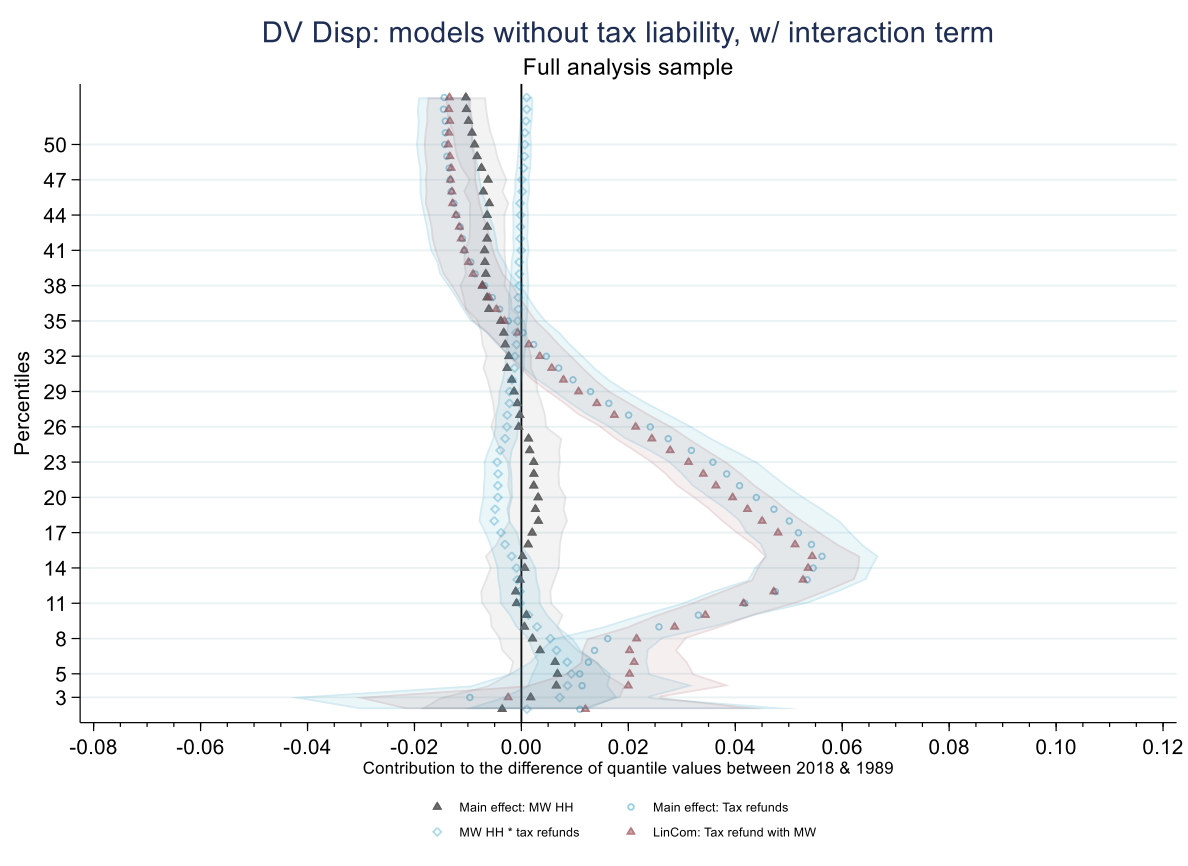


Figure 68: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households receiving tax refunds on percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

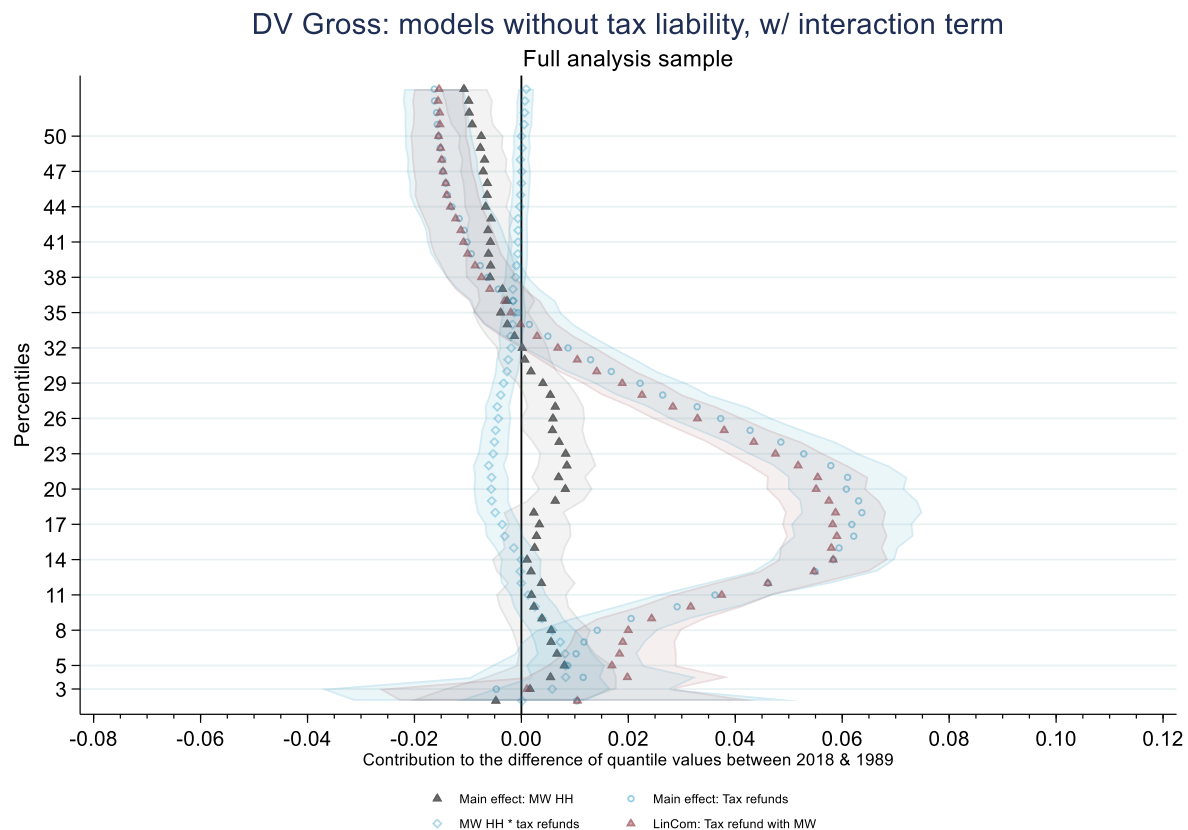


Figure 69: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households receiving tax refunds on percentile values of the distribution of gross household income, based on the full model specification with interaction effects, full analysis sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

When using the market income sample, the results patterns remain largely the same (see section G of the appendix). Switching to the labor income sample, which goes along with a stronger limitation of the analysis sample to households with positive labor incomes, the positive contributions are more pronounced, particularly in the case of households with tax refunds (see Figure 70). They contribute to increases in the 10th percentile of the distribution of households' labor income by more than 12%, which is about double the contribution found for the full analysis sample. As before, the contributions are more heavily concentrated in the lower end, which is plausible given that households with zero labor income are excluded from this analysis, who are disproportionately located in the lower bottom of the income distribution.

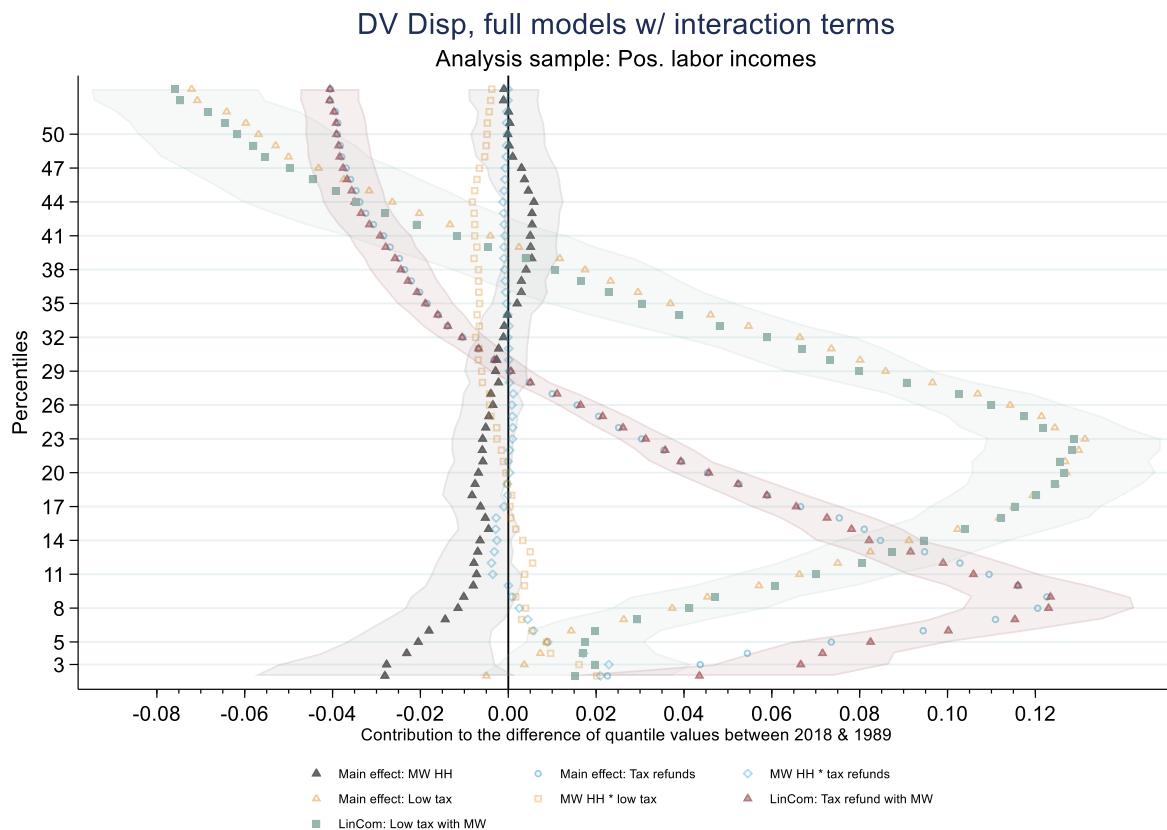


Figure 70: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households receiving tax refunds on percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, labor income sample.

Note: "DV" (dependent variable) indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. "MW HH" means minimum wage households. "LinCom" refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

In general, the variety of models based on different specifications and estimating changes for different income concepts and their distribution shows that the positive contributions based on the beneficial situation of households due to their tax liability are larger than those due to their affectedness by the minimum wage.¹⁰² The coefficients of the linear combinations of the main effects of tax refunds or low tax liability and their interaction with minimum wage affectedness are much larger than the coefficients of the linear combinations of the main effects of minimum wage households and their interaction with tax refunds or low tax liability. This is based almost entirely on the substantially larger main effect of households receiving tax refunds or with a low tax liability. This suggests that receiving tax refunds (or having a low tax liability) compared to having a medium-level tax liability is a more significant financial benefit than having a minimum wage worker compared to having higher-wage earners in a household, despite increasing minimum wage levels. However, households with minimum wage earners benefitted from the changing tax policy, too. The interaction terms show that when households with minimum wage earners receive tax refunds, they contribute *more* to increasing percentile values than they do when they do not receive tax refunds, when changes in the tax system are not controlled for. These two types of linear combinations are not equal, as they differ in terms

¹⁰² This is the case also in the models without interaction terms (see section G of the appendix).

of the circumstances they apply in: the coefficient for the main effect of households with a minimum wage earner indicates the contribution of minimum wage households that do not receive tax refunds (i.e. when the dummy variable for households receiving tax refunds is zero). The main effect of households receiving tax refunds refers to the contribution of households that receive tax refunds and in which no household member works for the minimum wage (when the dummy variable for households with a minimum wage earner is zero). The latter therefore technically refers to households receiving tax refunds and in which the household members work for higher wages or in which all members are jobless.¹⁰³

To sum up, the results based on specifications including interaction terms suggest that the reduction in income inequality through increasing minimum wages was not solely due to a more favorable policy landscape, as indicated by the results in section 10.3. The results including interaction terms indicate that it was particularly the more progressive tax system – a policy that also benefits households with minimum wage earners – that contributed to positive changes in the lower area of the income distribution.

11. Discussion and conclusion

Minimum wages have featured prominently in policy debates in recent years. Policymakers, scholars, and the media have increasingly emphasized their role as a social policy tool to combat income poverty by boosting the earnings of low-income individuals and families. If minimum wages are effective in raising the incomes of low-income individuals and families, they can be effective in reducing income inequality. Income inequality has surged in many affluent democracies in recent decades, with the United States standing out for its exceptionally high levels of inequality. This trend has been driven by significant income and wealth growth at the top, while the middle and lower segments of the income distribution have experienced slower growth. In some countries, lower-income households have fallen behind the middle class, while in others this relationship has remained stable. In the U.S., inequality in the lower half of the income distribution has remained relatively stable over the long term.

Earnings strongly determine the level and trends in the distribution of income, which means that, in addition to market processes, labor market institutions, such as the regulation of minimum wages, can have a substantial impact on population-level income inequality.

The literature on income inequality argues that some of the rise in income inequality can be attributed to the declining real value of the minimum wage, and that the minimum wage may be a suitable policy instrument to tackle inequality in labor markets, which strongly shape the overall level of inequality in society.

However, since poverty and income inequality are measured at household level, the question of the effectiveness of the minimum wage in combating income inequality arises on at least two

¹⁰³ The latter case is empirically very unlikely, especially with regard to the receipt of tax refunds. The main criterion for entitlement to refundable tax credits is a minimum amount of earned income, which means that a household cannot empirically be jobless and receive tax credits. Nevertheless, the heterogeneity of the reference group has to be taken into account when interpreting the coefficients for households with different tax liabilities (receiving tax refunds or with low tax liabilities) in specifications that include these interaction terms. An alternative would be to exclude the main effect for receiving tax refunds. However, this would allow tax returns to shift incomes only for households with minimum wage earners, which is empirically not the case (Angrist and Pischke (2009)).

levels: that of the individuals who work for the minimum wage and that of the households in which they live and whose total income determines their standard of living. The way that individuals with earnings from work cluster together in households and other income components in their total household income also play a role.

Policymakers concerned about economic inequality regularly advocate for laws to increase the minimum wage; but efforts to raise the minimum wage also have opponents. Low-wage workers do not necessarily live in low-income households. This targeting problem is one major counterargument raised by skeptics of a higher minimum wage. Another issue is the unfavorable interaction between rising earnings as a result of minimum wages and income support. High marginal tax rates through transfer withdrawal rates or increasing tax burdens of households can diminish the gains through higher wages, which ultimately leaves the net income of households unchanged.

Minimum wage policy is currently determined at the state and local levels. The federal minimum wage has not been raised for more than a decade. This stagnation has led more and more states to take advantage of the ability to set minimum wages at the state level in order to keep the minimum wage floor in line with the rising cost of living in many areas of the USA. On average, the real level of the minimum wage has increased, and a growing share of workers and households is affected by higher minimum wages.

In this dissertation, I assume that the relationship between low wages and low incomes has strengthened during the past few decades and that an increasing portion of the benefits from minimum wage hikes flow to low-income households. Combined with the growing bite of the minimum wage, this should have had an inequality-reducing effect.

My fundamental question, therefore, was whether minimum wages reduced inequality in the lower half of the income distribution in the USA between 1989 and 2018. This long-term timeframe covers a period in which the minimum wage became increasingly important as a social policy measure and in which the U.S. welfare state underwent significant changes in the provision of income support. These parallel developments are of substantial interest since the shift from welfare to workfare was accompanied by broad changes in the labor market, such as the growing low wage sector, paired with the growing supply of low-wage labor that was accompanied by a large influx of immigrants. Both the changes in the labor market as well as the stronger reliance of the working-age population on earnings and their better match with changes in welfare state provision increase the relevance of the minimum wage as a population-level policy measure.

My approach was to study the impact of minimum wages on the development of income inequality by estimating the contribution of households with minimum wage earners to changes in percentile values in the lower half of the income distribution in the whole population. The goal was to determine whether changes in minimum wage policy supported low-income households and had a population-level impact on income inequality. This would be the case if households with minimum wage earners experienced income growth and contributed to increases in percentile values at the lower part of the income distribution and less so at higher income strata. If this were the case, these households would contribute to a narrowing of the gap between lower and higher income strata and thus to a reduction in inequality. To this end, I used a repeated cross-sectional design and estimated the contribution of households with

minimum wage earners on changes in all quantile values in the lower half of the income distribution using unconditional quantile regression. Using an Oaxaca-Blinder decomposition, I distinguished income structure effects from composition effects. I assume that the changes in minimum wage policy and the changed policy landscape regarding social policy and tax policy were associated with improvements in the income situation of households with minimum wage earners and that this contributed to a decline in income inequality in the lower half of the income distribution. Such income structure effects are distinguished from the compositional effects which result from a change in the sheer proportion of households with minimum wage workers.

I hypothesized that the within-group income situation of households with minimum wage earners changed in the long term in a way that led to rising incomes in the lower area of the income distribution, which reduced the income gap between low-income households and households at the median and ultimately had an inequality-decreasing effect in the lower half of the income distribution. Both rising hourly wages of household members working for the minimum wage and the changing composition of the group of households with minimum wage earners over time have contributed to an improvement in the income situation of this population group: the group increasingly consists of households in which minimum wage earners are the main earners in the household and thus contribute the majority of the total income in these households.

Furthermore, I assumed that this effect would be more pronounced for the distribution of households' labor or market income because these narrower income concepts exclude households' receipt of transfers. This means that unfavorable interaction effects with the transfer system cannot diminish the positive impact of rising minimum wages. Once the income concept includes transfers received, I expected the effect to be more pronounced for the income concepts that include tax refunds as an income component, similar to income from other forms of public income support.

Changes in the tax system increasingly support low-income households in employment, with tax refunds playing a particularly prominent role and serving as one of the largest cash income support programs today. Therefore, I expected that the relationship between higher labor income from the minimum wage and household tax liability would be more favorable in 2018 than in 1989, and that model specifications controlling for changes in the income tax system would suggest a smaller contribution of minimum wage households to lower quantile values.

In addition to the changed policy landscape in which minimum wages are set, I expected that the interplay of minimum wages and progressive tax policies would be particularly beneficial for low-income households. I expected that households with minimum wage earners who received tax refunds would contribute more to rising percentile values than if they did not receive tax refunds.

In the following section, I summarize the central findings of the dissertation in relation to my hypotheses, and then turn to limitations and avenues for further research. Finally, I discuss the implications of my findings for broader inequality research.

11.1. Central findings of this dissertation

I hypothesized that increasing levels of minimum wages led to rising incomes in the lower area of the income distribution, which, as a result, had an inequality-decreasing effect in the lower half of the income distribution. Furthermore, I assumed that this effect is more pronounced for the narrower definitions of income than the broader definitions. The narrower definition of households' labor or market income disregards households' transfer receipts, so that unfavorable interaction effects with the transfer system do not diminish the positive impact of rising minimum wages. Among the broader definitions of gross and net household income I assume that the effect is more pronounced for the distribution of disposable household income since it additionally includes households' tax liability and tax refunds. Since I expected that the changes in the income tax system were beneficial for households with low income from labor, including households with minimum wage earners, model specifications that do not control for these changes over time should be most likely to yield results suggesting a positive contribution of households with minimum wage earners to declining income inequality. Lastly, I assumed that the interplay of minimum wages and progressive tax policy is particularly beneficial for low-income households and that this contributed to a reduction in income inequality.

This work shows that the impact of the minimum wage, as measured by the contribution of households in which at least one person works for the minimum wage, on changes in income inequality in the population as a whole is limited. Nevertheless, an influence can be demonstrated: Households with minimum wage earners contribute to small positive changes in percentile values of 1 to 2% between the 3rd and the 8th percentiles when looking at the comprehensive income concepts of gross and net household income. In terms of the distribution of household disposable income, this income range includes incomes that decreased over time by 11% at the 3rd percentile and incomes that increased by 10% at the 7th percentile. The contribution of households with minimum wage earners therefore prevented an even greater drop in the percentile value at the 3rd percentile and contributed to the increases in the percentile values found up to the 7th percentile. The picture is similar for the distribution of disposable household income and the comprehensive measure of gross household income which includes the sum of tax refunds households receive as an income source. If the sum of tax refunds received is disregarded and not taken into account as an additional source of household income, no such positive effect can be identified. For all three measures, income inequality in the lower half of the distribution is slightly reduced because at the median, either no effects or significantly negative effects were found.

When looking at the distribution of households' labor income, I find positive contributions between 4 and 5% in the lowest 5 percentiles. At the 10th percentile, households with minimum wage earners contributed to increases in percentile values by 2.5 percent.¹⁰⁴ This is a modest

¹⁰⁴ The most favorable trend towards reducing inequality can be observed in the distribution of market incomes. Positive contributions between 7% and 14% at the bottom stand in contrast with a negative contribution of about 2% at the median. This indicates that households with minimum wage earners contributed to a decline in the inequality of households' market income. However, the distribution of market income has developed in a very specific manner. Below the 15th percentile, i.e. the area in which contributions are particularly high, market incomes declined between -20% at the 15th percentile to -98% at the 3rd percentile (see section B of the appendix). These are extreme shifts that can probably be attributed to the specific population group under consideration here: the distribution of total income excluding public transfers. Nevertheless, this sample includes households that have no income from work. At the lower end, for example, these may be households that receive market-based retirement incomes. Due to this overall development, I focus on the contributions found on the distribution of labor income.

but significant part of the overall strong increase in labor income in the lower income range, ranging from 74% at the 3rd percentile to 13% at the 15th percentile. When it comes to the distribution of market income of households in the sample with earned income, the estimated contributions are very similar. This shows that the estimated contributions do not diminish at this point when additional market-based income sources are taken into account in the outcome variable of interest, but rather at a later step when public transfers are included as a source of income.¹⁰⁵

For comparability, all calculations for the more comprehensive income concepts were carried out with the limited analysis samples of households that have positive market incomes or positive earned incomes. This shows that the population under consideration plays a significant role in estimating the impact of households with minimum wage earners. The effects are significantly less pronounced in the more limited sample of households with positive labor income and the positive effects at the lower end disappear if only the population with earned income is considered. This means that the advantage of households with minimum wage earners comes into play when the entire population is considered, and the distribution therefore also consists of population groups outside of the labor market. Thus, the relative improvement in the income situation of households with minimum wage earners *compared to households with higher-wage earners* appears to be most pronounced when looking at the *composition of the total population*, including other groups such as low-income elderly and low-income non-working households. This shows that the difference between two groups in terms of their influence on the shape of the distribution depends on its overall composition, including the positioning of "uninvolved" third groups.

Contrary to the original assumption, it was not the careful control of other possible factors influencing the development of inequality that made it possible to find evidence of an - albeit small - influence of the minimum wage in this study. The inequality-reducing effect is more pronounced when changes in the income tax system are not controlled for, but overall, the choice of model specification only plays a limited role when considering the inequality of net household incomes. Even though the differences are not large, they are most pronounced in the lower middle: The results are the least favorable for the full specification, which means that in this income strata, the overall change in the tax systems has created a context in which the minimum wage could contribute more to increases in percentile values. It appears that the lower tax burden of households in relation to their household income, resulting from more progressive tax rates and refundable and non-refundable tax credits, decreases the degree to which additional labor incomes in households lead to higher tax liability and thus lower net income growth.

In addition, controlling for changes in social structure, e.g. the ethnic origin of households, their marital status, their educational composition and their labor market activity did not play a prominent role. The inclusion of variables that were included in the basic model only changed the findings on the contribution of households with minimum wage recipients to a small extent.

¹⁰⁵ The estimated contributions for the distribution of household market incomes were even larger when estimated for the analysis sample with positive market incomes. However, I suspect that these results are only of limited validity and are based on the specific combination of an income concept that only takes into account selective sources of household income and a selective analysis sample. For this reason, I refrain from interpreting these results in more detail.

This is interesting as the descriptive findings revealed a strong shift towards labor market inactivity among households in the lower half of the income distribution, which should create a completely different setting in which minimum wages are effective in the lower half of the income distribution over time. The shares of households who are pensioners or otherwise inactive in the labor force increased strongly. However, the most important target group of minimum wage policy, households in which minimum wage income accounts for at least half of total income, remained a significant group in the lower half of the income distribution and even increased in size. This seems to have allowed minimum wage policy to still contribute to small but significant positive changes in percentile values. However, the shift to labor market inactivity may help to explain the differing results depending on the analysis sample used. The way in which inactive households are positioned alongside active and minimum wage households in the lower income ranges affects how they can contribute to population-level changes in income inequality. The relative improvement in the income situation of households with minimum wage earners compared to households with higher-wage earners was most evident when looking at the composition of the total population, including inactive households such as low-income elderly and low-income non-working households.

Overall, the limited influence of the chosen model specification suggests that the extent to which increases in the minimum wage translate into rising incomes at the bottom of the income distribution is not due to *changes* in the interdependencies between the receipt of minimum wages and the receipt of public transfers or tax benefits over time. Rather, the clearer differences between the results for the various income concepts used as dependent variables indicate that there is generally an unfavorable interplay between (low) labor income and public transfers over the entire period under consideration, which prevents rising wages from translating to a greater extent into higher net incomes at the household level.

It is by no means unreasonable to measure the potential effect of the minimum wage on the poverty rate or the extent of income inequality in the population as a whole. The advantage in certain income areas that affected households gain compared to households with higher-earning members appears to be greater when the influence on the income distribution of the entire population, including uninvolved third parties, is measured.

These analyses confirm findings of a small but significant impact of rising minimum wages on income inequality, measured as the contribution households with minimum wage earners make to a declining gap between the lowest percentiles and the median. However, the findings suggest that minimum wage policy indeed had no or at best little impact on the poverty rate. Relative income poverty would be unaffected by households with minimum wage earners since the relative poverty threshold is located between the 18th and 25th percentiles, an income range in which no contributions could be found when looking at the distribution of disposable household income. Furthermore, as households with minimum wage earners did not contribute to increases in the values of quantiles around the 12th percentile when looking at the distribution of gross household income, the poverty rate as measured by the official poverty measure would remain unaffected as well. In contrast to the results for households with minimum wage workers, the results for households that receive tax refunds and households with a low tax burden clearly show positive effects on the relative poverty rate.

Overall, the estimated contributions for households with minimum wage workers appear very robust. The basic pattern that there is a slight positive contribution in the 5th percentile range, which then weakens towards the top, remains consistent across many different income concepts, model specifications and analysis samples considered. This pattern can also be confirmed by adding an interaction term between being affected by the minimum wage and receiving tax refunds. The models with interaction terms suggest that at least part of the positive contribution found for households with minimum wage earners is based on the beneficial interplay between the receipt of (on average) increasing minimum wages and the receipt of tax refunds through a more generous system of refundable tax credits over time.

The results including the interaction terms indicate that it was in particular the more progressive tax system, i.e. a policy that *also* benefits households with minimum wage earners, that contributed to positive changes in the lower areas of the income distribution. The financial benefit of receiving tax refunds (or having a low tax liability) compared to having a moderate tax liability is more significant than that of having a minimum wage worker compared to having higher wage earners in a household, despite the increasing minimum wage levels. However, households with minimum wage earners clearly benefitted from the changing tax policy, too. The interaction terms show that when households with minimum wage earners receive tax refunds, they contribute more to increasing percentile values than they do when they do not receive tax refunds.

11.2. Limitations and avenues for further research

Although my analytical strategy contributes to the existing literature and study situation on both a conceptual and methodological level, my dissertation nevertheless has its limitations. It paves the way for promising future research. One limitation is the repeated cross-sectional design of this study. I estimate the contribution of a certain population group, namely households with minimum wage workers, on the overall change in income inequality. This is regularly done with other population groups as well, such as single mothers, the low-educated, Black or Hispanic persons, the unemployed, etc. Such strategies study whether something has led to a change in the respective group, for example, whether their likelihood to fall into poverty or the penalties they experience on the labor market have changed over time. In my case, the population group of interest is defined by the policy, whose impact I wish to estimate. To put it another way, the group is defined by the treatment itself, i.e. being affected by minimum wage policy. The households with minimum wage earners in 2018 are distinct from those with minimum wage earners in 1989. While both groups include at least one member who works for an hourly wage at the prevailing minimum wage rate in their state of residence, they are not necessarily similar in terms of other characteristics. In fact, one of my arguments is that these households are *not* similar, and that this is part of the explanation for why minimum wage policy may be better targeted at low-income households in 2018 than in 1989. A panel design would allow the contribution of households in which at least one person earned the minimum wage in year t , and in which the same person still earned the (higher) minimum wage in year $t+1$ to be estimated. This would enable the impact of the households affected by the *increase* in the minimum wage itself to be estimated, in contrast to the repeated cross-sectional design that estimates the impact of households that were affected by the prevailing minimum wage in year

t, and (other) households who were affected by the prevailing minimum wage in year $t+1$. The major problem with such a design is that panel surveys offer smaller sample sizes, which is particularly problematic if there is no oversampling of low-income families or workers in the low-wage sector. At the same time, the sample must be representative of the entire population in order to be able to make statements about the effects on income inequality at the level of the population as a whole. The proportion of households with a minimum wage earner is around 10% in the cross-section. The CPS-ASEC provides a large sample, which is why in my case it is 6,700 households in 1989 and 7,300 households in 2018. The Panel Study of Income Dynamics (PSID) provides an alternative data source based on a longitudinal panel survey of American families conducted by the Survey Research Center at the University of Michigan. It provides an oversample of low-income families, but the total case numbers range from 7,100 to 9,600 cases for the period of interest. The PSID provides information on calculated hourly wages of individuals as well as other income sources in total family income. However, the much smaller sample reduces the expected number of households with minimum wage earners to 1,000 to 1,500 households despite an oversampling of low-income households. This complicates the analysis in the context of a KOB decomposition of unconditional quantile regressions. For an analysis that makes use of the panel design, the group of interest would in addition be limited to households with at least two waves in which one of their household members earned the minimum wage. To address my research question, which deals with long-term change over time, this would restrict the analysis to households that can be identified as affected over a reasonably long period of time. Since this case is empirically too rare, an analysis with repeated cross-sections makes sense for this type of study. In theory, a panel design would make it possible to identify the households that are directly affected by the minimum wage *increase*, but empirically this case is too rare. One of my central arguments is that the composition of households with minimum wage employees has changed. Furthermore, not even a panel design can meet the challenge of controlling for all other time-varying confounding variables.

One of the strengths of the present design is the broad understanding of the changing situation of households affected by the minimum wage. I have argued that in addition to the rising level of minimum wages, their bite has also increased as more and more households derive their total income primarily from minimum wage employment. In combination with a more favorable policy landscape, I assumed that households with minimum wage earners fared better in 2018 than in 1989, and that this contributed to a declining income gap between low-income households and households at the median. However, it cannot be ruled out that the average improvement in the income situation, which is measured using the income structure effect, is not entirely attributable to the average increase in minimum wages. Alternatively, the composition of households with minimum wage employees could change in a way that cannot be controlled for using the covariates. Changing compositions depending on employment composition and work intensity, education, ethnicity and family constellation, in particular the number of children, are controlled for using suitable covariates. Variables on relevant alternative sources of income such as public transfers, tax refunds and the tax liability of households are also controlled for. Unobserved heterogeneity therefore remains a challenge and cannot rule out the possibility that other developments have led to a change in the income situation.

As is usual in analyses of income measures, I use logged values of the figures for the different types of income. This means that households that reported having no income at all are excluded from the analysis. Furthermore, in the analyses of the distribution of household labor income, all households that did not report labor income are excluded. This considerably restricts the analysis sample. Households with a gross or net income of zero make up only 0.6% of the sample with valid data on all other variables, but around 20% of households have no earned income. As the aim is to estimate changes in income inequality at the population level, households with zero income from work are retained in the analysis sample for the analyses of the broad income measures. The poverty and inequality measures may change if zero-income households are excluded, and this group makes up a significant proportion of the population. In such cases, the measures should be adjusted (Hlasny, Ceriani, and Verme 2021). The specific treatment of such cases is beyond the scope of this paper, but I argue that an alternative solution to the exclusion of households with no labor income might be a good step forward to better compare the results between the effects of minimum wage households on the distribution of the broad income concepts of gross or net household income and the more limited ones, i.e. the distribution of household labor income. My results have shown that the population considered in estimating the impact of minimum wage households plays an important role in the observed results regarding the distribution of households' gross and net incomes. The relative improvement in the income situation of minimum wage households compared to households with higher hourly wages appears to be most pronounced when the composition of the total population is considered, including other groups such as low-income elderly and low-income households without gainful employment. This shows that the difference between two groups in terms of their influence on the shape of the distribution depends on the overall composition of the entire unconditional distribution, including the positioning of "uninvolved" third groups. It would therefore be worthwhile to investigate a suitable method for replacing the value of zero with a positive constant in the context of unconditional quantile regression and the distribution of labor income. Examples that could be investigated would be the addition of 1, so that raw zeros remain as log-transformed zeros, or the addition of a very small constant.

The results suggest a complex interplay between households' minimum wage receipt and their tax liability. In multiple cases, the results indicated stronger contributions of households with minimum wage earners when changes in the income tax system are not controlled for. I used different model specifications and compared the results to argue that changes in the tax system were beneficial to the interplay between rising earnings and households' tax liability. The results suggest that the increasing progressivity of the tax system and generosity of the tax refund system ensures higher income growth among households with minimum wage earners, which is not visible to the same extent when such changes are controlled for. For the estimation of interaction effects, however, my models always include the corresponding main effect. Thus, when I estimate the contribution of households with minimum wage earners who receive tax refunds, the model specification technically includes the variables on the receipt of tax refunds. It therefore controls for the impact of the system of tax refunds (or the tax system overall, depending on the model specification) on changes in income inequality. This allows for an interpretation of the contribution of households with minimum wage earners on inequality independent of the role of tax systems. However, this is not necessarily what we want if we wish to estimate the effects of the minimum wage in the changing tax policy landscape, and not

independent of the impact of redistributive system. Only their omission allows them to interfere with the impact of the minimum wage, but when including the interaction effect, they are part of the model. Future research on the complex interplay between minimum wage and tax policy may employ an alternative research design that focuses on the changes in the tax system and how these changes have interacted with minimum wage policy.

My outcome measure of total household income does not include the cash value of employer or government-provided health insurance such as Medicare and Medicaid benefits. This was done in accordance with the standard procedure in the harmonized data set of the Luxembourg Income Study, and the measurement of income using the Supplemental Poverty Measure, which does not take into account the present value of benefits provided by employer or government-provided health insurance such as Medicare and Medicaid benefits. The inclusion of these benefits is fraught with substantive difficulties. First, benefits from medical insurance and aid do not make recipients better off than others with otherwise same amounts of income. Payments to cover expensive but necessary treatments do not result in any financial advantage over someone without similar payments and without the need for treatment. Second, medical insurance offsets medical expenses, which are unevenly distributed. This could mean that households with medical problems may look financially worse off than households with the same amount of income but without medical conditions (Wimer et al. 2020). I also do not subtract medical out-of-pocket expenses (MOOP) from income since data on medical out of pocket payments was available only as of ASEC 2011. Expenditures for health care are a significant portion of a family budget and have become an increasingly larger budget item. They include the payment of health insurance premiums plus other medically necessary items, such as prescription drugs and doctor copayments that are not covered by insurance. MOOP expenses are a mix of cost for premiums and smaller fees for people who have insurance and the costs reported by people without medical insurance cover. This is a limitation which opens future research possibilities. Contributions toward the cost of medical care and health insurance premiums, or medical out-of-pocket costs, are necessary expenses for critical goods and services and the Interagency Technical Working Group (ITGW), which developed the starting points for the production of the Supplemental Poverty Measure (SPM), recommended subtracting MOOP expenses from income, following the Panel on Poverty and Family Assistance of the National Academy of Sciences. Analyses on the SPM show that subtracting medical out-of-pocket expenses leads to an increase in the SPM rate of 2.46 percentage points, where the SPM rate stood at 12.77% in 2018 (U.S. Census Bureau 2019b). This is the largest impact among the necessary expenses of families that are subtracted, such as their income and payroll tax liability, work expenses, and child support paid. This suggests that it would be worthwhile studying the interplay between minimum wage work, medical expenses, and low household income more closely.

Several studies of minimum wage research have simulated varying levels of minimum wages and their impact on different aggregate measures such as employment or poverty. Future research could address the question of whether increases in larger steps are actually necessary, or whether indexing the level of the minimum wage would not only prevent its real value from falling over time as the cost of living rises, but also ensure its positive impact on low-income households. Especially against the background of the current development of inflation, this would be a decisive gain in knowledge. The advantage of indexation is that increases in the

minimum wage do not have to be fought for again and again in a lengthy and tiresome political process. The results of previous research suggested that indexation would be a good way of ensuring that the minimum wage functions as a safeguard against wage dumping, so that the expansion and generosity of the tax system does not end up subsidizing disproportionately low hourly wages (Lundstrom 2017). If the interplay between low-paid work and income support for low-income households works so effectively that an increase in the real value of the minimum wage is not even necessary to ensure that low-income households do not fall behind, indexation could be a policy move that would be easier to implement and still improve the wellbeing of a large number of households.

The results of the models including interaction terms indicated that the more progressive tax system in particular contributed to positive changes in the lower parts of the income distribution. Compared to the contributions of households with minimum wage earners, the positive contributions of households benefiting from tax refunds and low tax liabilities are substantially larger but located further up in the distribution. Refundable tax credits are a policy tool that benefits working households in general, and among them, also households with minimum wage earners. It remains an open question as to whether the positive contributions of households receiving tax refunds would be lower if there had been no statutory wage floor, or whether its real value would not have increased over time. A minimum hourly wage may be essential to ensure sufficiently high amounts of earned income for households with workers in the low-wage sector to be eligible for refundable tax credits such as the EITC. Future studies could explore whether the strong income-boosting effect of tax refunds can also be found in settings with a low minimum wage floor. Examples could be states in which there is no state-specific minimum wage or in which its real value, preferably measured using the state-specific costs of living, has declined.

As far as future research is concerned, I'm convinced that looking at recent years could help to advance knowledge. I have limited my analyses to the period up to 2018 and use ASEC 2019 as the most recent wave. The outbreak of the coronavirus pandemic led to changes in data collection and the systematic dropout of certain groups of survey participants. This led to biased results, particularly with regard to household income. Even with the help of the adjusted survey weights, there appears to be a break in the series. However, the last few years in particular should be looked at to consider the deliberate policy decisions made during the pandemic recession that led to low-wage workers experiencing dramatically rapid real wage growth after decades of slow growth. Between 2019 and 2023, state minimum wage increases combined with a tight labor market have led to faster real wage growth for low-wage workers, especially in states that increased their minimum wage during this period. At the 10th percentile, wages increased by 12.1% between 2019 and 2023, but this is probably still far from enough to make ends meet (Economic Policy Institute 2024a). Following my argument, however, one should look not only at the increase in real wages that accompanied the increase in minimum wages, but also at the composition of the group of households whose incomes are supported by income from minimum wage work. It is possible that this group has changed again systematically with the onset of the recession in connection with the pandemic, for example due to increased risks of unemployment within certain population groups. This in turn would imply a different potential influence of the minimum wage on aggregate measures such as income inequality or the poverty rate.

Another fruitful area of research may be to take a closer look at growing inequality of inequalities and how this relates to trends in the minimum wage and its impact on income inequality. There is a consensus that certain regions and local labor markets have diverged in terms of their economic fortunes. In particular, densely populated cities with a high share of college-educated workers, firms driving technological innovation and entrepreneurship have experienced enormous growth in mean income levels, whereas other regions or local labor markets, often less populous, educated and developed, have failed to keep pace with this trend. However, besides levels of economic fortune, levels of inequality have also become more unequal across regions. Since 1990, inequality levels in wages have diverged between U.S. regions and today's differences in local wage inequality are as large as at any time in the last 80 years (VanHeuvelen 2023). The diverging trend since 1990 is characterized by the separation of highly urban areas, which were unique in their high level of inequality. Low wages became more prevalent in large urban areas while high wage earners, who consistently resided in highly urban areas, experienced substantial growth in wage levels. That is, highly urban areas increasingly became the locations of extreme levels of wage inequality due to high concentrations of the country's highest wage earners and growing concentrations of the country's lowest wage earners (VanHeuvelen 2023). This is the case despite the fact that increasingly more cities have installed city-wide minimum wages, which underpins their relevance. In contrast to the convergence period before 1990, no particular region exhibited a pronounced tendency in this trend. Future research may use this pattern to study the precise relationship between a minimum wage threshold and the extent of local wage and income inequality and how this relationship affects the overall impact of minimum wages on measures such as income inequality in the population of the USA overall. This could clarify the extent to which the overall relationship is determined only by certain areas or whether such areas tend to cancel out the positive effect of minimum wages on income inequality or poverty.

Another starting point for future research could be the use of alternative outcome variables. For example, it could be that minimum wages have a greater influence on job or life satisfaction. A higher hourly wage can theoretically lead to higher job satisfaction, but it could also be that this is not the case if this hourly wage corresponds to the statutory minimum wage and therefore reflects only the "bare minimum". Life satisfaction could increase because job satisfaction increases. However, it could also increase because people have more free time, particularly if higher hourly wages lead to higher earnings and allow workers to choose more time for themselves instead of working more. In a society where leisure time or activities outside of work are becoming increasingly important, this could be an interesting research question. Minimum wages could also improve the lives of families in ways other than income-related measures, which might be worth exploring.

11.3. Discussion

Previous literature and empirical studies have indicated that minimum wages exert a relatively modest effect on poverty. However, the empirical landscape is highly fragmented, and results have been mixed. The academic, political, and media discourse surrounding the minimum wage has employed a number of theoretical perspectives on the efficiency of the minimum wage, many of which lack sufficient scientific foundation.

This dissertation identifies essential research gaps and contributes to the literature and research on the minimum wage based on alternative approaches to both conceptual and methodological issues. It utilizes a distributional analysis performed on a sample representing the whole population, combined with a new approach to specifying the affectedness by minimum wage policy not at the state level but at the household level. In order to investigate at what point in the "pipeline" from an individual's hourly wage to the total net income of a household a positive wage effect is not or only insufficiently translated further, I estimated the contribution of households with minimum wage earners to changes in percentile values of different income concepts. Different model specifications and interaction effects allow for a closer look at the interplay between changes in the systems of public transfers and taxes and the minimum wage, as well as the question as to whether households with minimum wage earners benefit from tax policy supporting low-income households in particular.

Unconditional quantile regression has already been used to provide a more nuanced picture of the impact of minimum wages compared to the commonly used poverty measure. However, in studies on the influence of the minimum wage on inequality, it has a) not been combined with a decomposition analysis in order to distinguish income structure effects from compositional effects and b) not been carried out for the distribution of net household income taking tax liability into account. Using quantile regression and estimating the impact of minimum wage policy at different points in the income distribution addresses the debate about the targeting problem associated with minimum wage policy. Unconditional quantile regression helps to assess at which points in the distribution changes in the income situation of minimum wage households actually contribute to rising quantile values in the overall distribution. In addition, statements can be made about how large the contributions are at different points in the distribution, i.e. whether, for example, households with minimum wage workers contribute to large increases in percentage terms in the lower range, while they contribute to small or no increases at the median. Such a result would counter the argument that the minimum wage is an insufficiently targeted measure. The results show that the positive contribution is indeed stronger in the lower income range, which indicates that minimum wage policy is actually able to reduce income inequality by providing targeted support to low-income households.

This general pattern was the same across all income concepts, but the more refined results and the extent of the differences between different income strata varied. The results showed that it is highly important to pay attention not only to certain points in the distribution such as the poverty threshold. The focus on inequality rather than the poverty rate and the distributional analysis showed that minimum wage households have indeed contributed significantly to positive changes in percentile values around the 5th percentile for the comprehensive income measures, which include income sources such as non-cash benefits and tax refunds, and, in the case of the measure of net household income, also the tax liability of households. This is well below the poverty threshold used for the supplemental poverty measure, which was located around the 13th percentile, or the poverty threshold of the relative poverty measure set at 50% (60%) of the year-specific median income, located around the 18th (24th) percentile of the distribution of net household income (U.S. Census Bureau 2019d; OECD.Stat 2024; LIS Cross-National Data Center in Luxembourg 2024). For the income concept that is closest to the income definition of the official poverty measure, namely gross household income excluding tax refunds, I did not find any positive contribution of households with minimum wage earners.

This may, despite the limited comparability, confirm that the way official poverty is measured makes it difficult to detect the impact of minimum wage policy. Also, 50/10 ratios and their development over time would not capture any changes happening below the 10th percentile. Especially when the exact target group of minimum wage policy is unknown, a full picture of the whole (lower half) of the income distribution is a reasonable approach to be able to detect possible policy impacts where they may not have been expected.

My main focus was on the development of the distribution of household net incomes in order to draw conclusions about the general impact of the minimum wage on the economic prosperity of households, which is ultimately defined by disposable household income. My results suggest that households with minimum wage earners contributed to increases in quantile values between the 5th and the 10th percentiles. Thus, a certain proportion of low-income households benefited and experienced an increase in their standard of living, which ultimately reduced income inequality in the lower half of the income distribution and thus the gap in living standards. This broad income concept also takes into account the income tax and payroll tax liability of households, which allows me to engage in the debate on the unfavorable interactions between minimum wages and other income sources such as public income support, including the receipt of tax refunds, as well as their tax burden.

To investigate the often-discussed interplay between minimum wage and EITC, the paper also approaches the empirical challenge of estimating interaction effects between minimum wage policy and tax policy. The results of the models with interaction terms indicate that the more progressive tax system in particular contributed to positive changes in the lower parts of the income distribution. Compared to the contributions of households with minimum wage earners, the positive contributions of households benefiting from tax refunds and low tax liabilities are substantially larger. In addition, the results suggest that refundable tax credits are a policy tool that also benefits households with minimum wage earners. However, it is working households in general that benefit, not in particular those in minimum wage employment. From these results, I conclude that households with minimum wage earners are more reliant on the increased generosity and progressivity of the income tax system than the target group of tax credits is reliant on the benefits of minimum wage policies. For example, the results show that households receiving tax refunds have not benefited from the increased real value of the minimum wage. However, this only relates to whether at least one person in the household in question worked for the minimum wage and was therefore directly and immediately affected. Nevertheless, an appropriate minimum hourly wage is essential to ensure a minimum level of earned income in conjunction with the maximum amounts of credits that households can claim. It also remains an open question as to whether the positive contributions of households receiving tax refunds would have been as high if there had been no statutory wage floor. As tax credits have often been discussed as subsidizing the low-wage sector, the combination with a statutory minimum wage is arguably crucial. Furthermore, an increase in the minimum wage also leads to an increase in wages further up the wage distribution. This means that other households can also benefit, which reinforces the positive effect of income tax policy on the lower income brackets and the reduction of income inequality.

This thesis also highlighted the importance of measuring the impact of the minimum wage at the population level, i.e. on overall income inequality or poverty. The highly fragmented empirical evidence base, with studies looking at many different, small population groups,

makes it difficult to draw conclusions about the population-wide effects of minimum wage policy. To address this problem, this paper examines trends in income inequality for the population as a whole. My results have shown that the population considered in estimating the impact of minimum wage households plays an important role in the observed results. The relative improvement in the income situation of minimum wage households compared to households with higher hourly wages, which is the basis of the contributions to changes in percentile values, appears to be most pronounced when considering the composition of the total population, including other groups such as low-income elderly and low-income households with no gainful employment. This shows that the difference between two groups in terms of their influence on the shape of the distribution depends on the overall composition of the total, unconditional distribution, including the positioning of “uninvolved” third groups.

Analyses of the influence of the minimum wage may be limited to certain population groups, such as the working population, due to the choice of research design or the lack of data for certain constructs. This would be the case, for example, when considering the distribution of labor income. However, positive values for earned income are only available for those people who are gainfully employed and earn salaries and therefore only for households in which at least one person is employed. In such cases, the composition of the total population is not taken into account. The comparison of different income concepts used as outcome variables underlines this, as households outside the labor market are neglected if the focus is on the distribution of labor income, for example. On this basis, I also take a critical look at the validity of the results based on different population groups.

In summary, this work advances the research agenda by filling both conceptual and empirical gaps. In addition to broadening the focus to provide a more comprehensive picture of the overall evolution of income inequality in the population as a whole, it also challenges prevailing methodological approaches. The work contributes to a more nuanced understanding of the impact of the minimum wage on income inequality and poverty, closes important research gaps and provides guidelines for future research in this critical field.

Institutions play a major role in sociology. However, research on the effects of the minimum wage has been neglected, even though regulation of the minimum wage is one of the most important labor market institutions. The empirical studies on which this thesis builds are almost exclusively in economics, although the outcome variable of interest, income inequality or poverty, is also a heavily researched topic in sociology. However, the focus in sociology, particularly in the US, has been on the decline of unionization and its impact on inequality. Unlike other labor market institutions that affect wages, job security or other quality criteria of employment of certain groups in the labor market, the minimum wage by definition targets those at the lower end of the distribution of hourly wages. What remains unclear, however, is the relationship to the distribution of (net) household income. It is surprising that this relationship has not been researched more thoroughly in sociology.

Therefore, this work also contributes to a broader discussion on social inequalities and the role of the welfare state in ensuring minimum income protection and securing an acceptable level of inequality in a society. Quantitatively, I have examined such a relationship in relation to different income concepts with the primary aim of measuring the influence of the minimum wage independently of other factors. However, I would also like to initiate a broader-based

discussion on unequal living standards and on the coordinated design of labor market institutions and welfare states.

I argued that potential cuts in transfers should not be used as a counterargument against minimum wages. The design of the system of public transfers and taxes is a political choice and, if the political will is there, can be adapted to reflect the evolution of wages and a better match between labor income and other sources of income in U.S. families. Indeed, scholars and organizations point out that the conclusion to be drawn from a limited impact of minimum wages on overall poverty is that the interplay between wage policies, benefit systems, and taxation needs to be adjusted to ensure that the effective minimum wage leads to higher net household incomes and thus greater financial security for families (OECD 2015a). Therefore, minimum wages should not be treated as a stand-alone policy, but only as part of a larger system of income security for individuals and families.

When labor income rises, regardless of whether other sources of income remain unchanged or fall due to lower entitlements, the share of labor income increases relative to the share of income from other sources, such as private or public transfers. Thus, labor income increases in absolute terms and plays a greater relative role than before as one of the components of total income, which has several implications.

Higher earned income leads to higher contributions to the social security system. This means that the future social security entitlements for old-age pensions and other social security benefits of the individuals concerned will be higher. An increase in earned income - even if it is not reflected in higher net income due to the decline in other sources of income such as transfers - is therefore accompanied by higher future income due to higher individual contributions to statutory pension insurance and social security. In addition to the positive effects on future income at an individual level, rising payroll taxes ensure the financial solvency of the Social Security Trust Fund.

As the share of labor income in the total income of individuals and households increases, the potential stigma of welfare dependency decreases. The relatively high non-take up rates in certain transfer programs suggests that individuals and families refrain from claiming public transfers due to stigma and complicated access to programs, strict schedules for dealing with authorities and paperwork, and the obligation to deliver supporting documents for means-testing with strict deadline (Ziliak 2016; Moffitt 2016). Altogether, this helps people escape possible poverty traps created by the operation of different welfare programs and reduces the problem of families not claiming transfers from programs they are eligible for. As a result, the issue of potential lack of support for families loses significance. Besides the stigma, one could expect on average lower stress for families, because fewer families are financially dependent on public transfers and required to fulfil the strict criteria that come with the receipt of public income support. In addition to the positive impact on individuals and families, this results in reduced caseloads and relieves state budgets, not only because of the reduced benefits to be paid, but also because of the reduced costs of governmental decision-making about benefit levels and eligibility requirements and for state and local agencies responsible for determining the eligibility criteria and procedures that apply in their programs.

Minimum wages also serve as a 'glass ceiling' to the adequacy of minimum income protection. Country-comparative data shows that increases in low-wage levels are associated with increases

in minimum incomes as provided by minimum income schemes (Cantillon, Parolin, and Collado 2020). Against the background of theory on reservation wages, this appears plausible. A sufficiently high minimum wage floor ensures a financial incentive for people to enter or stay in employment. In parallel, public income support helps individuals and families to maintain a certain minimum income level when their opportunities for engaging in work are limited. If earnings prospects are too low, which becomes more likely with a very low minimum wage floor, labor supply will decline, and consequently, welfare states would have to adapt by imposing stricter welfare provision rules. Income protection is a trade-off between attempts to ensure a balance between income adequacy for non-working households and the financial incentive for an individual to take up work. Thus, if minimum wage levels stagnate, minimum income protection is likely to stagnate as well (Cantillon, Parolin, and Collado 2020:12). Minimum wages may therefore be an essential tool for reducing poverty risks in general, and not exclusively for workers in minimum wage work and their families.

The main objective of the introduction of the minimum wage and the struggles to increase it was to improve the living conditions of families dependent on the income of a low wage earner. It is debatable what specific indicators should be used to assess whether this goal has been achieved. This dissertation examines the impact of minimum wage development on income inequality. Therefore, the analyses in this paper are based on income measures, primarily net household income. The overall results found are relatively small, especially when compared to results based on differential household income tax liability and receipt of tax refunds, which represent the impact of changes in the income tax system on income inequality. At the fifth percentile, for example, a 1% (2%) increase in household disposable income equals an increase of about \$86 (\$172) per year, which is only a moderate amount even for a household with an income of \$8,600. Households that received tax refunds contributed by more than 6% to the value of the 15th percentile, which equals about \$830 per year on a total disposable income of about \$13,880. This is arguably a more significant amount, but it is important to remember that these contributions were located further up the distribution. At the 5th percentile, households with tax refunds also contributed only 2% to the percentile value. Thus, for the same income range, the income-increasing effect is not much larger. The target groups appear to differ, and the largest contributions from households with minimum wage earners were found much further down in the income distribution, which actually speaks in favor of the target efficiency of the minimum wage.

This means that the impact of households with minimum wage earners on income inequality, independent of other factors, is significantly lower than that of households that benefit from the progressive tax system. However, minimum wages have other important functions (OECD 2015a) that should not be neglected, especially when it comes to reducing social inequalities. As already mentioned, the minimum wage also serves as a safeguard against wage dumping, so that the expansion and generosity of the tax system does not lead to disproportionately low hourly wages being subsidized.

I argue that even a null result would merely indicate that the minimum wage has no discernible effect on the distribution of net household income under the current system. This should not lead to the conclusion that minimum wages are not a policy worth pursuing.

The question remains open as to whether other outcome variables might indicate a stronger influence. For example, it would also be legitimate to investigate whether minimum wages have a greater impact on life satisfaction or job satisfaction, or on people's leisure time. Thus, minimum wages could arguably improve the lives of families in other ways too.

Rising minimum wages do not lead to rising incomes if minimum wage earners work fewer hours, whether voluntarily or not. The possible reduction in working hours was part of the debate about the effectiveness of the minimum wage as a social policy instrument. However, it may also be that people simply prefer leisure time over work if their earnings remain the same. More free time would still be a rational option if people value their time away from work or if that extra time can save other costs, such as for childcare, housework or through behaviors such as cost-conscious shopping at bargain prices. More broadly, additional free time can also translate into greater well-being, better health or a greater sense of happiness, which can ultimately increase productivity beyond being an end in itself. A higher hourly wage, regardless of whether it is reflected in a higher net income, also indicates a higher appreciation of low-wage work. This can also lead to greater employee satisfaction and higher productivity.

In the context of the extensive debates over the benefits and costs of the minimum wage, the minimum wage has also been defended as an essential labor standard. Like many other regulations in the labor market that are enacted through laws, regulations, and standards, the minimum wage establishes a certain standard of work, in this case a floor below which Congress will not allow wages to fall. Many other labor standards, such as laws against child labor, unpaid overtime or discrimination, increase employers' costs but are recognized as “integral to the functioning of labor markets” (Bernstein and Shierholz 2014b:1037). Regardless of its potential impact on employment, the minimum wage has therefore been defended as an essential labor standard, and most scholars agree that some degree of harmful effects should be acceptable for a social policy instrument that improves the economic situation of families and households at the lower end of the income distribution (Neumark and Wascher 2008:141–42). Neither the impact on employment nor on working hours should be the central criterion for evaluating minimum wage policy, but rather the ultimate goals of combating poverty and income inequality and setting a standard below which neither the law nor the norms based on it allow people to be employed (Neumark and Wascher 2008:106). This is all the more true given the distress of many low-wage workers and the looming threats of technological change, globalization and socioeconomic inequality. Against this backdrop, indexing current minimum wages or indexing the next minimum wage adjustment to inflation is critical to freeing minimum wage adjustments from congressional oversight. The bare minimum of a low-wage standard and the plight of working families should not be politicized. Otherwise, the fate of low-wage workers is contingent upon the shifting political agendas of each new administration.

12. References

Acemoglu, Daron, and David H. Autor. 2011. “Skills, Tasks and Technologies: Implications for Employment and Earnings” Pp. 1043–171 in *Handbook of Labor Economics*, Volume 4, Part B, edited by David E. Card and Orley Ashenfelter. Amsterdam: Elsevier-North Holland.

- Acs, Gregory and Pamela Loprest. 2004. *Leaving welfare. Employment and well-being of families that left welfare in the post-entitlement era*. WE Upjohn Institute.
- Addison, John T., and McKinley L. Blackburn. 1999. "Minimum Wages and Poverty". *Industrial and Labor Relations Review* 52 (3):393–409.
- Agan, Amanda Y., and Michael D. Makowsky. 2020. "The Minimum Wage, EITC, and Criminal Recidivism". *Journal of Human Resources* 58 (5):1712–51.
- Alderson, Arthur S., and Kevin Doran. 2013. "How has income inequality grown? The reshaping of the income distribution in LIS countries" Pp. 51–76 in *Income inequality: Economic disparities and the middle class in affluent countries*, edited by Janet C. Gornick and Markus Jäntti. Stanford Calif.: Stanford Univ. Press.
- Allegretto, Sylvia A., Arindrajit Dube, and Michael Reich. 2009. "Spatial Heterogeneity and Minimum Wages: Employment Estimates for Teens Using Cross-State Commuting Zones". Working Paper Series. Institute for Research on Labor and Employment, Institute of Industrial Relations, UC Berkeley.
- Allegretto, Sylvia A., Arindrajit Dube, and Michael Reich. 2011. "Do Minimum Wages Really Reduce Teen Employment? Accounting for Heterogeneity and Selectivity in State Panel Data". *Industrial Relations* 50 (2):205–40.
- Allegretto, Sylvia A., Arindrajit Dube, Michael Reich, and Ben Zipperer. 2017. "Credible Research Designs for Minimum Wage Studies". *ILR Review* 70 (3):559–92.
- Alonso, Cristian. 2020. "Beyond labor market outcomes: The impact of the minimum wage on nondurable consumption". *Journal of Human Resources*:0518-9524R2.
- Alper, Kaitlin, Evelyne Huber, and John D. Stephens. 2021. "Poverty and Social Rights Among the Working Age Population in Post-Industrial Democracies". *Social Forces* 99 (4):1710-44.
- Angrist, Joshua D. and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*, vol. 2008. Princeton, NJ: Princeton University Press.
- Antonczyk, Dirk, Thomas DeLeire, and Bernd Fitzenberger. 2018. "Polarization and Rising Wage Inequality: Comparing the U.S. and Germany". *Econometrics* 6 (2):20.
- Ashenfelter, Orley C., Henry Farber, and Michael R. Ransom. 2010. "Labor Market Monopsony". *Journal of Labor Economics* 28 (2):203–10.
- Atkinson, Anthony B., and François Bourguignon. 2015. "Introduction: Income Distribution Today" Pp. xvii–lxiv in *Handbook of Income Distribution*, vol. 2, edited by Anthony Barnes Atkinson and François Bourguignon. Elsevier.
- Atkinson, Anthony Barnes. 2015. *Inequality. What can be done?* Cambridge, Massachusetts: Harvard University Press.
- Auten, Gerald, and David Splinter. 2019. "Top 1 Percent Income Shares: Comparing Estimates Using Tax Data". *AEA Papers and Proceedings* 109:307–11.
- Autor, David H. 2014. "Skills, education, and the rise of earnings inequality among the 'other 99 percent'". *Science (New York, N.Y.)* 344 (6186):843–51.
- Autor, David H., and David Dorn. 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market". *American Economic Review*.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2008. "Trends in U.S. Wage Inequality: Revising the Revisionists". *Review of Economics and Statistics* 90 (2):300–23.

- Autor, David H., Alan Manning, and Christopher L. Smith. 2016. "The Contribution of the Minimum Wage to US Wage Inequality over Three Decades: A Reassessment". *American Economic Journal: Applied Economics* 8 (1):58–99.
- Avdagic, Sabina, and Paola Salardi. 2013. "Tenuous link: labour market institutions and unemployment in advanced and new market economies". *Socio-Economic Review* 11 (4):739–69.
- Baccaro, Lucio, and Diego Rei. 2007. "Institutional Determinants of Unemployment in OECD Countries: Does the Deregulatory View Hold Water?". *International Organization* 61 (3):527–69.
- Bailey, Martha J. and Sheldon H. Danziger (eds.). 2013. *Legacies of the War on Poverty*. The National Poverty Center Series on Poverty and Public Policy. New York: Russell Sage Foundation.
- Baker, Dean, Andrew Glyn, David R. Howell, and John Schmitt. 2005. "Labor Market Institutions and Unemployment: Assessment of the Cross-Country Evidence" Pp. 72–118 in *Fighting unemployment: The limits of free market orthodoxy*, edited by David R. Howell. Oxford: Oxford Univ. Press.
- Barack Obama. 2014. "Remarks by the President on Signing of Executive Order". Retrieved February 24, 2020 (<https://obamawhitehouse.archives.gov/the-press-office/2014/02/12/remarks-president-signing-executive-order>).
- Bartsch, Kristina J. 2009. "The employment projections for 2008-18". *Monthly Labor Review* 132 (11):3–10.
- Bastian, Jacob, and Katherine Micheltore. 2018. "The Long-Term Impact of the Earned Income Tax Credit on Children's Education and Employment Outcomes". *Journal of Labor Economics* 36 (4):1127–63.
- Baumol, William J. 1986. "Productivity growth, convergence, and welfare: What the long-run data show". *American Economic Review* 76 (5):1072–85.
- Becker, Gary S. 1974. "On the relevance of the new economics of the family". *The American Economic Review* 64 (2):317–19.
- Bell, Daniel. 1976. "The Coming of the Post-Industrial Society". *The Educational Forum* 40 (4):574–79.
- Belman, Dale and Paul J. Wolfson. 2014. *What does the Minimum Wage do?* Kalamazoo, Michigan: W.E. Upjohn Institute for Employment Research.
- Belman, Dale, Paul J. Wolfson, and Kritkorn Nawakitphaitoon. 2015. "Who Is Affected by the Minimum Wage?". *Industrial Relations* 54 (4):582–621.
- Belman, Dale L., and Paul Wolfson. 2010. "The Effect of Legislated Minimum Wage Increases on Employment and Hours: A Dynamic Analysis". *Labour* 24 (1):1–25.
- Benjamin, Dwayne. 1996. "Do Minimum Wages Really Matter?: Reducing employment and distributing income". *POLICY OPTIONS-MONTREAL* 17:37–41.
- Benjamin, Dwayne. 2001. "Minimum wages in Canada" Pp. 187–220 in *Labor Market Policies in Canada and Latin America: Challenges of the New Millennium*, edited by Albert Berry. Boston, MA: Springer US.
- Ben-Shalom, Yonatan, Robert A. Moffitt, and John K. Scholz. 2012. "An Assessment of the Effectiveness of Antipoverty Programs in the United States" Pp. 709–49 in *The Oxford Handbook of the Economics of Poverty*, edited by Philip N. Jefferson. Oxford: Oxford University Press.

- Bernstein, Jared, and Heidi Shierholz. 2014a. "A Response to Joseph J. Sabia". *Journal of Policy Analysis and Management* 33 (4):1047–49.
- Bernstein, Jared, and Heidi Shierholz. 2014b. "The Minimum Wage: A Crucial Labor Standard that is well targeted to Low- and Moderate-Income Households". *Journal of Policy Analysis and Management* 33 (4):1036–43.
- Bianchi, Suzanne M., and Lynne M. Casper. 2000. "American Families". *Population Bulletin. A publication of the Population Reference Bureau* 55 (4).
- Biegert, Thomas. 2019. "Labor market institutions, the insider/outsider divide and social inequalities in employment in affluent countries". *Socio-Economic Review* 17 (2):255–81.
- Blackburn, McKinley L. and David E. Bloom. 1991. "The Distribution of Family Income: Measuring and Explaining Changes in the 1980s for Canada and the United States". NBER Working Paper 3659. Cambridge, MA: National Bureau of Economic Research.
- Blank, Rebecca M. 1997. "Policy Watch: The 1996 Welfare Reform". *Journal of Economic Perspectives* 11 (1):169–77.
- Blau, Francine D., and Lawrence M. Kahn. 2013. "Female Labor Supply: Why Is the United States Falling Behind?". *American Economic Review* 103 (3):251–56.
- Bloome, Deirdre, and Shannon Ang. 2020. "Marriage and Union Formation in the United States: Recent Trends Across Racial Groups and Economic Backgrounds". *Demography*.
- Boeri, Tito, Pietro Garibaldi, and Marta Ribeiro. 2011. "The lighthouse effect and beyond". *Review of Income and Wealth* 57:54–78.
- Bollinger, Christopher, Luis J. Gonzalez, and James P. Ziliak. 2009. "Welfare Reform and the Level and Composition of Income" Pp. 59–103 in *Welfare reform and its long-term consequences for America's poor*, edited by James Patrick Ziliak. Cambridge: Cambridge University Press.
- Bollinger, Christopher R., Barry T. Hirsch, Charles M. Hokayem, and James P. Ziliak. 2019. "Trouble in the Tails? What We Know about Earnings Nonresponse 30 Years after Lillard, Smith, and Welch". *Journal of Political Economy* 127 (5):2143–85.
- Brady, D. 2003. "The Politics of Poverty: Left Political Institutions, the Welfare State, and Poverty". *Social Forces* 82 (2):557–88.
- Brady, David. 2009. *Rich Democracies, Poor People. How Politics Explain Poverty*. New York: Oxford University Press.
- Brady, David. 2023. "Poverty, not the poor". *Science Advances* 9 (34).
- Brady, David, Regina S. Baker, and Ryan M. Finnigan. 2013. "When Unionization Disappears". *American Sociological Review* 78 (5):872–96.
- Brady, David, Ryan M. Finnigan, and Sabine Hübgen. 2017. "Rethinking the Risks of Poverty: A Framework for Analyzing Prevalences and Penalties". *American Journal of Sociology* 123 (3):740–86.
- Brady, David, Andrew S. Fullerton, and Jennifer Moren Cross. 2010. "More Than Just Nickels and Dimes: A Cross-National Analysis of Working Poverty in Affluent Democracies". *Social Problems* 57 (4):559–85.
- Brady, David, Marco Giesselmann, Ulrich Kohler, and Anke Radenacker. 2018. "How to measure and proxy permanent income: evidence from Germany and the U.S". *The Journal of Economic Inequality* 16 (3):321–45.
- Brady, David, and Zachary Parolin. Forthcoming. "The levels and trends in deep and extreme poverty in the U.S., 1993–2016". *Demography*.

- Bramlett, Matthew D., and William D. Mosher. 2002. "Cohabitation, Marriage, Divorce, and Remarriage in the United States". *Vital Health Statistics* 23 (22):1–32.
- Bridges, Benjamin and Robert V. Gesumaria. 2015. "The supplemental poverty measure (SPM) and children: How and why the SPM and official poverty estimates differ". *Social Security Bulletin* 75(3).
- Brochu, Pierre, David A. Green, Thomas Lemieux, and James Townsend. 2018. "The minimum wage, turnover, and the shape of the wage distribution". Unpublished manuscript.
- Brown, Charles. 1999. "Minimum Wages, Employment, and the Distribution of Income". *Handbook of Labor Economics* 3:2101–63.
- Brown, Hana E., and Rachel K. Best. 2017. "Logics of Redistribution: Determinants of Generosity in Three U.S. Social Welfare Programs". *Sociological Perspectives* 60 (4):786–809.
- Bryan, Mark, Andrea Salvatori, and Mark Taylor. 2013. "The Impact of the National Minimum Wage on Employment Retention, Hours and Job Entry: Research Report for the Low Pay Commission.". Institute for Social and Economic Research; University of Essex.
- Bullinger, Lindsey R. 2017. "The Effect of Minimum Wages on Adolescent Fertility: A Nationwide Analysis". *American journal of public health* 107 (3):447–52.
- Bureau of Labor Statistics. 2020a. "Labor Force Statistics from the Current Population Survey: 23. Persons at work by occupation, sex, and usual full- or part-time status". Retrieved December 2, 2020 (<https://www.bls.gov/cps/cpsaat23.htm>).
- Bureau of Labor Statistics, U.S. Department of Labor. 1997. "Employment Characteristics of Families: 1996". Washington, DC: Bureau of Labor Statistics, U.S. Department of Labor. Retrieved May 18, 2020 (https://www.bls.gov/news.release/history/famee_061697.txt).
- Bureau of Labor Statistics, U.S. Department of Labor. 2002. "Characteristics of Minimum Wage Workers: 2002". BLS Reports. Retrieved February 24, 2020 (https://www.bls.gov/opub/reports/minimum-wage/archive/minimumwageworkers_2002.pdf).
- Bureau of Labor Statistics, U.S. Department of Labor. 2008. "Characteristics of Minimum Wage Workers: 2007". BLS Reports. Retrieved February 24, 2020 (https://www.bls.gov/opub/reports/minimum-wage/archive/minimumwageworkers_2007.pdf).
- Bureau of Labor Statistics, U.S. Department of Labor. 2014. "Women in the Labor Force: A Databook". BLS Reports 1049. Retrieved May 25, 2020 (<https://www.bls.gov/cps/wlf-databook-2013.pdf>).
- Bureau of Labor Statistics, U.S. Department of Labor. 2019a. "A profile of the working poor, 2017". BLS Reports 1079.
- Bureau of Labor Statistics, U.S. Department of Labor. 2019b. "Characteristics of minimum wage workers, 2018". BLS Reports Report 1078. Bureau of Labor Statistics, U.S. Department of Labor. Retrieved February 24, 2020 (<https://www.bls.gov/opub/reports/minimum-wage/2018/pdf/home.pdf>).
- Bureau of Labor Statistics, U.S. Department of Labor. 2020b. "A profile of the working poor, 2018". BLS Reports 1087.
- Bureau of Labor Statistics, U.S. Department of Labor. 2020c. "Labor Force Statistics". Retrieved October 27, 2020 (<https://www.bls.gov/data/#employment>).

- Bureau of Labor Statistics, U.S. Department of Labor. 2020d. "States and selected areas: Employment status of the civilian noninstitutional population: 1976 to 2019 annual averages". Retrieved May 28, 2020 (<https://www.bls.gov/lau/staadata.txt>).
- Bureau of Labor Statistics, U.S. Department of Labor. 2020e. "Employment Characteristics of Families - 2019". Washington, DC: Bureau of Labor Statistics, U.S. Department of Labor. Retrieved May 18, 2020 (<https://www.bls.gov/news.release/pdf/famee.pdf>).
- Burkhauser, Richard, Kenneth A. Couch, and Glenn, Andrew, J. 1996. "Public Policies for the Working Poor: The Earned Income Tax Credit versus Minimum Wage Legislation". *Research in labor economics* 15. JAI Press, Greenwich:65–109.
- Burkhauser, Richard V. 2010. "Book review: Minimum Wages by David Neumark; William L. Wascher". *Industrial and Labor Relations Review* 64 (1):202–03.
- Burkhauser, Richard V. 2014. "Why Minimum Wage Increases Are a Poor Way to Help the Working Poor". *IZA Policy Paper* (86).
- Burkhauser, Richard V., Kenneth A. Couch, and Andrew J. Glenn. 1995. "Public Policies for the Working Poor: The Earned Income Tax Credit versus Minimum Wage Legislation". *Research in labor economics* 15. JAI Press, Greenwich:65–109.
- Burkhauser, Richard V., Kenneth A. Couch, and David C. Wittenburg. 1996. "'Who Gets What' from Minimum Wage Hikes: A Re-Estimation of Card and Krueger's Distributional Analysis in Myth and Measurement: The New Economics of the Minimum Wage". *Industrial and Labor Relations Review* 49 (3).
- Burkhauser, Richard V., Shuaizhang Feng, Stephen P. Jenkins, and Jeff Larrimore. 2012. "Recent Trends in Top Income Shares in the United States: Reconciling Estimates from March CPS and IRS Tax Return Data". *Review of Economics and Statistics* 94 (2):371–88.
- Burkhauser, Richard V., and Aldrich T. Finegan. 1989. "The Minimum Wage and the Poor: The End of a Relationship". *Journal of Policy Analysis and Management* 8 (1):53–71.
- Burkhauser, Richard V. and Joseph J. Sabia. 2004. Why Raising the Minimum Wage Is a Poor Way to Help the Working Poor: An Analysis of Senators Kerry and Kennedy's Minimum Wage Proposal. Employment Policies Institute, Washington.
- Burkhauser, Richard V., and Joseph J. Sabia. 2007. "The Effectiveness of Minimum Wage Increase in reducing Poverty". *Contemporary Economic Policy* 25 (2):263–81.
- Burkhauser, Richard V., and Kosali I. Simon. 2008. "Who Gets What From Employer Pay or Play Mandates?". *Risk Management & Insurance Review* 11 (1):75–102.
- Burmeister, Kai. 2004. "Der gesetzliche Mindestlohn in den USA". WSI.
- Campolieti, Michele, and Morley Gunderson. 2010. "The Poverty of Minimum Wages an an Anti-Poverty Policy" Pp. 45–62 in *Social policy: Challenges, developments and implications*, edited by Lara P. Harrison. New York: Nova Science Publishers.
- Campolieti, Michele, Morley Gunderson, and Byron Lee. 2012. "The (Non) Impact of Minimum Wages on Poverty: Regression and Simulation Evidence for Canada". *Journal of Labor Research* 33 (3):287–302.
- Cantillon, Bea, Zachary Parolin, and Diego Collado. 2020. "A glass ceiling on poverty reduction? An empirical investigation into the structural constraints on minimum income protections". *Journal of European Social Policy* 30 (2):129-143.
- Card, David E. 1992a. *The Effect of Unions on the Distribution of Wages. Redistribution or Relabelling?* Cambridge, MA: National Bureau of Economic Research.

- Card, David E. 1992b. "Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage". *ILR Review* 46 (1):22–37.
- Card, David E., and Alan B. Krueger. 1994. "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania.". *The American Economic Review* 84 (4):772–93.
- Card, David E. and Alan B. Krueger. 1995a. *Myth and measurement. The new economics of the minimum wage*. Princeton, NJ: Princeton Univ. Press.
- Card, David E., and Alan B. Krueger. 1995b. "Time-Series Minimum-Wage Studies: A Meta-analysis". *The American Economic Review* 85 (2):238–43.
- Carrington, William J., and Fallick Bruce C. 2001. "Do some workers have minimum wage careers?". *Monthly Labor Review*:17–27.
- Casselmann, Ben. 2014. "When Living Wage Is Minimum Wage". Retrieved September 2, 2020 (<https://fivethirtyeight.com/features/when-living-wage-is-minimum-wage/>).
- Casselmann, Ben. 2015. "It's Getting Harder To Move Beyond A Minimum-Wage Job". Retrieved September 2, 2020 (<https://fivethirtyeight.com/features/its-getting-harder-to-move-beyond-a-minimum-wage-job/>).
- Cengiz, Doruk. 2019. "Essays on the Minimum Wage, Immigration, and Privatization". Doctoral Dissertations. 1702, University of Massachusetts Amherst. Retrieved June 15, 2020 (https://scholarworks.umass.edu/dissertations_2/1702/).
- Cengiz, Doruk, Arindrajit Dube, Attila Lindner, and Ben Zipperer. 2017. "The effect of minimum wages on the total number of jobs: Evidence from the United States using a bunching estimator". *Journal of Labor Economics* 35 (2).
- Cengiz, Doruk, Arindrajit Dube, Attila Lindner, and Ben Zipperer. 2019. "The Effect of Minimum Wages on Low-Wage Jobs". *Quarterly Journal of Economics* 134 (3):1405–54.
- Center on Budget and Policy Priorities. 2020. "Childless Adults Are Lone Group Taxed Into Poverty: EITC expansion could address problem". Washington, DC.
- Center on Budget and Policy Priorities. 2022a. "Policy Basics: Federal Payroll Taxes". Washington, DC (<https://www.cbpp.org/research/policy-basics-federal-payroll-taxes>).
- Center on Budget and Policy Priorities. 2022b. "Policy Basics: The Child Tax Credit". Washington, DC (<https://www.cbpp.org/research/policy-basics-the-child-tax-credit>).
- Center on Budget and Policy Priorities. 2022c. "Policy Basics: The Supplemental Nutrition Assistance Program (SNAP)". Washington, DC (<https://www.cbpp.org/research/policy-basics-the-supplemental-nutrition-assistance-program-snap>).
- Chattopadhyay, Shinjinee, and Emily C. Bianchi. 2021. "Does the Black/White Wage Gap Widen During Recessions?". *Work and Occupations* 48 (3):247–284.
- Cherlin, Andrew J. 2010. "Demographic Trends in the United States: A Review of Research in the 2000s". *Journal of marriage and the family* 72 (3):403–19.
- Chernozhukov, Victor, Iván Fernández-Val, and Blaise Melly. 2013. "Inference on counterfactual distributions". *Econometrica* 81 (6):2205–68.
- Chetty, Raj, John N. Friedman, and Emmanuel Saez. 2013. "Using Differences in Knowledge Across Neighborhoods to Uncover the Impacts of the EITC on Earnings". *American Economic Review* 103 (7):2683–721.
- Clemens, Jeffrey, and Michael Wither. 2019. "The minimum wage and the Great Recession: Evidence of effects on the employment and income trajectories of low-skilled workers". *Journal of Public Economics* 170:53–67.

- Cohen, Philip N., and Suzanne M. Bianchi. 1999. "Marriage, children, and women's employment: what do we know?". *Monthly Labor Review* 122 (12):22–31.
- Congressional Budget Office. 2014. "The Effects of a Minimum-Wage Increase on Employment and Family Income". *OBO*.
- Congressional Research Service. 2018. "The Earned Income Tax Credit (EITC): A Brief Legislative History". Washington, DC.
- Congressional Research Service. 2019a. "Final Vote Results for Roll Call 496". Retrieved April 1, 2020 (<http://clerk.house.gov/evs/2019/roll496.xml>).
- Congressional Research Service. 2019b. "H.R.582 - 116th Congress (2019-2020): Raise the Wage Act: H.R.582 - 116th Congress (2019-2020): Raise the Wage Act". Retrieved April 1, 2020 (<https://www.congress.gov/bill/116th-congress/house-bill/582>).
- Congressional Research Service. 2020. "State Minimum Wages: An Overview" R43792 (<https://fas.org/sgp/crs/misc/R43792.pdf>).
- Connolly, Sara, and Mary Gregory. 2002. "The National Minimum Wage and Hours of Work: Implications for Low Paid Women*". *Oxford Bulletin of Economics and Statistics* 64 (supplement):607–31.
- Cooper, David. 2014. "20 States Raise Their Minimum Wages While the Federal Minimum Continues to Erode". Economic Policy Institute. Retrieved May 11, 2020 (<https://www.epi.org/blog/20-states-raise-their-minimum-wages-while-the-federal-minimum-continues-to-erode/>).
- Cooper, David. 2018. "Our analysis of January 1 state minimum wage changes understated the total increase in wages for workers throughout the country". Economic Policy Institute. Retrieved May 11, 2020 (<https://www.epi.org/blog/our-analysis-of-january-1-state-minimum-wage-changes-understated-the-total-increase-in-wages-for-workers-throughout-the-country/>).
- Cooper, David, Elise Gould, and Ben Zipperer. 2019. "Low-wage workers are suffering from a decline in the real value of the federal minimum wage". Washington, DC: Economic Policy Institute. Retrieved February 24, 2020 (<https://www.epi.org/files/pdf/172974.pdf>).
- Cribb, Jonathan, Giulia Giupponi, Robert Joyce, Attila Lindner, Tom Waters, Thomas Wernham, and Xiaowei Xu. 2021. "The distributional and employment impacts of nationwide Minimum Wage changes". Working Paper 21/48. Institute for Fiscal Studies.
- Currie, Janet and Fallick Bruce C. 1993. "'The Minimum Wage and the Employment of Youth: Evidence from the NLSY'". Cambridge, MA.
- Daly, Mary C., and Robert G. Valletta. 2006. "Inequality and Poverty in United States: The Effects of Rising Dispersion of Men's Earnings and Changing Family Behaviour". *Economica* 73:75–98.
- DeNavas-Walt, Carmen and Bernadette D. Proctor. 2015. "Income and Poverty in the United States: 2014.". Current Population Reports P60-252. Washington, D.C. Retrieved March 5, 2021 (<https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-252.pdf>).
- Derenoncourt, Ellora, and Claire Montialoux. 2020. "Minimum Wages and Racial Inequality*". *The Quarterly Journal of Economics* 136 (1):169–228.
- Desmond, Matthew. 2019. "Dollars on the margins". *The New York Times Magazine*. 21 February 2019. Retrieved June 23, 2020

- (<https://www.nytimes.com/interactive/2019/02/21/magazine/minimum-wage-saving-lives.html?action=click&module=RelatedLinks&pgtype=Article>).
- Diamond, Rebecca. 2016. "The Determinants and Welfare Implications of US Workers' Diverging Location Choices by Skill: 1980-2000". *American Economic Review* 106 (3):497–524.
- Dickens, Richard, Rebecca Riley, and David Wilkinson. 2009. "The Employment and Hours of Work Effects of the Changing National Minimum Wage: Research Report for the Low Pay Commission". University of Sussex and Centre for Economic Performance, London School of Economics; and National Institute of Economic and Social Research.
- Dickens, Richard, Rebecca Riley, and David Wilkinson. 2012. "Re-examining the Impact of the National Minimum Wage on Earnings, Employment and Hours: The Importance of Recession and Firm Size: Technical Report.". London: Low Pay Commission.
- DiNardo, John E., Nicole M. Fortin, and Thomas Lemieux. 1996. "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach". *Econometrica* 64 (5):1001–44.
- DiPrete, Thomas A. 2007. "What Has Sociology to Contribute to the Study of Inequality Trends?: A Historical and Comparative Perspective". *American Behavioral Scientist* 50 (5):603–18.
- DiPrete, Thomas A., Dominique Goux, Eric Maurin, and Amélie Quesnel-Vallée. 2006. "Work and pay in flexible and regulated labor markets: A generalized perspective on institutional evolution and inequality trends in Europe and the US". *Research in Social Stratification and Mobility* 24:311–32.
- Donovan, Sarah A., Marc Labonte, and Joseph Dalaker. 2016. "The US Income Distribution: Trends and Issues". *Washington DC: Congressional Research Service*. Retrieved on June 13:2017.
- Doucouliagos, Hristos, and T. D. Stanley. 2009. "Publication Selection Bias in Minimum-Wage Research?: A Meta-Regression Analysis". *British Journal of Industrial Relations* 47 (2):406–28.
- Dow, William, Anna Godøy, Christopher Lowenstein, and Michael Reich. 2019. "Can Economic Policies Reduce Deaths of Despair?". Cambridge, MA.
- Dube, Arindrajit. 2011. "Book review: Minimum Wages by David Neumark, William L. Wascher". *Journal of Economic Literature* 49 (3):762–66.
- Dube, Arindrajit. 2014. "Proposal 13: Designing thoughtful minimum wage policy at the state and local level". *Policies to Address Poverty in America* 137:137–46.
- Dube, Arindrajit. 2018. "Minimum Wages and the Distribution of Family Incomes". Cambridge, MA.
- Dube, Arindrajit. 2019a. "Making the case for a higher minimum wage". Retrieved January 10, 2024 (<https://www.milkenreview.org/articles/making-the-case-for-a-higher-minimum-wage>).
- Dube, Arindrajit. 2019b. "Minimum Wages and the Distribution of Family Incomes". *American Economic Journal: Applied Economics* 11 (4):268–304.
- Dube, Arindrajit. 2019c. "Impacts of minimum wages: review of the international evidence". HM Treasury, Department for Business, Energy & Industrial Strategy.
- Dube, Arindrajit, Laura Giuliano, and Jonathan Leonard. 2019. "Fairness and Frictions: The Impact of Unequal Raises on Quit Behavior". *American Economic Review* 109 (2):620–63.

- Dube, Arindrajit, T. W. Lester, and Michael Reich. 2010. "Minimum Wage Effects Across State Borders Estimates using Contiguous Counties". *The Review of Economics and Statistics* 92 (4):945–64.
- Dube, Arindrajit, Suresh Naidu, and Michael Reich. 2007. "The Economic Effects of a Citywide Minimum Wage". *ILR Review* 60 (4):522–43.
- Dube, Arindrajit and Ben Zipperer. "Pooling multiple case studies using synthetic controls: An application to minimum wage policies". IZA discussion paper no. 8944.
- Dwyer, and Wright. 2019. "Low-Wage Job Growth, Polarization, and the Limits and Opportunities of the Service Economy". *RSF: The Russell Sage Foundation Journal of the Social Sciences* 5 (4):56.
- Economic Policy Institute. 2019. "Minimum Wage Tracker". Retrieved July 11, 2019 (https://www.epi.org/minimum-wage-tracker/#/min_wage/).
- Economic Policy Institute. 2020. "Minimum Wage Tracker". Retrieved April 24, 2020 (<https://www.epi.org/minimum-wage-tracker/>).
- Economic Policy Institute. 2024a. "Fastest wage growth over the last four years among historically disadvantaged groups". Retrieved March 21, 2024 (<https://www.epi.org/publication/swa-wages-2023/>).
- Economic Policy Institute. 2024b. "Minimum Wage Tracker". Retrieved February 14, 2024 (<https://www.epi.org/minimum-wage-tracker/>).
- Edin, Kathryn and Laura Lein. 1997. *Making ends meet. How single mothers survive welfare and low-wage work*. New York: Russell Sage Foundation.
- Edwards, Ashley and John Creamer. 2019. "Updating the Current Population Survey Processing System and Bridging Differences in the Measurement of Poverty". Poverty Working Papers SEHSD-WP2019-05. U.S. Census Bureau. Retrieved March 5, 2021 (<https://www.census.gov/content/dam/Census/library/working-papers/2019/demo/sehswp2019-05.pdf>).
- Edwards, Ashley and Rachel Lindstrom. 2017. "Measuring the Presence and Impact of Same-Sex Married Couples on Poverty Rates in the Current Population Survey" SEHSD-WP 2017-01. U.S. Census Bureau. Retrieved March 5, 2021 (<https://census.gov/content/dam/Census/library/working-papers/2017/demo/SEHSD-WP2017-01.pdf>).
- Eissa, Nada, and Hilary W. Hoynes. 2004. "Taxes and the labor market participation of married couples: the earned income tax credit". *Journal of Public Economics* 88 (9-10):1931–58.
- England, Paula. 2010. "The Gender Revolution: Uneven and Stalled". *Gender & Society* 24 (2):149–66.
- Esping-Andersen, Gøsta. 1990. *The three worlds of welfare capitalism*. Princeton: Princeton University Press.
- Esping-Andersen, Gøsta. 2011. *Social foundations of postindustrial economies*. Oxford: Oxford Univ. Press.
- Even, William E., and David A. Macpherson. 2014. "The Effect of the Tipped Minimum Wage on Employees in the U.S. Restaurant Industry". *Southern Economic Journal* 80 (3):633–55.
- Falk, Gene, Maggie McCarthy, and Randy Alison Aussenberg. 2014. "Work Requirements, Time Limits, and Work Incentives in TANF, SNAP, and Housing Assistance". CRS Report. Congressional Research Service.

- Federal Reserve Bank of St. Louis. 2021. "NBER based Recession Indicators for the United States from the Period following the Peak through the Trough [USREC]". Retrieved February 5, 2021 (<https://fred.stlouisfed.org/series/USREC>).
- Feenberg, Daniel. 2019. "TAXSIM Related Files at the NBER". Retrieved March 2, 2020 (<http://users.nber.org/~taxsim/>).
- Feenberg, Daniel, and Elisabeth Coutts. 1993. "An Introduction to the TAXSIM Model". *Journal of Policy Analysis and Management* 12 (1).
- Finnigan, Ryan. 2018. "Varying weekly work hours and earnings instability in the Great Recession". *Social science research* 74:96–107.
- Firpo, Sergio, Nicole M. Fortin, and Thomas Lemieux. 2009. "Unconditional Quantile Regressions". *Econometrica* 77 (3):953–73.
- Fishback, Price V. and Andrew J. Seltzer. 2020. "The Rise of American Minimum Wages, 1912-1968". Discussion Paper Series 12973. Bonn: IZA Institute of Labor Economics. Retrieved June 22, 2020Uhr (<http://ftp.iza.org/dp12973.pdf>).
- Fisher, Jonathan, and Timothy M. Smeeding. 2016. "Income Inequality". *Pathways: A magazine on poverty, inequality, and social policy*. Special Issue 2016:32–38.
- Fligstein, Neil. 2018. *The Architecture of Markets. An Economic Sociology of Twenty-First-Century Capitalist Societies*. Princeton University Press.
- Flinn, Christopher J. 2006. "Minimum Wage Effects on Labor Market Outcomes under Search, Matching, and Endogenous Contact Rates". *Econometrica* 74 (4):1013–62.
- Flood, Sarah, Miriam King, Renae Rodgers, Steven Ruggles, and J. Robert Warren. 2020. "Integrated Public Use Microdata Series, Current Population Survey: Version 8.0".
- Flood, Sarah, Miriam King, Renae Rodgers, Steven Ruggles, and John Robert Warren. 2018. "Integrated Public Use Microdata Series, Current Population Survey: Version 6.0".
- Förster, Michael F., and István G. Tóth. 2015. "Cross-Country Evidence of the Multiple Causes of Inequality Changes in the OECD Area" Pp. 1729–843 in *Handbook of Income Distribution*, vol. 2, edited by Anthony Barnes Atkinson and François Bourguignon. Elsevier.
- Fortin, Nicole M., and Thomas Lemieux. 1997. "Institutional Changes and Rising Wage Inequality: Is There a Linkage?". *Journal of Economic Perspectives* 11 (2):75–96.
- Fortin, Nicole M., Thomas Lemieux, and Sergio Firpo. 2011. "Decomposition Method in Economics" Pp. 1–102 in *Handbook of labor economics*, edited by Orley Ashenfelter and David E. Card. Amsterdam: North-Holland.
- Freeman, Richard B. 1993. "How Much has Deunionization Contributed to the Rise of Male Earnings Inequality?" Pp. 133–63 in *Uneven tides: Rising inequality in America*, edited by Sheldon H. Danziger. New York: Russell Sage Foundation.
- Freeman, Richard B. 1996. "The Minimum Wage as a Redistributive Tool". *The Economic Journal* 106 (436):639–49.
- Fry, Richard. 2015. "More Milleennials Living With Family Despite Improved Job Market". *Pew Research Center, Washington, D.C.*
- Ganong, Peter, and Daniel Shoag. 2017. "Why has regional income convergence in the U.S. declined?". *Journal of Urban Economics* 102:76–90.
- Gardner, Jennifer M. and Diane E. Herz. 1992. "Working and poor in 1990". Retrieved May 25, 2020Uhr (<https://www.bls.gov/opub/mlr/1992/12/art2full.pdf>).

- Garnero, Andrea, Stephan Kampelmann, and François Rycx. 2015. "Minimum wage systems and earnings inequalities: Does institutional diversity matter?". *European Journal of Industrial Relations* 21 (2):115–30.
- Gautié, Jérôme, and Sophie Ponthieux. 2016. "Employment and the Working Poor" in *The Oxford Handbook of the Social Science of Poverty*, vol. 1, edited by David Brady and Linda M. Burton. Oxford: Oxford University Press.
- Gautié, Jérôme and John Schmitt. 2009. *Low-wage work in the wealthy world*. The Russell Sage Foundation Case Studies of Job Quality in Advanced Economies. New York: Russell Sage Foundation.
- Gearhart, Richard, Lyudmyla Sonchak-Ardan, and Raphael Thibault. 2022. "The impact of minimum wage on parental time allocation to children: evidence from the American Time Use Survey". *Review of Economics of the Household*:1–24.
- Giesselmann, Marco, and Henning Lohmann. 2008. "The Different Roles of Low-wage Work in Germany: Regional, Demographical and Temporal Variances in the Poverty Risk of Low-paid Workers: 4" in *The working poor in Europe: Employment, poverty and globalisation*, edited by Hans-Jürgen Andreß and Henning Lohmann. Cheltenham: Edward Elgar.
- Godbout, Todd M. 1993. "Employment change and sectoral distribution in 10 countries, 1970-90". *Monthly Labor Review* 116:3–20.
- Godøy, Anna and Michael Reich. 2019. "Minimum Wage Effects in Low-Wage Areas" NO. 106-19. IRLE Working Paper. Retrieved February 24, 2020 (<http://digamoo.free.fr/godoyreich619.pdf>).
- Goldin, Claudia and Lawrence F. Katz. 2007. *The Race between Education and Technology. The Evolution of U.S. Educational Wage Differentials, 1890 to 2005*. Cambridge, MA: National Bureau of Economic Research.
- Goldstein, Joshua R., and Catherine T. Kenney. 2001. "Marriage Delayed or Marriage Forgone? New Cohort Forecasts of First Marriage For U.S. Women". *American Sociological Review* 66:506–19.
- Gornick, Janet C. and Branko Milanović. 2015. "Income Inequality in the United States in Cross-National Perspective: Redistribution Revisited". LIS Center Research Brief 1. New York.
- Gottschalk, Peter, and Sheldon H. Danziger. 2005. "Inequality of wage rates, earnings and family income in the United States, 1975-2002". *Review of Income and Wealth* 51 (2):231–54.
- Gottschalk, Peter, and Timothy M. Smeeding. 1997. "Cross-national comparisons of earnings and income inequality". *Journal of Economic Literature* 35 (2):633–87.
- Gouskova, Elena, Patricia Andreski, and Robert F. Schoeni. 2010. "Comparing Estimates of Family Income in the Panel Study of Income Dynamics and the March Current Population Survey, 1968-2007". Technical Series Paper 10-01. University of Michigan.
- Government Accountability Office. 2015. "Federal Low Income Programs: Multiple Programs Target Diverse Populations and Needs". Washington, DC.
- Gramlich, Edward M., Robert J. Flanagan, and Michael L. Wachter. 1976. "Impact of Minimum Wages on Other Wages, Employment, and Family Incomes". *Brookings Papers on Economic Activity* 1979 (2):409–61.

- Gregg, Paul, Rosanna Scutella, and Jonathan Wadsworth. 2010. "Reconciling workless measures at the individual and household level. Theory and evidence from the United States, Britain, Germany, Spain and Australia". *Journal of Population Economics* 23 (1):139–67.
- Grogger, Jeffrey. 2003. "The Effects of Time Limits, the EITC, and Other Policy Changes on Welfare Use, Work, and Income among Female-Headed Families". *Review of Economics and Statistics* 85 (2):394–408.
- Grusky, David B., and Jasmine Hill. 2018. "Poverty and Inequality in the 21st Century" Pp. 1–10 in *Inequality in the 21st Century: A Reader*, edited by David B. Grusky and Jasmine Hill. Boulder: Routledge.
- Grusky, David B., and Manwai C. Ku. 2008. "Gloom, Doom, and Inequality" Pp. 2–28 in *Social Stratification: Class, Race, and Gender in Sociological Perspective*, edited by David B. Grusky. Boulder, Colorado: Westview Press.
- Grusky, David B., and Alair MacLean. 2016. "The Social Fallout of a High-Inequality Regime". *The ANNALS of the American Academy of Political and Social Science* 663 (1):33–52.
- Gundersen, Craig, and James P. Ziliak. 2004. "Poverty and Macroeconomic Performance Across Space, Race, and Family Structure". *Demography* 41 (1):61–86.
- Gunderson, Morley. 2005. "Minimum Wages in Canada: Theory, Evidence and Policy".
- Hall, Peter A. and David Soskice (eds.). 2001. *Varieties of capitalism. The institutional foundations of comparative advantage*. Oxford Scholarship Online. Oxford: Oxford Univ. Press.
- Hamermesh, Daniel S. 2019. "The labor market in the US, 2000–2018". *IZA World of Labor*.
- Harasztosi, Péter, and Attila Lindner. 2019. "Who Pays for the Minimum Wage?". *American Economic Review* 109 (8):2693–727.
- Hardy, Bradley, Timothy M. Smeeding, and James P. Ziliak. 2018. "The Changing Safety Net for Low-Income Parents and Their Children: Structural or Cyclical Changes in Income Support Policy?". *Demography*.
- Haugen, Steven E., and Earl F. Mellor. 1990. "Estimating the number of minimum wage workers". *Monthly Labor Review* 113 (70).
- Hildebrandt, Eugenie, and Patricia Stevens. 2009. "Impoverished Women With Children and No Welfare Benefits: The Urgency of Researching Failures of the Temporary Assistance for Needy Families Program". *American journal of public health* 99 (5):793–801.
- Hirsch, Barry T., Bruce E. Kaufman, and Tetyana Zelenska. 2015. "Minimum Wage Channels of Adjustment". *Industrial Relations: A Journal of Economy and Society* 54 (2):199–239.
- Hirsch, Barry T., David A. Macpherson, and Wayne G. Vroman. 2001. "Estimates of Union Density by State". *Monthly Labor Review* 124 (7):51–55.
- Hlasny, Vladimir, Lidia Ceriani, and Paolo Verme. 2021. "Bottom Incomes and the Measurement of Poverty and Inequality". *Review of Income and Wealth*.
- Holtzblatt, Janet, Janet McCubbin, and Robert Gillette. 1994. "Promoting work through the EITC". *National Tax Journal* 47 (3).
- Horemans, Jeroen. 2018. "Atypical Employment and In-work Poverty" Pp. 146–70 in *Handbook on In-Work Poverty*, edited by Henning Lohmann and Ive Marx. Edward Elgar Publishing.

- Horrigan, Michael W., and Ronald B. Mincy. 1993. "The Minimum Wage and Earnings and Income Inequality" in *Uneven tides: Rising inequality in America*, edited by Sheldon H. Danziger. New York: Russell Sage Foundation.
- House of Representatives. 1938. *Fair Labor Standards Act of 1938*.
- House of Representatives. 2007. *Fair Minimum Wage Act of 2007*.
- Hout, Michael, Asaf Levanon, and Erin Cumberworth. 2011. "Job Loss and Unemployment" Pp. 59–81 in *The Great Recession*, edited by David B. Grusky, Bruce Western, and Christopher Wimer. New York, NY: Russell Sage Foundation.
- Hoynes, Hilary W., and Ankur Patel. 2018. "Effective Policy for Reducing Poverty and Inequality?: The Earned Income Tax Credit and the Distribution of Income". *Journal of Human Resources* 53 (4):859–90.
- Hughes, Samuel. 2020. "Housing Demand & Affordability for Low-Wage Households: Evidence from Minimum Wage Changes". *SSRN Electronic Journal*.
- Hurst, Erik, Patrick Kehoe, Elena Pastorino, and Thomas Winberry. 2022. "The Distributional Impact of the Minimum Wage in the Short and Long Run". NBER Working Paper Series. Cambridge, MA.
- Iceland, John. 2003. "Why poverty remains high: The role of income growth, economic inequality, and changes in family, 1949-1999". *Demography* 40 (3):499–519.
- Institute for Research on Poverty. 2019. "Understanding benefit cliffs and marginal tax rates". IRP Fast Focus Research/Policy Brief No. 43-2019. Madison, WI.
- Institute for Social Research. 2023. "PSID-2021 Main Interview User Manual: Release 2023". University of Michigan.
- Internal Revenue Service. 2021. "Topic No. 751 Social Security and Medicare Withholding Rates". Retrieved January 22, 2021 (<https://www.irs.gov/taxtopics/tc751>).
- Iversen, Torben, and Anne Wren. 1998. "Equality, employment, and budgetary restraint: The trilemma of the service economy". *World Politics* 50:507–46.
- Jantti, Markus, Eva Sierminska, and Tim Smeeding. 2008. "The Joint Distribution of Household Income and Wealth: Evidence from the Luxembourg Wealth Study".
- Johnson, David S. and Timothy M. Smeeding. 2012. "A consumer's guide to interpreting various U.S. poverty measures". Madison, WI: Institute for Research on Poverty (<https://www.irlp.wisc.edu/publications/fastfocus.htm>).
- Johnson, Lyndon. 2016. "Special Message to Congress Proposing a War on the Sources of Poverty: March 16, 1964" (<https://www.presidency.ucsb.edu/node/239636>).
- Johnson, Martin. 2001. "The Impact of Social Diversity and Racial Attitudes on Social Welfare Policy". *State Politics & Policy Quarterly* 1 (1):27–49.
- Johnson, William R., and Edgar K. Browning. 1983. "The Distributional and Efficiency Effects of Increasing the Minimum Wage: A Simulation". *The American Economic Review* 73 (73):204–11.
- Kaitz, Hyman. 1970. "Experience of the past: the national minimum wage" in *Youth unemployment and minimum wages: Bulletin 1657*, edited by U.S. Department of Labor.
- Kakwani, Nanak C. 1977. "Measurement of Tax Progressivity: An International Comparison". *The Economic Journal* 87 (345):71.
- Kalleberg, Arne L. 2000. "Nonstandard Employment Relations: Part-time, Temporary and Contract Work". *Annual Review of Sociology* 26 (1):341–65.

- Kalleberg, Arne L. 2018. *Precarious Lives. Job Insecurity and Well-Being in Rich Democracies*. Newark: Polity Press.
- Katz, Lawrence F., and David H. Autor. 1999. "Changes in the Wage Structure and Earnings Inequality" Pp. 1463–555 in *Handbook of Labor Economics*, vol. 3, edited by Orley Ashenfelter and David E. Card. Amsterdam: Elsevier.
- Katz, Lawrence F. and Richard B. Freeman (eds.). 1995. *Differences and changes in wage structures*. Chicago: University of Chicago Press.
- Katz, Lawrence F., and Alan B. Krueger. 1992. "The Effect of the Minimum Wage on the Fast-Food Industry". *ILR Review* 46 (1):6–21.
- Katz, Lawrence F., and Alan B. Krueger. 2016. "The Rise and Nature of Alternative Work Arrangements in the United States, 1995-2015". *NBER Working Paper*.
- Kenworthy, Lane. 2011. *Progress for the poor*. New York: Oxford University Press.
- Kenworthy, Lane. 2015. "Do employment-conditional earnings subsidies work?". ImPRovE Working Paper 15/10. Antwerpen: Herman Deleeck Centre for Social Policy - University of Antwerp.
- Kenworthy, Lane. 2018. "America's great decoupling" in *Inequality and Inclusive Growth in Rich Countries: Shared Challenges and Contrasting Fortunes*, edited by Brian Nolan. Oxford University Press.
- Kenworthy, Lane. 2024. *The Good Society*. <https://lanekenworthy.net/>.
- Kenworthy, Lane, and Ive Marx. 2018. "In-work Poverty in the United States" Pp. 328–44 in *Handbook on In-Work Poverty*, edited by Henning Lohmann and Ive Marx. Edward Elgar Publishing.
- King, Desmond, and David Rueda. 2008. "Cheap Labor: The New Politics of "Bread and Roses" in Industrial Democracies". *Perspectives on Politics* 6 (2):279–97.
- Kirkland, Katie. 2000. "On the decline in average weekly hours worked". *Monthly Labor Review* 123 (26).
- Klein, Bruce W. and Philip L. Rones. 1989. "A profile of the working poor". *Monthly Labor Review*. Retrieved May 26, 2020Uhr (<https://www.bls.gov/opub/mlr/1989/10/art1full.pdf>).
- Kleven, Henrik. 2020. "The EITC and the Extensive Margin: A Reappraisal". NBER Working Paper 26405. Cambridge, MA: National Bureau of Economic Research.
- Knowles, Sarah, Ilham Dehry, Katie Shantz, and Sarah Minton. "Graphical Overview of State TANF Policies as of July 2020: OPRE Report 2021-160". Washington, DC.
- Kochhar, Rakesh. 2014. "Latino Jobs Growth Driven by U.S. Born: Immigrants No Longer The Majority of Hispanic Workers". Washington, DC: Pew Research Center.
- Komro, Kelli A., Melvin D. Livingston, Sara Markowitz, and Alexander C. Wagenaar. 2016. "The Effect of an Increased Minimum Wage on Infant Mortality and Birth Weight". *American journal of public health* 106 (8):1514–16.
- Kristal, Tali, and Yinon Cohen. 2017. "The causes of rising wage inequality: The race between institutions and technology". *Socio-Economic Review* 15 (1):187-212.
- Kroll, Steven. 2011. "The decline in work hours during the 2007-09 recession". *Monthly Labor Review* 134 (53).
- Kuddo, Arvo, David Robalino, and Michael Weber. "Balancing regulations to promote Jobs: From employment contracts to unemployment benefits". Washington, DC: World Bank Group.

- Lee, David s. 1999. "Wage Inequality in the United States during the 1980s: Rising Dispersion or Falling Minimum Wage?". *The Quarterly Journal of Economics*, 114 (3):97–1023.
- Leigh, J. P., Wesley A. Leigh, and Juan Du. 2019. "Minimum wages and public health: A literature review". *Preventive medicine* 118:122–34.
- Lemieux, Thomas. 2008. "The Changing Nature of Wage Inequality". *Journal of Population Economics* 21 (1):21–48.
- Lemieux, Thomas. 2010. "What do we really know about changes in wage inequality?" Pp. 17–59 in *Labor in the new economy*, edited by Katharine G. Abraham, James Spletzer, and Michael J. Harper. Chicago, London: University of Chicago Press.
- Levin-Waldman, Oren M. 2015. "Taylorism, Efficiency, and the Minimum Wage: Implications for a High Road Economy". *Binzagr Institute for Sustainable Prosperity Working Paper* No. 105.
- Lindert, Peter H., and Jeffrey G. Williamson. 2016. "Unequal gains: American growth and inequality since 1700". *Juncture* 22 (4):276–83.
- LIS Cross-National Data Center in Luxembourg. 2024. "Inequality and Poverty Key Figures: LIS - United States: Relative Poverty Rates". Retrieved July 5, 2024 (<https://www.lisdatacenter.org/lis-ikf-webapp/app/search-ikf-figures>).
- Lohmann, H., and Ive Marx. 2008. "The different faces of in-work poverty across welfare state regimes" Pp. 17–46 in *The working poor in Europe: Employment, poverty and globalisation*, edited by Hans-Jürgen Andreß and Henning Lohmann. Cheltenham: Edward Elgar.
- Lohmann, Henning, and Eric Crettaz. 2018. "Explaining Cross-country Differences in In-Work Poverty" Pp. 50–69 in *Handbook on In-Work Poverty*, edited by Henning Lohmann and Ive Marx. Edward Elgar Publishing.
- Long, James E. 1999. "Updated estimates of the wage mobility of minimum wage workers". *Journal of Labor Research* 20 (4):493–503.
- Low Pay Commission. 2015. "National Minimum Wage: Low Pay Commission Report 2015".
- Luce, Stephanie. 2014. "Living Wages, Minimum Wages, and Low-Wage Workers" Pp. 215–43 in *What Works for Workers?: Public Policies and Innovative Strategies for Low-Wage Workers*, edited by Stephanie Luce, Jennifer Luff, Joseph A. McCartin, and Ruth Milkman. New York: Russel Sage Foundation.
- Lundstrom, Samuel M. 2017. "When is a Good Time to Raise the Minimum Wage?". *Contemporary Economic Policy* 35 (1):29–52.
- MaCurdy, Thomas. 2015. "How Effective Is the Minimum Wage at Supporting the Poor?". *Journal of Political Economy* 123 (2):497–545.
- Maloney, Tim, and Gail Pacheco. 2012. "Assessing the Possible Antipoverty Effects of Recent Rises in Age-Specific Minimum Wages in New Zealand". *Review of Income and Wealth* 58 (4):648–74.
- Manduca, Robert A. 2019. "The Contribution of National Income Inequality to Regional Economic Divergence". *Social Forces* 98 (2):622–48.
- Manning, Alan. 2003. *Monopsony in Motion*. Princeton: Princeton University Press.
- Manzo, Frank, Jill Manzo, and Robert Bruno. 2018. "Raising the minimum wage: What would \$10, \$13, or \$15 per hour mean for Illinois". Illinois Economic Policy Institute.
- Martin, Molly A. 2006. "Family Structure and Income Inequality in Families With Children, 1976 to 2000". *Demography* 43 (3):421–45.

- Marx, Ive, and Gerlinde Verbist. 2008. "When familialism fails: The nature and causes of in-work poverty in Belgium" Pp. 77–95 in *The working poor in Europe: Employment, poverty and globalisation*, edited by Hans-Jürgen Andreß and Henning Lohmann. Cheltenham: Edward Elgar.
- Mascella, Allison, Shahzia Teja, and Brennan S. Thompson. 2009. "Minimum Wage Increases as an Anti-Poverty Policy in Ontario". *Canadian Public Policy / Analyse de Politiques* 35 (3):373–79.
- McCall, Leslie, and Christine Percheski. 2010. "Income Inequality: New Trends and Research Directions". *Annual Review of Sociology* 36 (1):329–47.
- Meyer, Bruce D. 2002. "Labor Supply at the Extensive and Intensive Margins: The EITC, Welfare, and Hours Worked". *American Economic Review* 92 (2):373–79.
- Meyer, Bruce D. 2010. "The Effects of the Earned Income Tax Credit and Recent Reforms" Pp. 153–80 in *Tax Policy and the Economy*, edited by Jeffrey D. Brown.
- Meyer, Bruce D., Wallace K. Mok, and James X. Sullivan. 2015. "Household surveys in crisis". *The Journal of Economic Perspectives* 29 (4):199–226.
- Meyer, Bruce D., and Dan T. Rosenbaum. 2001. "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers". *The Quarterly Journal of Economics* 116 (3):1063–114.
- Meyer, Bruce D., and James X. Sullivan. 2012. "Identifying the Disadvantaged: Official Poverty, Consumption Poverty, and the New Supplemental Poverty Measure". *Journal of Economic Perspectives* 26 (3):111–36.
- Mishel, Lawrence. 2013. Declining value of the federal minimum wage is a major factor driving inequality. Washington, DC. *Economic Policy Institute, ISSUE BRIEF*.
- Mishel, Lawrence, Jared Bernstein, and John Schmitt. 1996. *The State of Working America. 1996-97*. New York: Routledge.
- Moellman, Nicholas S. 2018. "Essays on Transfer-Program Interactions Among Low-Income Households". Theses and Dissertations -- Economics 36. Kentucky.
- Moffitt, Robert, and John K. Scholz. 2010. "Trends in the Level and Distribution of Income Support". *Tax Policy and the Economy* 24 (1):111–52.
- Moffitt, Robert A. 2003. "The Negative Income Tax and the Evolution of U.S. Welfare Policy". *Journal of Economic Perspectives* 17 (3):119–40.
- Moffitt, Robert A. 2015. "The Deserving Poor, the Family, and the U.S. Welfare System". *Demography* 52 (3):729–49.
- Moffitt, Robert A. and Gwyn Pauley. 2018. "Trends in the Distribution of Social Safety Net Support: After the Great Recession". Stanford: Stanford Center on Poverty and Inequality.
- Moffitt, Robert A. and John Karl Scholz. 2009. *Trends in the Level and Distribution of Income Support*, H53, 13. Cambridge, MA: NBER Working Paper Series.
- Montenovo, Laura, Xuan Jiang, Felipe Lozano Rojas, Ian M. Schmutte, Kosali I. Simon, Bruce A. Weinberg, and Coady Wing. 2021. "Determinants of disparities in Covid-19 job losses". NBER Working Paper Series 27132. National Bureau of Economic Research. Retrieved September 20, 2021 (<http://www.nber.org/papers/w27132>).
- Morelli, Salvatore, Timothy M. Smeeding, and Jeffrey P. Thompson. 2015. "Post-1970 Trends in Within-Country Inequality and Poverty: Rich and Middle-Income Countries" Pp. 593–696 in *Handbook of Income Distribution*, vol. 2, edited by Anthony Barnes Atkinson and François Bourguignon. Elsevier.

- Morgan, David R., and Kenneth Kickham. 2001. "Children in poverty: Do State Policies Matter?". *Social Science Quarterly* 82 (3):478–93.
- Morgan, Stephen L., and Youngjoo Cha. 2007. "Rent and the Evolution of Inequality in Late Industrial United States". *American Behavioral Scientist* 50 (5):677–701.
- Morris, Martina, and Bruce Western. 2008. "Inequality in Earnings: Trends and Implications" Pp. 61–66 in *Social Stratification: Class, Race, and Gender in Sociological Perspective*, edited by David B. Grusky. Boulder, Colorado: Westview Press.
- Neumark, David. 2007. "Minimum Wage Effects in the Post-welfare Reform Era". *Employment Policies Institute*.
- Neumark, David. 2016. "Policy levers to increase jobs and increase income from work after the Great Recession". *IZA Journal of Labor Policy* 5 (1).
- Neumark, David, Brian Asquith, and Brittany Bass. 2020. "Longer-run effects of anti-poverty policies on disadvantaged neighborhoods". *Contemporary Economic Policy* (38):409–34.
- Neumark, David, J. M. Salas, and William L. Wascher. 2014. "More on recent evidence on the effects of minimum wages in the United States". *Journal of Labor Policy (IZA)* 3 (24).
- Neumark, David, Mark Schweitzer, and William L. Wascher. 2004. "Minimum Wage Effects throughout the Wage Distribution". *The Journal of Human Resources* 39 (2):425.
- Neumark, David, Mark Schweitzer, and William L. Wascher. 2005. "The Effects of Minimum Wages on the Distribution of Family Incomes.". *The Journal of Human Resources* 40 (4):867–94.
- Neumark, David, and William L. Wascher. 1992. "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws". *ILR Review* 46 (1):55–81.
- Neumark, David, and William L. Wascher. 2001. "Using The EITC to Help Poor Families: New Evidence and a Comparison with the Minimum Wage". *National Tax Journal* 54 (2):281–317.
- Neumark, David, and William L. Wascher. 2002. "Do Minimum Wages Fight Poverty?". *Economic Inquiry* 40 (3):315–33.
- Neumark, David, and William L. Wascher. 2011. "Does a higher minimum wage enhance the effectiveness of the earned income tax credit?". *Industrial and Labor Relations Review* 64 (4):712–46.
- Neumark, David and William Louis Wascher. 2008. *Minimum wages*, 1st edn. Cambridge, Massachusetts: MIT Press.
- Newman, Katherine S. and Rourke L. O'Brien. 2011. *Taxing the poor. Doing damage to the truly disadvantaged*. The Aaron Wildavsky forum for public policy, vol. 7. Berkeley: University of California Press.
- Nichols, Austin, and Jesse Rothstein. 2016. "The Earned Income Tax Credit" Pp. 137–218 in *Economics of means-tested transfer programs in the United States. Vol I.*, edited by Robert A. Moffitt. Chicago: The University of Chicago Press.
- Nichols, Austin and Sheila Zedlewski. "Is the safety net catching unemployed families?". Urban Institute Brief no. 21. Washington, DC: The Urban Institute.
- Nickell, Stephen. 1997. "Unemployment and Labor Market Rigidities: Europe versus North America". *Journal of Economic Perspectives* 11 (3):55–74.
- Nightingale, Demetra S., and Michael Fix. 2004. "Economic and Labor Market Trends". *The Future of Children* 14 (2):48.

- Nolan, Brian and Ive Marx. 1999. "Low Pay and Household Poverty". LIS Working papers 216. LIS Cross-National Data Center in Luxembourg (<https://EconPapers.repec.org/RePEc:lis:liswps:216>).
- OECD. 2003. "The Sources of Economic Growth in OECD Countries". Paris: OECD.
- OECD. 2011. "Labour Force Statistics 2010". Paris: OECD.
- OECD. 2015a. "Employment Outlook 2015". Paris: OECD.
- OECD. 2015b. "Labour Force Statistics 2014". Paris: OECD.
- OECD. 2016. "Income Inequality Update: Income inequality remains high in the face of weak recovery". Paris.
- OECD. 2020. "Hours worked (indicator)". Retrieved December 1, 2020 (<https://data.oecd.org/emp/hours-worked.htm>).
- OECD.Stat. 2024. "Income Distribution Database: Poverty by country". Retrieved March 6, 2024 (<https://stats.oecd.org/Index.aspx?DataSetCode=IDD>).
- Oka, Tatsushi and Ken Yamada. 2019. "Heterogeneous Impact of the Minimum Wage: Implications for Changes in Between-and Within-group Inequality."
- Orazem, Peter F., and J. P. Mattila. 2002. "Minimum wage effects on hours, employment, and number of firms: The Iowa case". *Journal of Labor Research* 23 (1):3–23.
- Orrenius, Pia M., and Madeline Zavodny. 2008. "The Effect of Minimum Wages on Immigrants' Employment and Earnings". *ILR Review* 61 (4):544–63.
- Page, Marianne E., Joanne Spetz, and Jane Millar. 2005. "Does the Minimum Wage Affect Welfare Caseloads?". *Journal of Policy Analysis and Management* 24 (2):273–95.
- Parolin, Zachary. 2019a. "Temporary Assistance for Needy Families and the Black–White child poverty gap in the United States". *Socio-Economic Review* 80:123.
- Parolin, Zachary. 2019b. "The Effect of Benefit Underreporting on Estimates of Poverty in the United States". *Social Indicators Research* 144 (2):869–98.
- Persky, Joseph J. and Ron Baiman. 2010. "Do State Minimum Wage Laws Reduce Employment? Mixed Messages from Fast Food Outlets in Illinois and Indiana".
- Peters, Gerhard and John T. Woolley. 2014. "Barack Obama, Address Before a Joint Session of the Congress on the State of the Union Online". Retrieved February 24, 2020 (<https://www.presidency.ucsb.edu/documents/address-before-joint-session-the-congress-the-state-the-union-21>).
- Pew Research Center. 2015a. "A Rising Share of the U.S. Black Population Is Foreign Born". Retrieved April 4, 2024 (<https://www.pewresearch.org/social-trends/2015/04/09/a-rising-share-of-the-u-s-black-population-is-foreign-born/>).
- Pew Research Center. 2015b. "Modern Immigration Wave Brings 59 Million to U.S., Driving Population Growth and Change Through 2065". Retrieved April 4, 2024 (<https://www.pewresearch.org/hispanic/2015/09/28/modern-immigration-wave-brings-59-million-to-u-s-driving-population-growth-and-change-through-2065/>).
- Pew Research Center. 2015c. "More Millennials Living With Family Despite Improved Job Market" (<https://www.pewresearch.org/social-trends/2015/07/29/more-millennials-living-with-family-despite-improved-job-market/>).
- Pew Research Center. 2020. "Key findings about U.S. immigrants". Retrieved April 4, 2024 (<https://www.pewresearch.org/short-reads/2020/08/20/key-findings-about-u-s-immigrants/>).

- Pew Research Center. 2021a. "Asian Americans are the fastest-growing racial or ethnic group in the U.S.". Retrieved April 4, 2024 (<https://www.pewresearch.org/short-reads/2021/04/09/asian-americans-are-the-fastest-growing-racial-or-ethnic-group-in-the-u-s/>).
- Pew Research Center. 2021b. "Key facts about Asian Americans, a diverse and growing population". Retrieved April 4, 2024 (<https://www.pewresearch.org/short-reads/2021/04/29/key-facts-about-asian-americans/>).
- Pew Research Center. 2021c. "The growing diversity of Black America". Retrieved April 4, 2024 (<https://www.pewresearch.org/social-trends/2021/03/25/the-growing-diversity-of-black-america/>).
- Pew Research Center. 2022a. "A brief statistical portrait of U.S. Hispanics". Retrieved April 4, 2024 (<https://www.pewresearch.org/science/2022/06/14/a-brief-statistical-portrait-of-u-s-hispanics/>).
- Pew Research Center. 2022b. "Key findings about Black immigrants in the U.S.". Retrieved April 4, 2024 (<https://www.pewresearch.org/short-reads/2022/01/27/key-findings-about-black-immigrants-in-the-u-s/>).
- Pew Research Center. 2022c. "U.S. population in multigenerational households quadrupled since 1971". Retrieved March 29, 2024 (https://www.pewresearch.org/social-trends/2022/03/24/the-demographics-of-multigenerational-households/psdt_03-24-22_multigenerational-households_1_0/).
- Pew Research Center. 2024. "Key facts about the nation's 47.9 million Black Americans". Retrieved April 4, 2024 (<https://www.pewresearch.org/short-reads/2024/01/18/key-facts-about-black-americans/>).
- Piketty, Thomas, and Emmanuel Saez. 2007. "How Progressive is the U.S. Federal Tax System? A Historical and International Perspective" 21 (1):3–24.
- Piketty, Thomas, and Emmanuel Saez. 2014. "Inequality in the long run". *The Science of Inequality* (6186):838–43.
- Plotnick, Robert D. 2012. "The Alleviation of Poverty: How Far Have We Come" Pp. 15–48 in *The Oxford Handbook of the Economics of Poverty*, edited by Philip N. Jefferson. Oxford: Oxford University Press.
- Powers, Elizabeth T. 2009. "The Impact of Minimum-Wage Increases: Evidence from Fast-food Establishments in Illinois and Indiana". *Journal of Labor Research* 30 (4):365–94.
- Prasch, Robert E. 1999. "Retrospectives: American Economists in the Progressive Era on the Minimum Wage". *Journal of Economic Perspectives* 13 (2):221–30.
- Raissian, Kerri M., and Lindsey R. Bullinger. 2017. "Money matters: Does the minimum wage affect child maltreatment rates?". *Children and Youth Services Review* 72:60–70.
- Raley, Sara B., Marybeth J. Mattingly, and Suzanne M. Bianchi. 2006. "How Dual Are Dual-Income Couples?: Documenting Change From 1970 to 2001". *Journal of Marriage and Family* (68):11–28.
- Reich, Michael. 2009. "Minimum Wages: Politics and Economics" Pp. 353–74 in *Labor in the Era of Globalization*, edited by Clair Brown, Barry J. Eichengreen, and Michael Reich. Cambridge, MA: Cambridge University Press.
- Reich, Michael, Ken Jacobs, and Annette Bernhardt. 2014. "Local Minimum Wage Laws: Impacts on Workers, Families and Businesses". *Institute for Research on Labor and Employment Working Paper* (104-14).

- Reich, Michael, and Rachel West. 2015. "The Effects of Minimum Wages on Food Stamp Enrollment and Expenditures". *Industrial Relations* 54 (4):668–94.
- Robinson, Helen, and Jonathan Wadsworth. 2007. "Impact of the Minimum Wage on the Incidence of Second Job Holding in Britain". *Scottish Journal of Political Economy* 54 (4):553–74.
- Romich, Jennifer, and Heather D. Hill. 2018. "Coupling a Federal Minimum Wage Hike with Public Investments to Make Work Pay and Reduce Poverty". *RSF: The Russell Sage Foundation Journal of the Social Sciences* 4 (3):22–43.
- Rosenfeld, Jake. 2014. *What Unions No Longer Do*. Harvard University Press.
- Rothbaum, Jonathan and Adam Bee. 2021. "Coronavirus Infects Surveys, Too: Survey Nonresponse Bias and the Coronavirus Pandemic". Census Working Papers SEHSD-WP2020-10. U.S. Census Bureau. Retrieved September 20, 2021 (<https://www.census.gov/library/working-papers/2020/demo/SEHSD-WP2020-10.html>).
- Rothstein, Jesse. 2010. "Is the EITC as Good as an NIT? Conditional Cash Transfers and Tax Incidence". *American Economic Journal: Economic Policy* 2 (1):177–208.
- Rothstein, Jesse and Ben Zipperer. 2020. "The EITC and minimum wage work together to reduce poverty and raise incomes". Washington, DC: Economic Policy Institute. Retrieved February 24, 2020 (<https://www.epi.org/files/pdf/179545.pdf>).
- Ruffini, Krista. 2020. "Do Higher Wages Save Consumer Lives? Evidence from Nursing Homes and Minimum Wage Reforms: Job Market Paper". Retrieved February 24, 2020 (https://drive.google.com/file/d/1d6vYu_uN9keb9iIT2R5UJihA_61K0Fce/view).
- Sabia, Joseph J. 2008. "Minimum Wages and the Economic Well-Being of Single Mothers". *Journal of Policy Analysis and Management* 27 (4):848–66.
- Sabia, Joseph J. 2009a. "Identifying Minimum Wage Effects: New Evidence from Monthly CPS Data". *Industrial Relations: A Journal of Economy and Society* 48 (2):311–28.
- Sabia, Joseph J. 2009b. "The Effects of Minimum Wage Increases on Retail Employment and Hours: New Evidence from Monthly CPS Data". *Journal of Labor Research* 30 (1):75–97.
- Sabia, Joseph J. 2014. "Minimum Wages: An Antiquated and Ineffective Antipoverty Tool". *Journal of Policy Analysis and Management* 33.
- Sabia, Joseph J., and Richard V. Burkhauser. 2008. "Minimum Wages and Poverty: Will the Obama Proposal Help the Working Poor?". *Employment Policies Institute*.
- Sabia, Joseph J., and Richard V. Burkhauser. 2010. "Minimum Wages and Poverty: Will a \$9.50 Federal Minimum Wage Really Help the Working Poor?". *Southern Economic Journal* 76 (3):592–623.
- Sabia, Joseph J. and Trinh T. Nguyen. 2017. "Do Minimum Wage Increases Really Reduce Public Assistance Receipt?: Unpublished paper". Employment Policies Institute.
- Sabia, Joseph J., and Robert B. Nielsen. 2015a. "Minimum wages, poverty, and material hardship: New evidence from the SIPP". *Review of Economics of the Household* 13 (1):95–134.
- Sabia, Joseph J., and Robert B. Nielsen. 2015b. "Minimum Wages, Poverty, and Material Hardship: New Evidence from the SIPP". *Review of Economics of the Household* 13 (1):95–134.
- Salverda, Wiemer, and Daniele Checchi. 2015. "Labor Market Institutions and the Dispersion of Wage Earnings" Pp. 1535–727 in *Handbook of Income Distribution*, vol. 2, edited by Anthony Barnes Atkinson and François Bourguignon. Elsevier.

- Salverda, Wiemer, Brian Nolan, and Timothy M. Smeeding. 2011a. "Introduction" in *The Oxford handbook of economic inequality*, edited by Wiemer Salverda, Brian Nolan, and Timothy M. Smeeding. Oxford: Oxford University Press.
- Salverda, Wiemer, Brian Nolan, and Timothy M. Smeeding (eds.). 2011b. *The Oxford handbook of economic inequality*, 1st edn. Oxford: Oxford University Press.
- Schanzenbach, Diane, and Michael R. Strain. 2021. "Employment Effects of the Earned Income Tax Credit: Taking the Long View". *Tax Policy and the Economy* 35:87–129.
- Schmitt, John. 2015. "Explaining the Small Employment Effects of the Minimum Wage in the United States". *Industrial Relations: A Journal of Economy and Society* 54 (4):547–81.
- Schwartz, Christine R., and Pilar Gonalons-Pons. 2016. "Trends in Relative Earnings and Marital Dissolution: Are Wives Who Outearn Their Husbands Still More Likely to Divorce?". *The Russell Sage Foundation journal of the social sciences: RSF* 2 (4):218–36.
- Scott, Christine and Margot L. Crandall-Hollick. 2014. "The Earned Income Tax Credit (EITC): An Overview". Congressional Research Service.
- Seefeldt, Kristin S., and Heather Sandstrom. 2015. "When There Is No Welfare: The Income Packaging Strategies of Mothers Without Earnings or Cash Assistance Following an Economic Downturn". *The Russell Sage Foundation Journal of the Social Sciences* 1 (1):139–58.
- Seikel, Daniel, and Dorothee Spannagel. 2018. "Activation and In-Work Poverty" Pp. 245–60 in *Handbook on In-Work Poverty*, edited by Henning Lohmann and Ive Marx. Edward Elgar Publishing.
- Seltzer, Andrew J. 1995. "The Political Economy of the Fair Labor Standards Act of 1938". *Journal of Political Economy* 103 (6):1302–42.
- Seltzer, Judith A. 2019. "Family Change and Changing Family Demography". *Demography*.
- Sen, Anindya, Kathleen Rybczynski, and Corey van de Waal. 2011. "Teen employment, poverty, and the minimum wage: Evidence from Canada". *Labour Economics* 18 (1):36–47.
- Shaefer, H. L., Kathryn Edin, Vincent Fusaro, and Pinghui Wu. 2019. "The Decline of Cash Assistance and the Well-Being of Poor Households with Children". *Social Forces* 136 (2):299.
- Shaefer, H. L., Kathryn Edin, and Elizabeth Talbert. 2015. "Understanding the Dynamics of \$2-a-Day Poverty in the United States". *The Russell Sage Foundation Journal of the Social Sciences* 1 (1):120–38.
- Siebert, Horst. 1997. "Labor Market Rigidities: At the Root of Unemployment in Europe". *Journal of Economic Perspectives* 11 (3):37–54.
- Smeeding, Timothy M. 2005. "Public Policy, Economic Inequality, and Poverty: The United States in Comparative Perspective". *Social Science Quarterly* (86):955–83.
- Smeeding, Timothy M. 2006. "Poor People in Rich Nations: The United States in Comparative Perspective". *Journal of Economic Perspectives* 20 (1):69–90.
- Smith, Ralph E., and Bruce Vavrichek. 1987. "The Minimum Wage: Its Relation to Incomes and Poverty". *Monthly Labor Review* 110 (6):24–30.
- Smith, Ralph E., and Bruce Vavrichek. 1992. "The Wage Mobility of Minimum Wage Workers". *Industrial and Labor Relations Review* 46 (1):82–88.
- Snyder, Thomas, Senayt Rinkevich, and Weici Yuan. 2019. "Do Minimum Wage Increases Affect SNAP Benefits?". *The B.E. Journal of Economic Analysis & Policy* 19 (2).

- Sobel, Russell S. 1999. "Theory and Evidence on the Political Economy of the Minimum Wage". *Journal of Political Economy* 107 (4):761–85.
- Solt, Frederick. 2020. "Measuring Income Inequality Across Countries and Over Time: The Standardized World Income Inequality Database". *Social Science Quarterly* 101 (3):1183–99.
- Stanley, Megan, Ife Floyd, and Misha Hill. 2016. "TANF Cash Benefits Have Fallen by More Than 20 Percent in Most States and Continue to Erode.". Washington, DC: Center on Budget and Policy Priorities.
- Stevans, Lonnie K., and David N. Sessions. 2001. "Minimum Wage Policy and Poverty in the United States". *International Review of Applied Economics* 15 (1):65–75.
- Stevens, Kathryn, Liana E. Fox, and Misty L. Heggeness. 2018. "Precision in Measurement: Using State-Level SNAP Administrative Records and the Transfer Income Model (TRIM3) to Evaluate Poverty Measurement". U.S. Census Bureau (<https://www.census.gov/content/dam/Census/library/working-papers/2018/demo/SEHSD-WP2018-15.pdf>).
- Stewart, Mark B. 2004. "The employment effects of the national minimum wage". *The Economic Journal* 114 (494):C110-C116.
- Stewart, Mark B., and Joanna K. Swaffield. 2008. "The Other Margin: Do Minimum Wages Cause Working Hours Adjustments for Low-Wage Workers?". *Economica* 75 (297):148–67.
- Stigler, George J. 1946. "The economics of minimum wage legislation". *The American Economic Review* 36 (3):358–65.
- Sykes, Jennifer, Križ, Katrin, Kathryn Edin, and Sarah Halpern-Meeking. 2015. "Dignity and Dreams: What the Earned Income Tax Credit (EITC) Means to Low-Income Families". *American Sociological Review* 80 (2):243–67.
- Tach, Laura, and Kathryn Edin. 2017. "The Social Safety Net After Welfare Reform: Recent Developments and Consequences for Household Dynamics". *Annual Review of Sociology* 43 (1):541–61.
- Tax Policy Center. 2020a. "Key Elements of the U.S. Tax System: How does the federal tax system affect low-income households?". Retrieved February 6, 2024 (<https://www.taxpolicycenter.org/briefing-book/how-does-federal-tax-system-affect-low-income-households>).
- Tax Policy Center. 2020b. "Key Elements of the U.S. Tax System: What is the standard deduction?". Retrieved February 5, 2024 (<https://www.taxpolicycenter.org/briefing-book/what-standard-deduction>).
- Tax Policy Center. 2021. "Key Elements of the U.S. Tax System: What is the child tax credit?". Retrieved February 7, 2024 (<https://www.taxpolicycenter.org/briefing-book/what-child-tax-credit>).
- Tax Policy Center. 2022a. "Key Elements of the U.S. Tax System: How did the TCJA change the standard deduction and itemized deductions?". Retrieved February 5, 2024 (<https://www.taxpolicycenter.org/briefing-book/how-did-tcja-change-standard-deduction-and-itemized-deductions>).
- Tax Policy Center. 2022b. "Standard Deduction Amount, 1970-2024". Retrieved February 5, 2024 (<http://www.taxpolicycenter.org/statistics/standard-deduction>).

- Tax Policy Center. 2023a. "EITC Recipients: Number of EITC recipients, total amount and refundable amount of credit, and average credit claimed, 1975 through 2020". Retrieved February 7, 2024 (<https://www.taxpolicycenter.org/statistics/eitc-recipients>).
- Tax Policy Center. 2023b. "U.S. Individual Income Tax: Personal Exemptions and Lowest and Highest Bracket Tax Rates, and Tax Base for Regular Tax". Retrieved February 5, 2024 (<https://www.irs.gov/statistics/soi-tax-stats-historical-table-23>).
- Tax Policy Center. 2024. "Historical Social Security Tax Rates, 1937 to 2024". Retrieved February 6, 2024 (<https://www.taxpolicycenter.org/statistics/payroll-tax-rates>).
- Torsney, Cheryl B. 2013. "In-Work Poverty" Pp. 131–56 in *Reconciling Work and Poverty Reduction: How Successful Are European Welfare States?*, edited by Bea Cantillon and Frank Vandenbroucke. Oxford University Press.
- U.S. Bureau of Economic Analysis. 2020a. "Table 6.4C. Full-Time and Part-Time Employees by Industry". Retrieved August 27, 2020 (<https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey>).
- U.S. Bureau of Economic Analysis. 2020b. "Table 6.4D. Full-Time and Part-Time Employees by Industry". Retrieved August 27, 2020 (<https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey>).
- U.S. Bureau of Labor Statistics. 2019. "Labor force characteristics by race and ethnicity, 2018". Retrieved April 5, 2024 (<https://www.bls.gov/opub/reports/race-and-ethnicity/2018/home.htm>).
- U.S. Census Bureau. 1989. "Estimates of the Population of the United States to January 1, 1989". Current Population Reports 1036. Retrieved March 29, 2024.
- U.S. Census Bureau. 1991. "Money income of households, families, and persons in the United States: 1988 and 1989". Current Population Reports 172 (<https://www2.census.gov/prod2/popscan/p60-172.pdf>).
- U.S. Census Bureau. 1992. "1990 Census of Population: General Population Characteristics. United States". Retrieved April 24, 2024 (<https://www2.census.gov/library/publications/decennial/1990/cp-1/cp-1-1.pdf>).
- U.S. Census Bureau. 1996. "Dynamics of Economic Well-Being: Program Participation, 1992-1993 — Who Gets Assistance?".
- U.S. Census Bureau. 1999. "Statistical Abstract of the United States 1999: Section 13: Labor Force, Employment, and Earnings". Retrieved April 5, 2024 (<https://www2.census.gov/library/publications/1999/compendia/statab/119ed/tables/sec13.pdf>).
- U.S. Census Bureau. 2002. "Asian and Pacific Islander, for the United States, Regions, Divisions, and States: 1990". Retrieved April 4, 2024 (<https://web.archive.org/web/20100327164259/http://www.census.gov/population/www/documentation/twps0056/appC.pdf>).
- U.S. Census Bureau. 2006. "Dynamics of Economic Well-Being: Participation in Government Programs, 2001 Through 2003 Who Gets Assistance?".
- U.S. Census Bureau. 2017. "Race & Ethnicity". Retrieved February 4, 2020 (<https://www.census.gov/mso/www/training/pdf/race-ethnicity-onepager.pdf>).

- U.S. Census Bureau. 2018a. “CPS Technical Documentation: Methodology”. Retrieved April 23, 2021 (<https://www.census.gov/programs-surveys/cps/technical-documentation/methodology.html>).
- U.S. Census Bureau. 2018b. “Monthly Population Estimates for the United States: April 1, 2010 to December 1, 2019 (NA-EST2018-01)”. Retrieved March 29, 2024 (<https://www.census.gov/newsroom/press-kits/2018/pop-estimates-national-state.html>).
- U.S. Census Bureau. 2019a. “ACS Demographic and Housing Estimates: American Community Survey, ACS 1-Year Estimates Data Profiles, Table DP05, 2019”. Retrieved April 2, 2024 (https://data.census.gov/table/ACSDP1Y2019.DP05?q=Regions Race and Ethnicity&g=020XX00US1,3,2,4_010XX00US).
- U.S. Census Bureau. 2019b. “Current Population Survey, 2019 Annual Social and Economic (ASEC) Supplement”. Washington.
- U.S. Census Bureau. 2019c. “Income and Poverty in the United States: 2018”. Current Population Reports (<https://www.census.gov/content/dam/Census/library/publications/2019/demo/p60-266.pdf>).
- U.S. Census Bureau. 2019d. “The Supplemental Poverty Measure: 2018”. Current Population Reports P60-268. U.S. Census Bureau.
- U.S. Census Bureau. 2019e. “Guidance for Poverty Data Users”. Retrieved February 3, 2020 (<https://www.census.gov/topics/income-poverty/poverty/guidance.html>).
- U.S. Census Bureau. 2020. “CPS Complete Technical Documentation: March 2020 Annual Social and Economic Supplement (ASEC)”. Retrieved February 18, 2021 (<https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar20.pdf>).
- U.S. Census Bureau. 2023a. “Households by Age of the Householder: 1960 to Present”. Retrieved March 28, 2024 (<https://www.census.gov/data/tables/time-series/demo/families/households.html>).
- U.S. Census Bureau. 2023b. “Households by Size, 1960 to Present”. Retrieved March 28, 2024 (<https://www.census.gov/data/tables/time-series/demo/families/households.html>).
- U.S. Census Bureau. 2023c. “Households by Type, 1940 to Present”. Retrieved March 28, 2024 (<https://www.census.gov/data/tables/time-series/demo/families/households.html>).
- U.S. Department of Labor. 2022. “History of Changes to the Minimum Wage Law”. Retrieved August 18, 2022 (<https://www.dol.gov/agencies/whd/minimum-wage/history>).
- U.S. Department of Labor Wage and Hour Division. 2011. *The Fair Labor Standards Act of 1938, As Amended*.
- U.S. Department of Labor Wage and Hour Division. 2021. “Changes in Basic Minimum Wages in Non-Farm Employment Under State Law: Selected Years 1968 to 2020”. Retrieved January 22, 2021 (<https://www.dol.gov/agencies/whd/state/minimum-wage/history>).
- U.S. Government Printing Office. 1999. “Economic Report of the President”. Washington, DC: U.S. Government Printing Office.
- University of Kentucky Center for Poverty Research. 2021. “UKCPR National Welfare Data, 1980-2019”. Retrieved March 9, 2021 (<http://ukcpr.org/resources/national-welfare-data>).
- van Bavel, Jan, Christine R. Schwartz, and Albert Esteve. 2018. “The Reversal of the Gender Gap in Education and Its Consequences for Family Life”. *Annual Review of Sociology*:341–60.

- VanHeuvelen, Tom. 2023. "The Topography of Subnational Inequality". *Social Forces* 101 (4):1682–711.
- Verdery, Ashton, and Colin Campbell. 2019. "Social Support in America: Stratification and Trends in Access over Two Decades". *Social Forces* 42 (5):519.
- Waldinger, Roger and Michael I. Lichter. 2003. *How the Other Half Works. Immigration and the Social Organization of Labor*. Berkeley, CA: University of California Press.
- Weeden, Kim A., and David B. Grusky. 2014. "Inequality and Market Failure". *American Behavioral Scientist* 58 (3):473–91.
- Wehby, George, Robert Kaestner, Wei Lyu, and Dhaval Dave. 2020. "Effects of the Minimum Wage on Child Health". NBER Working Paper 26691. Cambridge, MA: National Bureau of Economic Research.
- Welniak, Edward J. 1990. "Effects of the March Current Population Survey's New Processing System on Estimates of Income and Poverty." Alexandria, VA.
- Western, Bruce, Deirdre Bloome, and Christine Percheski. 2008. "Inequality among American Families with Children, 1975 to 2005". *American Sociological Review* 73:903–20.
- Western, Bruce, and Jake Rosenfeld. 2011. "Unions, Norms, and the Rise in U.S. Wage Inequality". *American Sociological Review* 76 (4):513–37.
- Wheaton, Laura and Kathryn Stevens. 2016. "The effect of different tax calculators on the Supplemental Poverty Measure". Urban Institute.
- Wicks-Lim, Jeannette. 2005. "Mandated wage floors and the wage structure: Analyzing the ripple effects of minimum and prevailing wage laws". Dissertation, University of Massachusetts Amherst.
- Williams, Erica, Samantha Waxman, and Juliette Legendre. 2020. "State Earned Income Tax Credits and Minimum Wages Work Best Together". Policy Futures. Center on Budget and Policy Priorities. Retrieved June 22, 2020 (<https://www.cbpp.org/sites/default/files/atoms/files/7-12-06sf.pdf>).
- Wilson, Valerie and Janelle Jones. 2018. "Working harder or finding it harder to work". Washington, DC: Economic Policy Institute (epi.org/138058).
- Wimer, Christopher, Zachary Parolin, Anny Fenton, Liana Fox, and Christopher Jencks. 2020. "The Direct Effect of Taxes and Transfers on Changes in the U.S. Income Distribution, 1967-2015". *Demography* 57:1833–51.
- Wolfson, Paul J., and Dale Belman. 2019. "15 Years of Research U.S. Employment and The Minimum Wage". *Labour* 33 (4):488–506.
- Wright, E. O., and Rachel E. Dwyer. 2003. "The patterns of job expansions in the USA: a comparison of the 1960s and 1990s". *Socio-Economic Review* 1 (3):289–325.
- Yang, Tzu-Ting. 2018. "Family Labor Supply and the Timing of Cash Transfers". *Journal of Human Resources* 53 (2):445–73.
- Yun, Myeong-Su. 2005. "A simple solution to the identification problem in detailed wage decompositions". *Economic Inquiry* 43 (4):766–72.
- Zagel, Hannah, and Richard Breen. 2018. "Family demography and income inequality in West Germany and the United States". *Acta Sociologica* 62 (2):174-192.
- Ziliak, James P. 2016. "Temporary Assistance for Needy Families" Pp. 303–93 in *Economics of means-tested transfer programs in the United States. Vol I.*, edited by Robert A. Moffitt. Chicago: The University of Chicago Press.

Zipperer, Ben. 2016. "Did the minimum wage or the Great Recession reduce low-wage employment? Comments on Clemens and Wither (2016)". Working Paper 120616. Washington Center for Equitable Growth.

Appendix to "Minimum wages and income inequality: The impact of minimum wages on income inequality in the USA since 1989"

Barbara Binder

Contents

A. Trends in income inequality	3
1. Distribution of disposable household income	3
2. Distribution of gross household income	5
3. Distribution of gross household income (excl. tax refunds)	7
4. Distribution of household-level labor income	9
5. Distribution of household-level market income	10
B. Percentile value changes	12
1. Disposable household income	12
2. Gross household income	14
3. Gross household income, excl. tax refunds	16
4. Household labor income	18
5. Household market income	19
C. Supplemental results for Chapter 8.2: Empirical overview	21
1. Share of households with minimum wage earners in the non-pensioner population	21
D. Supplemental results for Chapter 8.3: Empirical overview	21
1. Income trends of different income types, per household type	21
2. Share of income from minimum wage work in different household types	26
E. Supplemental results for Chapter 10.2: Multivariate results, different income concepts	29
F. Supplemental results for Chapter 10.3: Multivariate results for different model specifications	32
G. Supplemental results for Chapter 10.4: Multivariate results and interaction effects	33
1. Results of OB-decompositions with interaction terms, market income sample	33
2. Results of OB-decompositions with interaction terms, focusing on income tax covariates	36
3. Results of OB-decompositions without interaction terms, focusing on income tax covariates	38
H. Supplementary tables	39
1. Income concept used for dependent variable: Disposable household income	39
1.1. Full analysis sample, using different model specifications	39
1.2. Market income sample, using different model specifications	49
1.3. Labor income sample, using different model specifications	59
2. Income concept used for dependent variable: Gross household income	69
2.1. Full analysis sample, using different model specifications	69
2.2. Market income sample, using different model specifications	76
2.3. Labor income sample, using different model specifications	84
3. Income concept used for dependent variable: Gross household income (excl. tax refunds)	91
3.1. Full analysis sample, using different model specifications	91
3.2. Market income sample, using different model specifications	96

3.3.	Labor income sample, using different model specifications	100
4.	Income concept used for dependent variable: Household labor income	105
4.1.	Labor income sample, using different model specifications	105
5.	Income concept used for dependent variable: Household market income	108
5.1.	Market income sample, using different model specifications	108
5.2.	Labor income sample, using different model specifications	110
I.	Robustness checks: Normalized coefficients	113
1.	Robustness checks for Chapter 10.2: Multivariate results for different income concepts: Normalized coefficients	113
2.	Robustness checks for Chapter 10.3: Multivariate results for different model specifications: Normalized coefficients	114
3.	Robustness checks for Chapter 10.4: Multivariate results and interaction effects: Normalized coefficients	118

A. Trends in income inequality

1. Distribution of disposable household income

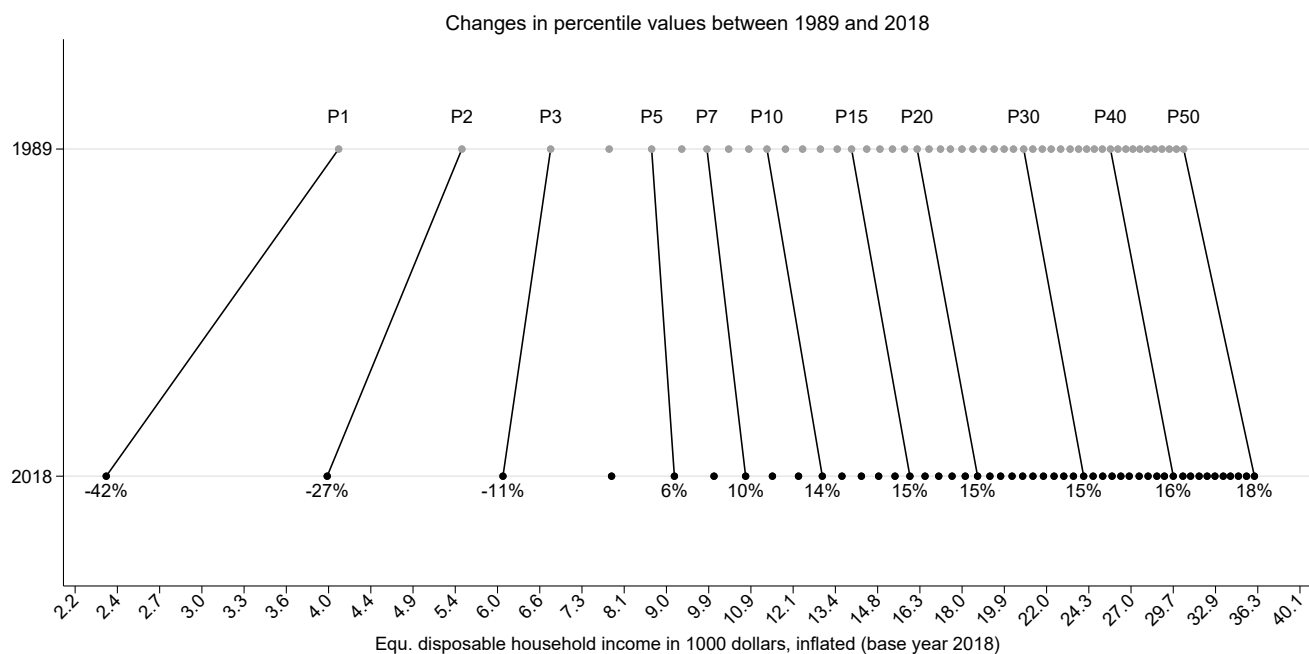


Figure 1: Full analysis sample: Percentile values of equivalized disposable household income and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

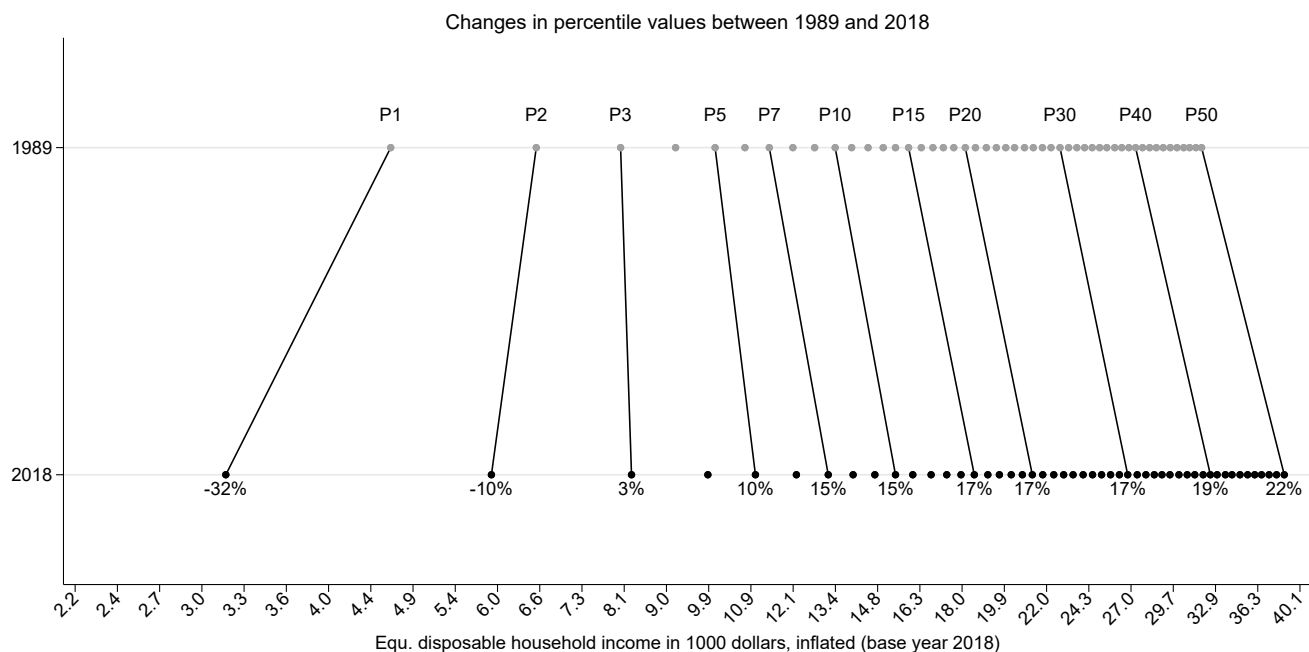


Figure 2: Market income sample: Percentile values of equivalized disposable household income and their change between 1989 and 2018
 Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

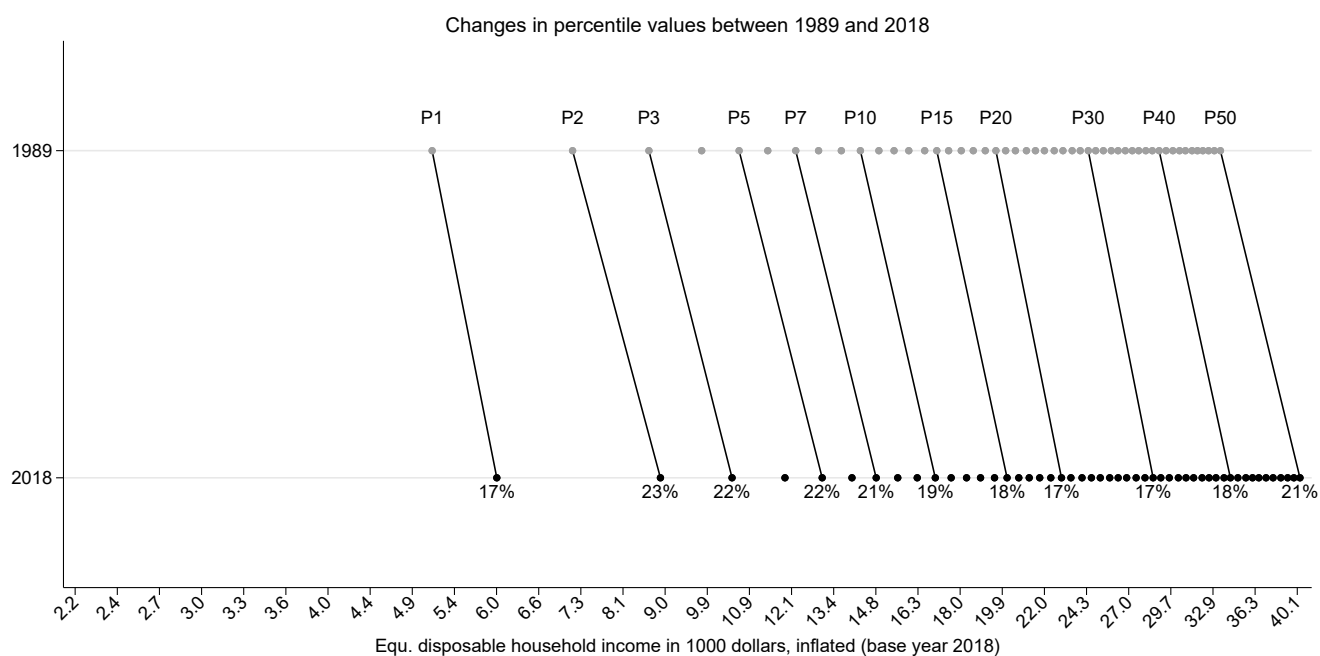


Figure 3: Labor income sample: Percentile values of equivalized disposable household income and their change between 1989 and 2018
 Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2. Distribution of gross household income

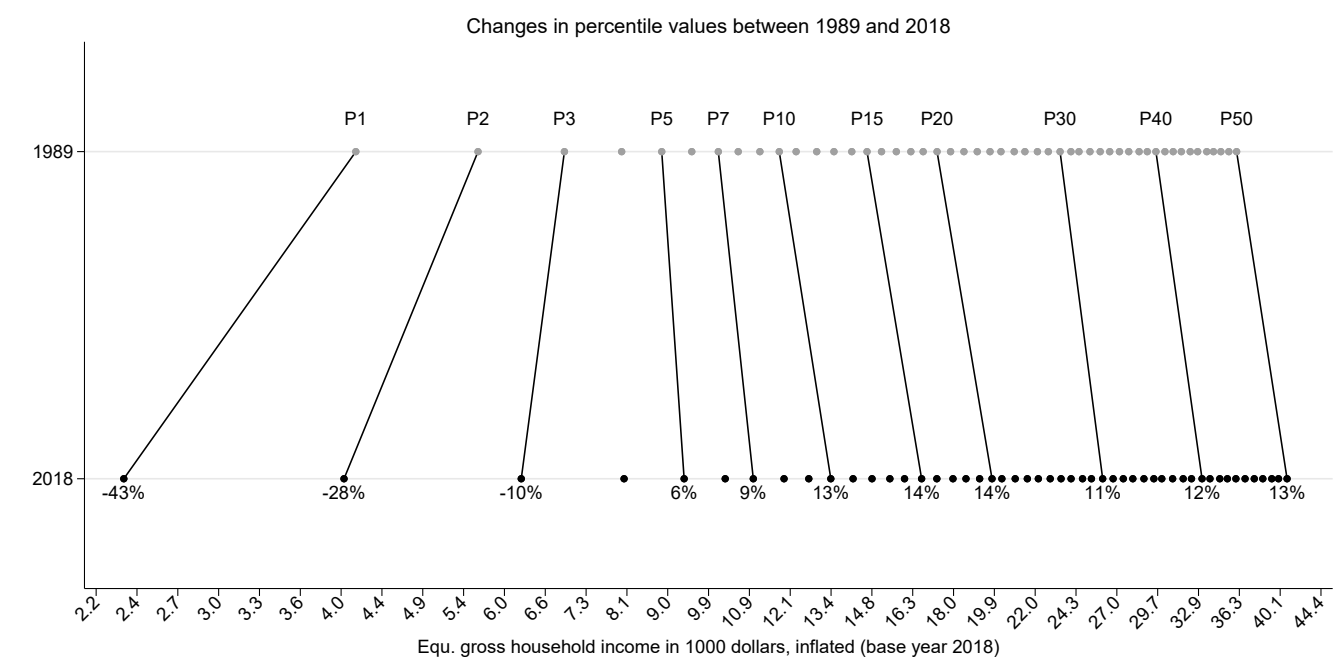


Figure 4: Full analysis sample: Percentile values of equivalized gross household income and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

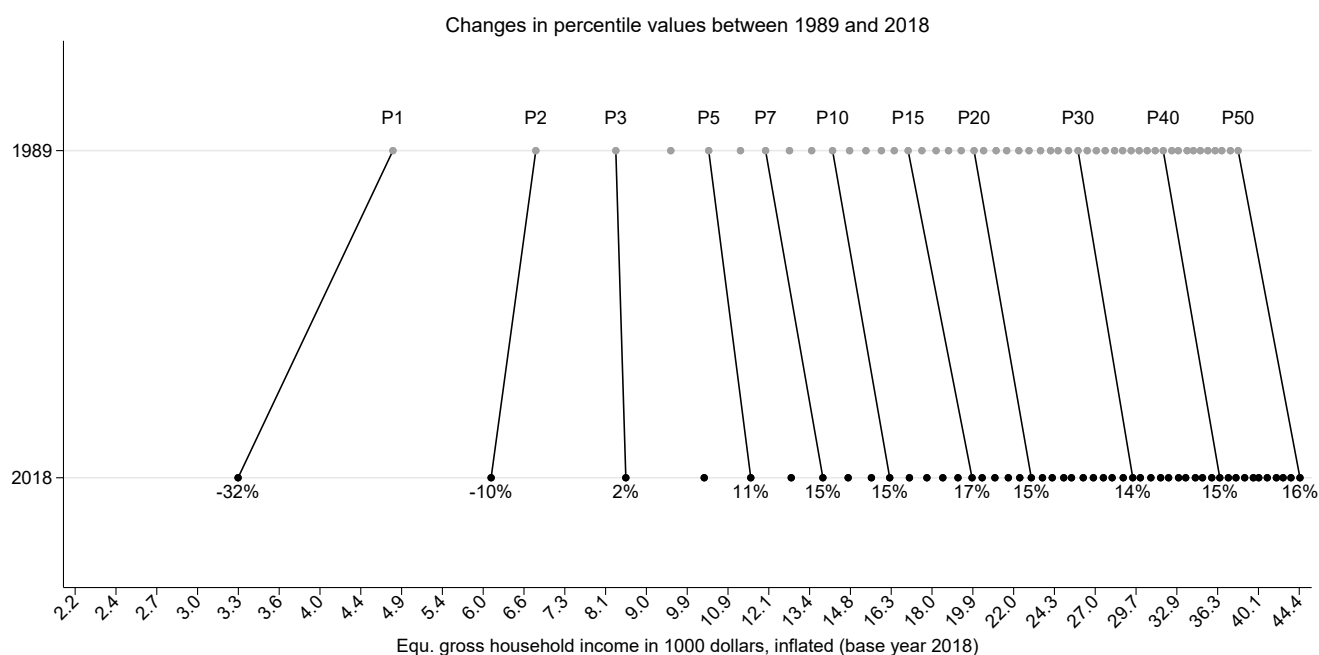


Figure 5: Market income sample: Percentile values of equivalized gross household income and their change between 1989 and 2018
 Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

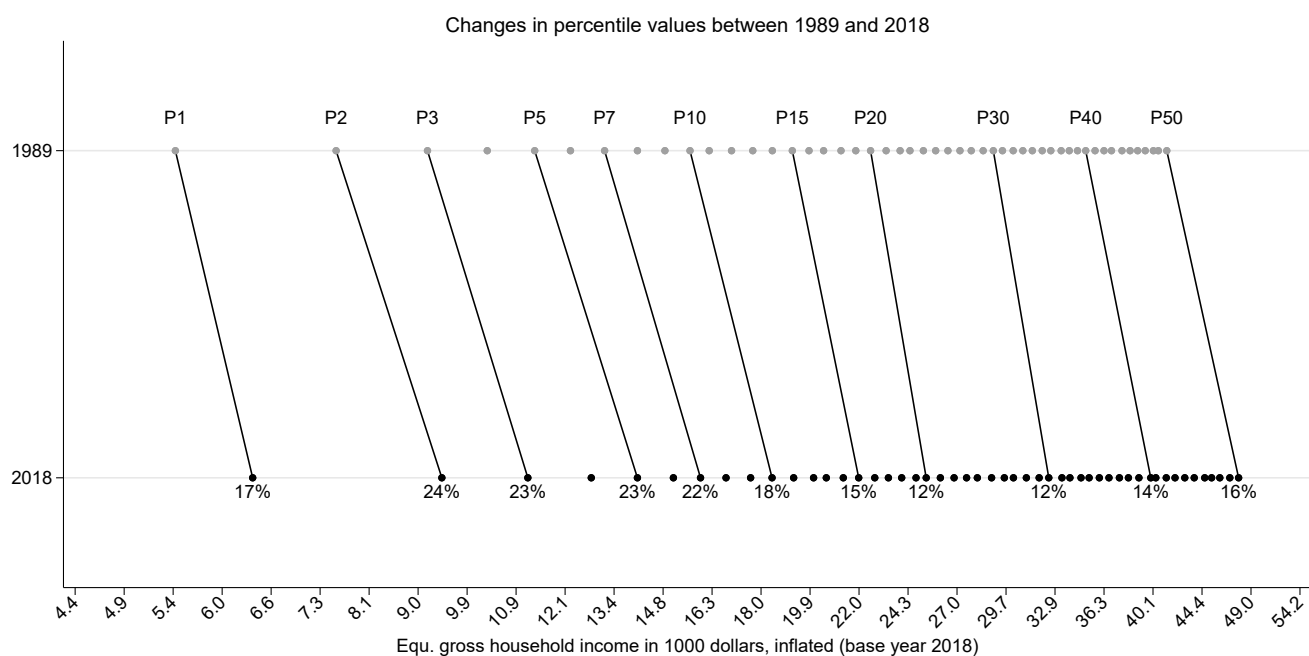


Figure 6: Labor income sample: Percentile values of equivalized gross household income and their change between 1989 and 2018
 Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3. Distribution of gross household income (excl. tax refunds)

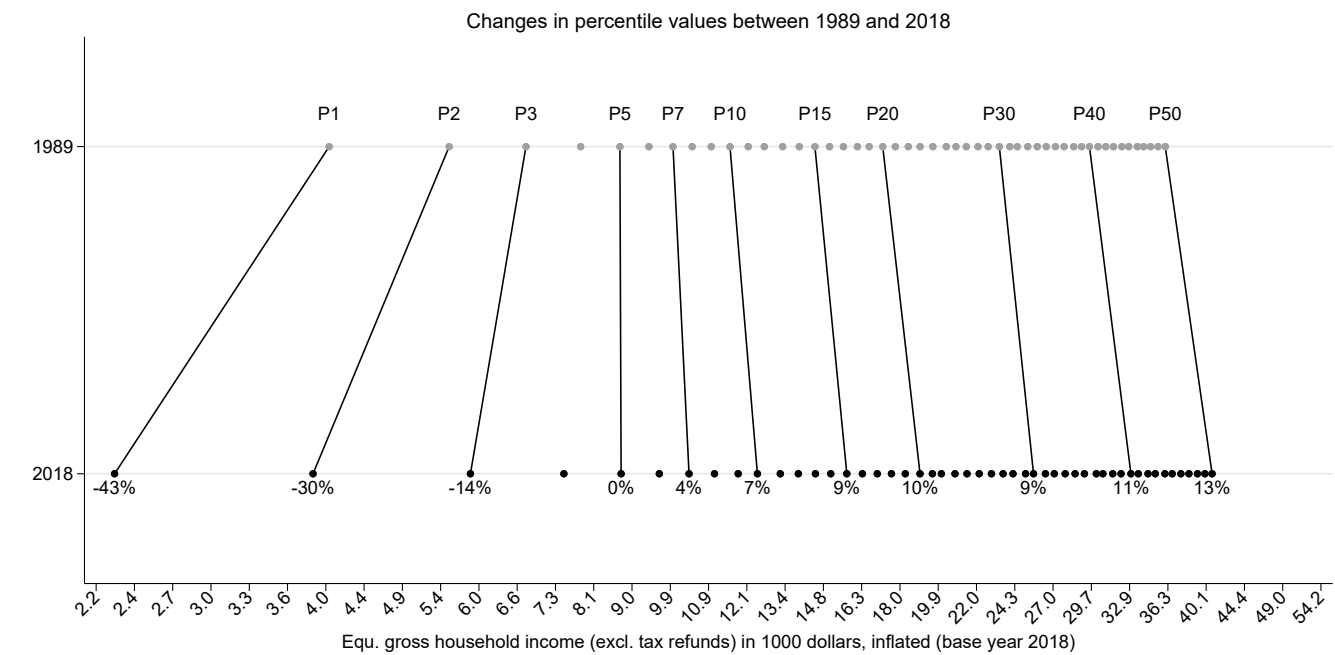


Figure 7: Full analysis sample: Percentile values of equivalized gross household income (excl. tax refunds) and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

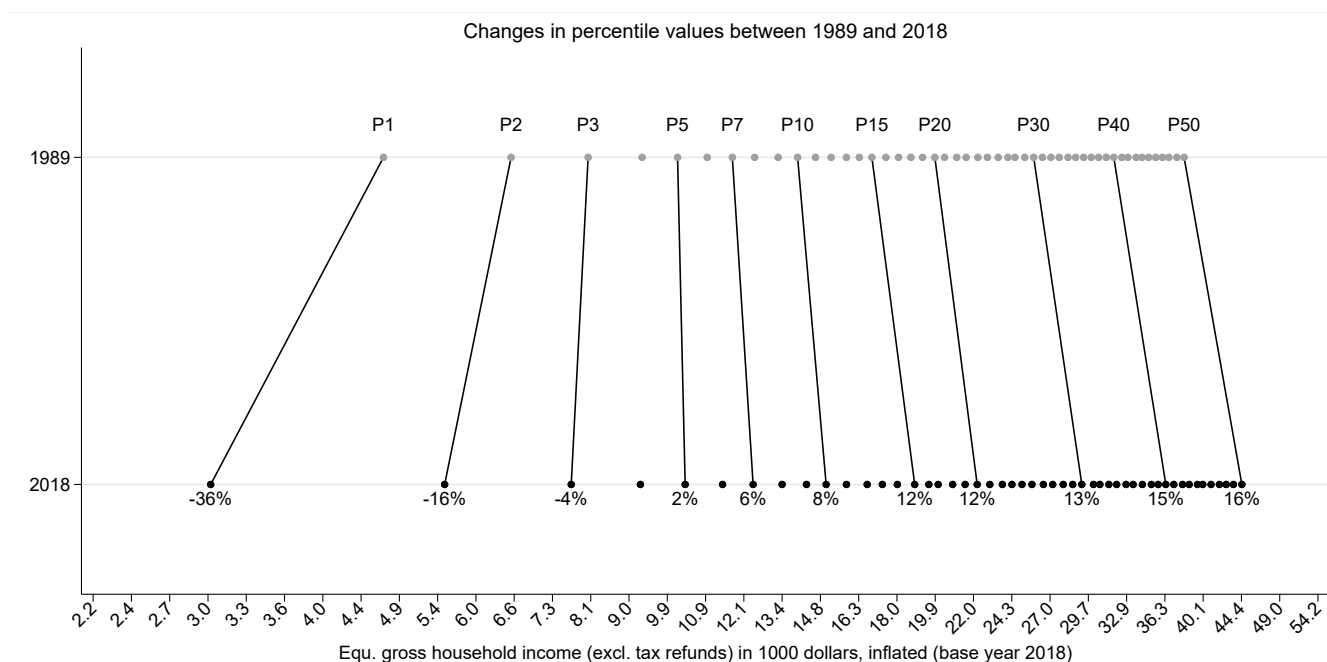


Figure 8: Market income sample: Percentile values of equivalized gross household income (excl. tax refunds) and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

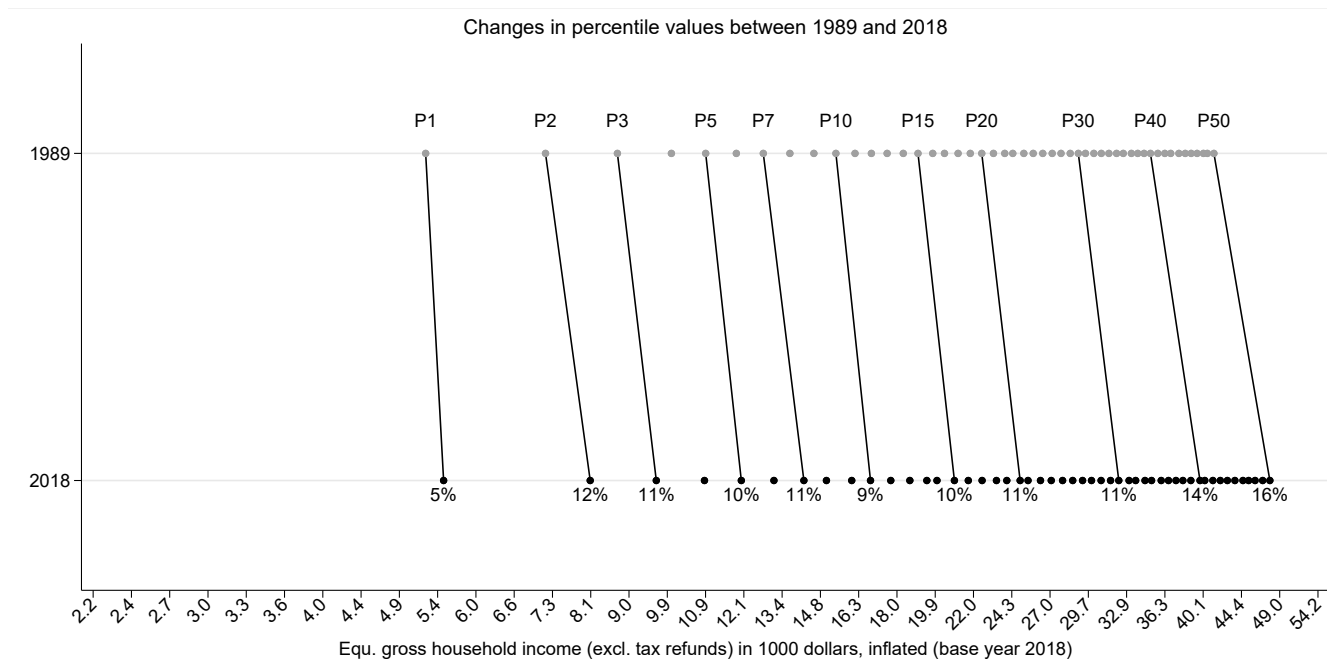


Figure 9: Labor income sample: Percentile values of equivalized gross household income (excl. tax refunds) and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

4. Distribution of household-level labor income

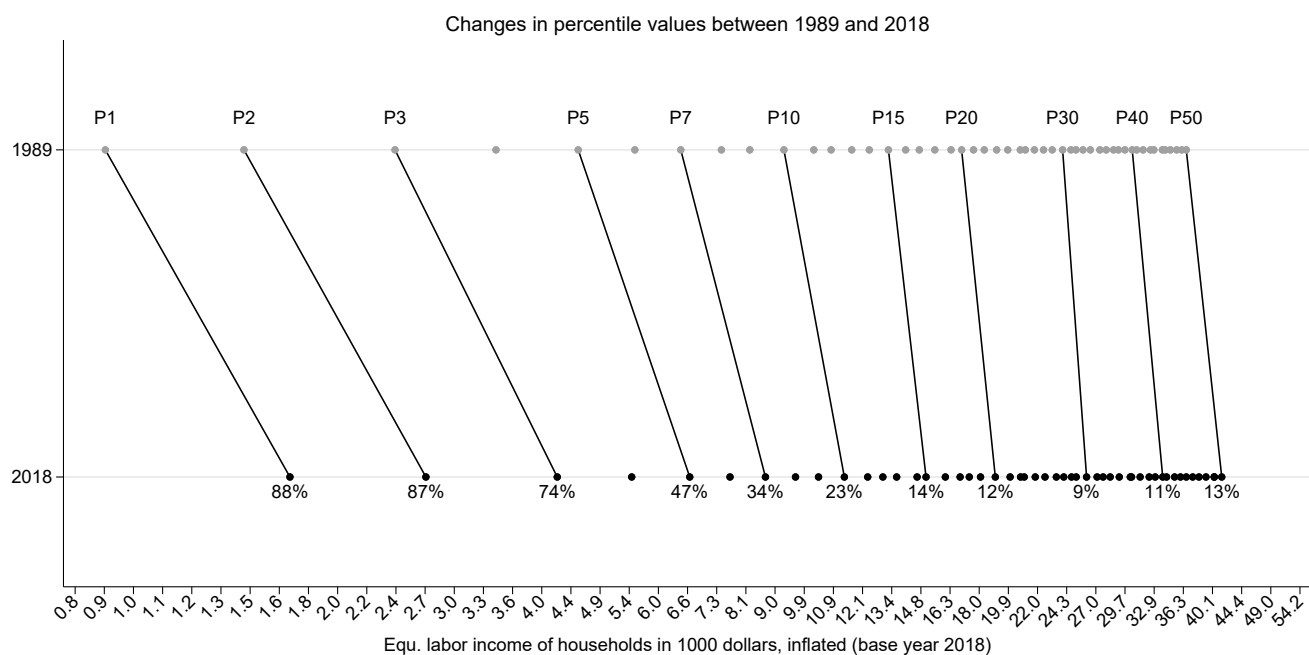


Figure 10: Labor income sample: Percentile values of equivalized household labor income and their change between 1989 and 2018

Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

5. Distribution of household-level market income

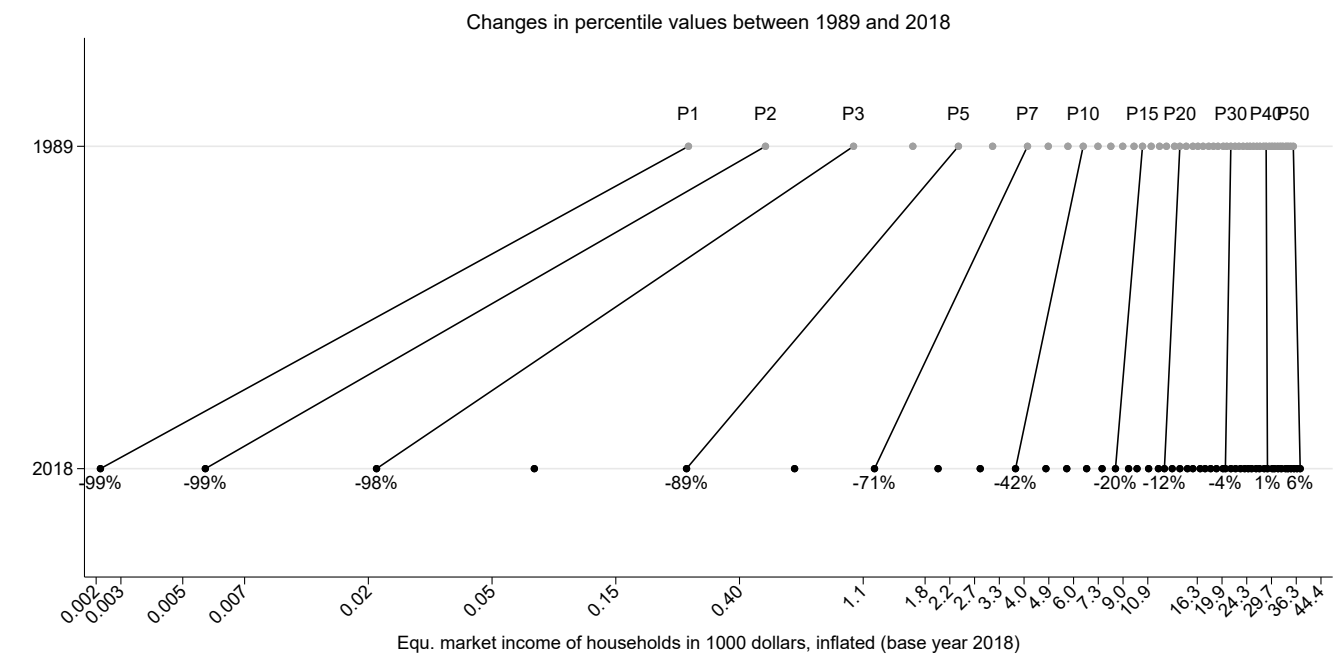


Figure 11: Market income sample: Percentile values of equivalized household market income and their change between 1989 and 2018
Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

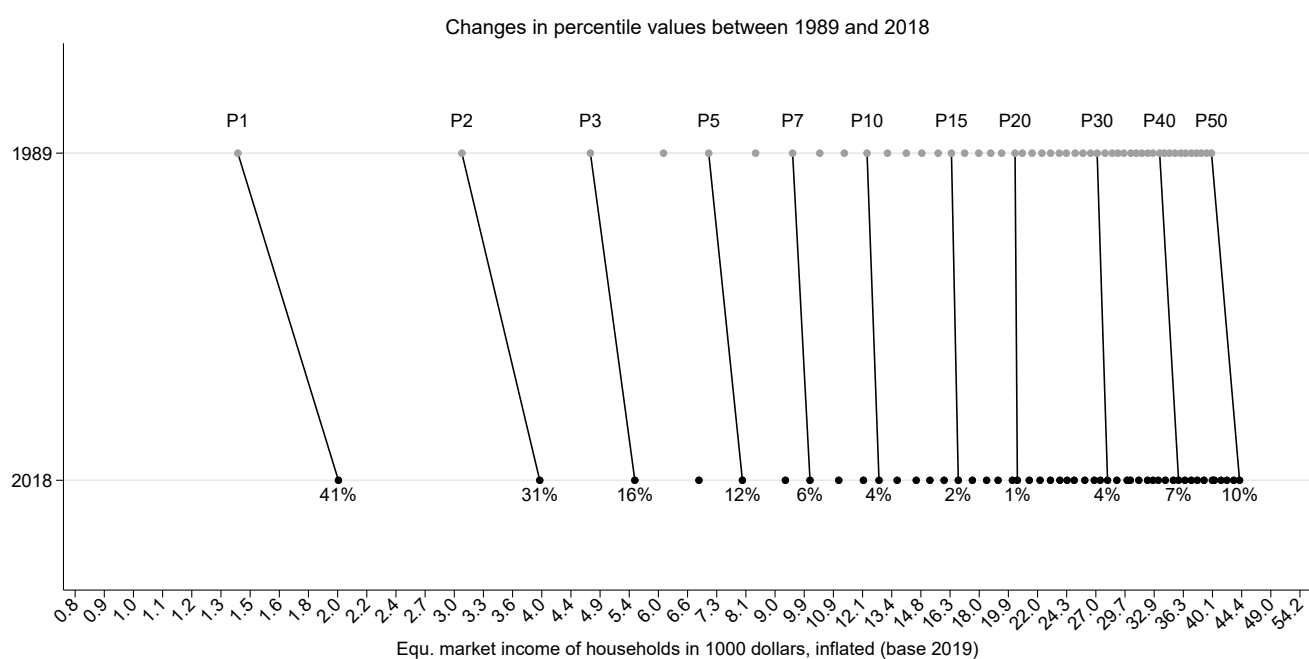


Figure 12: Labor income sample: Percentile values of equivalized household market income and their change between 1989 and 2018
 Note: The y-axis uses a logarithmic scale. Labels refer to non-logged dollar values and the percent change between these values over time. Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

B. Percentile value changes

1. Disposable household income

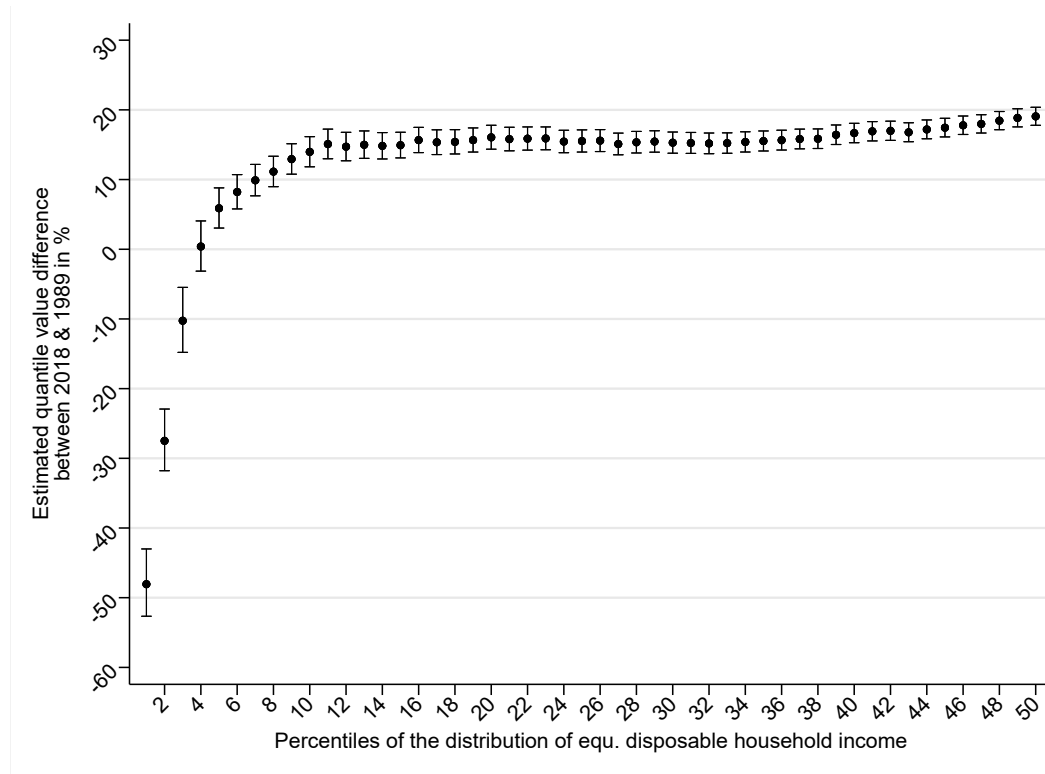


Figure 13: Full analysis sample: Estimated differences in percentile values of equivalized disposable household income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

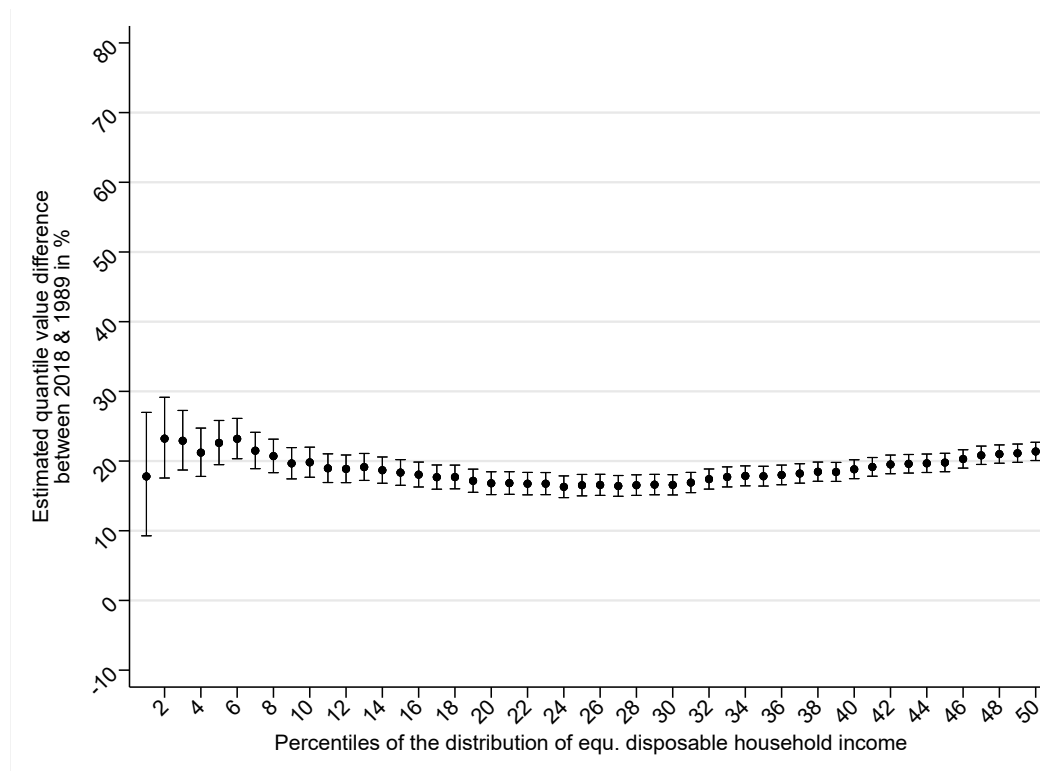


Figure 14: Market income sample: Estimated differences in percentile values of equivalized disposable household income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

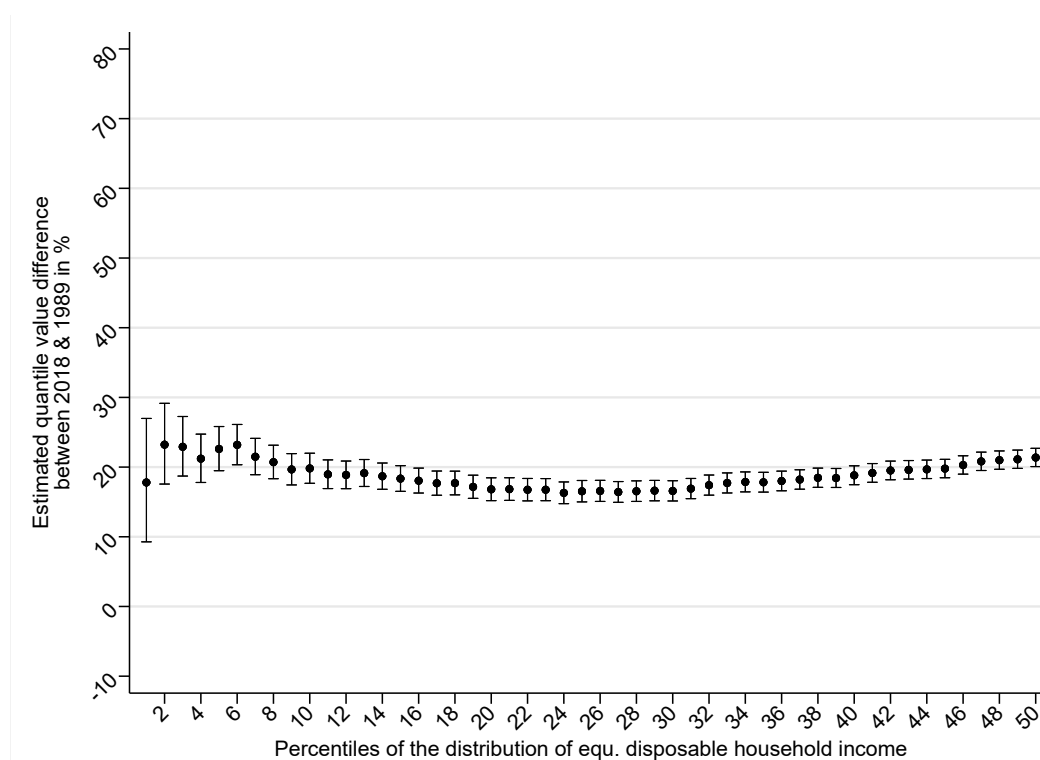


Figure 15: Labor income sample: Estimated differences in percentile values of equivalized disposable household income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2. Gross household income

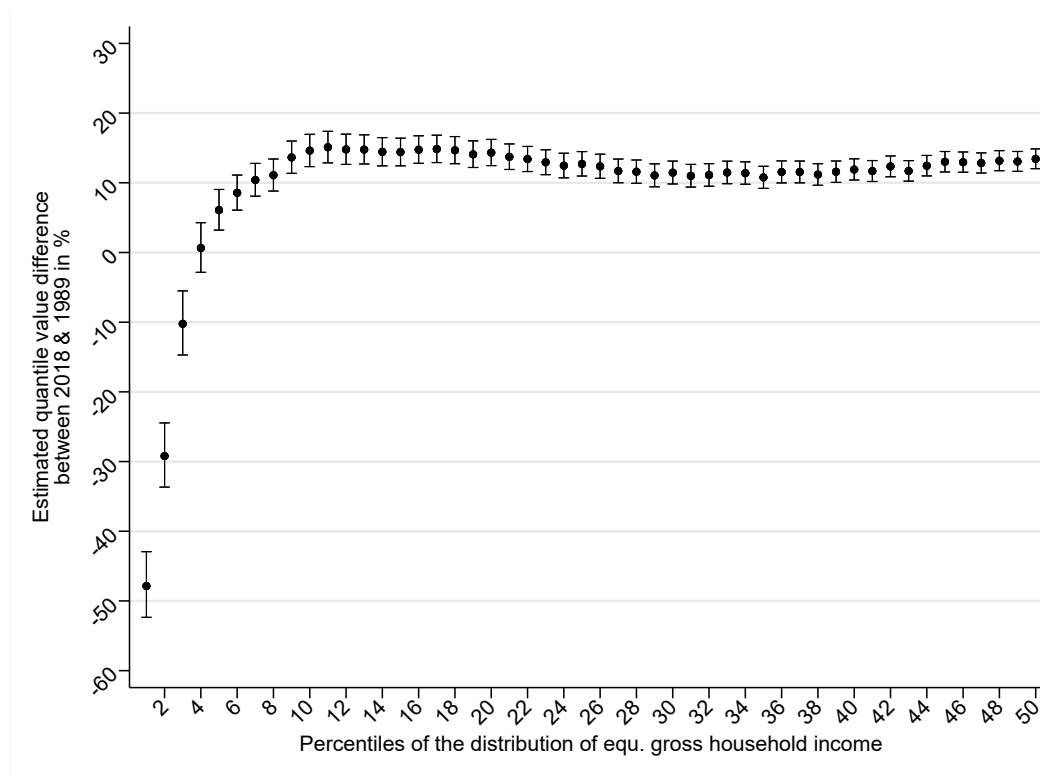


Figure 16: Full analysis sample: Estimated differences in percentile values of equivalized gross household income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

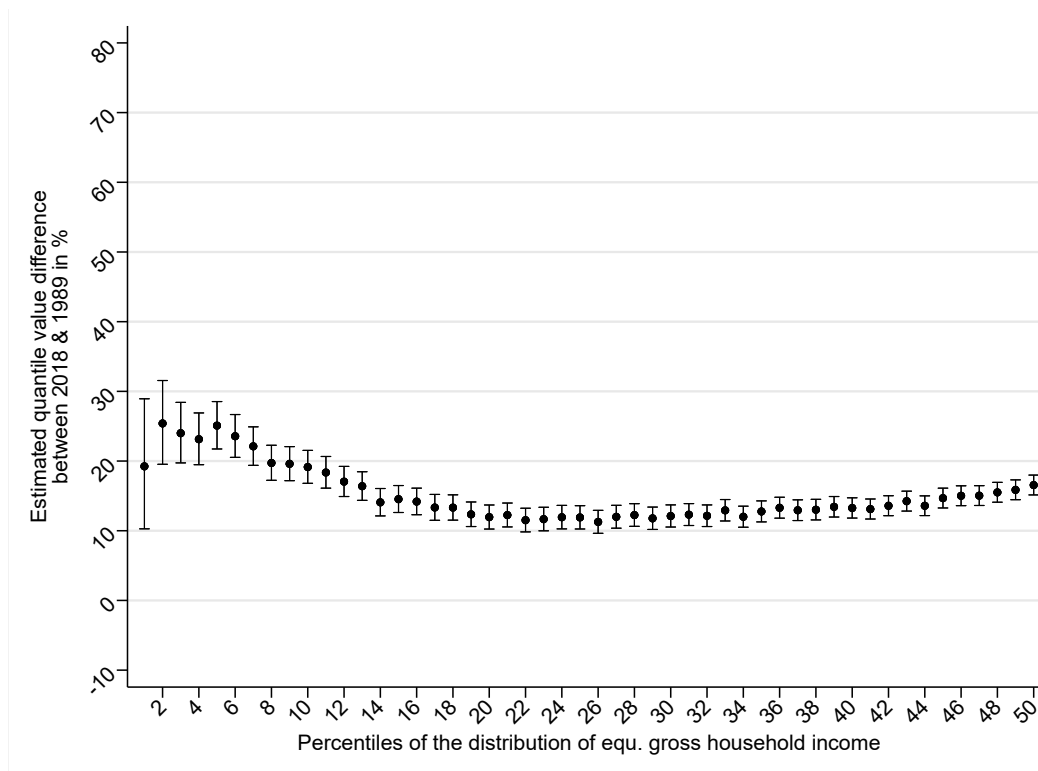


Figure 17: Market income sample: Estimated differences in percentile values of equivalized gross household income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

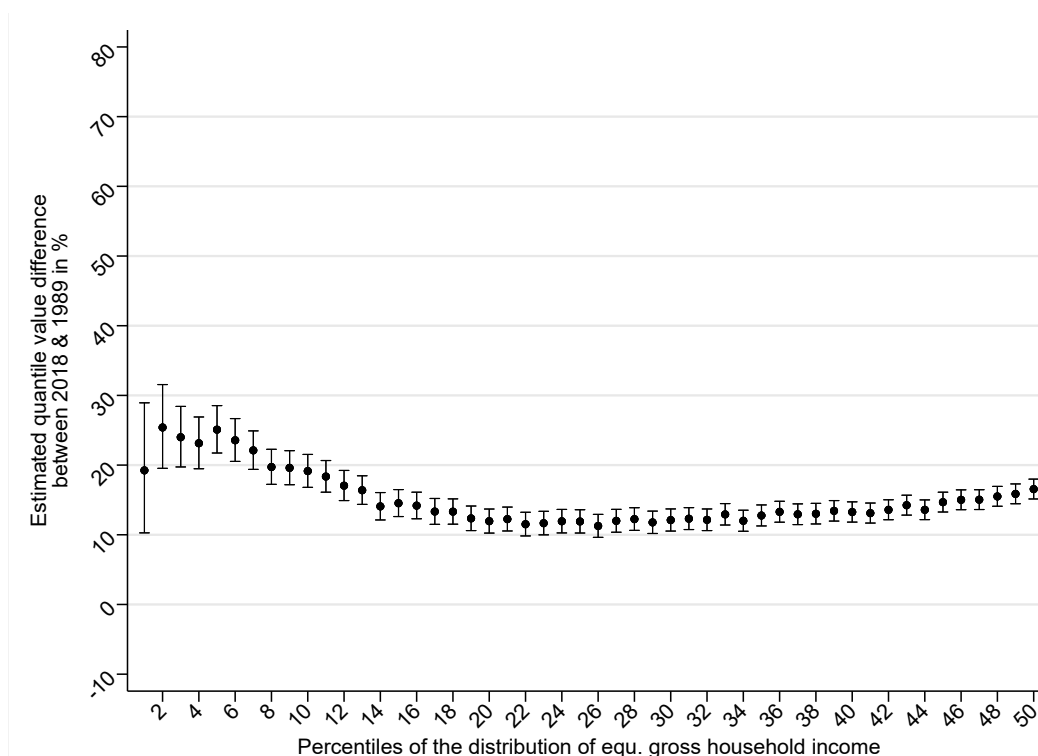


Figure 18: Labor income sample: Estimated differences in percentile values of equivalized gross household income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3. Gross household income, excl. tax refunds

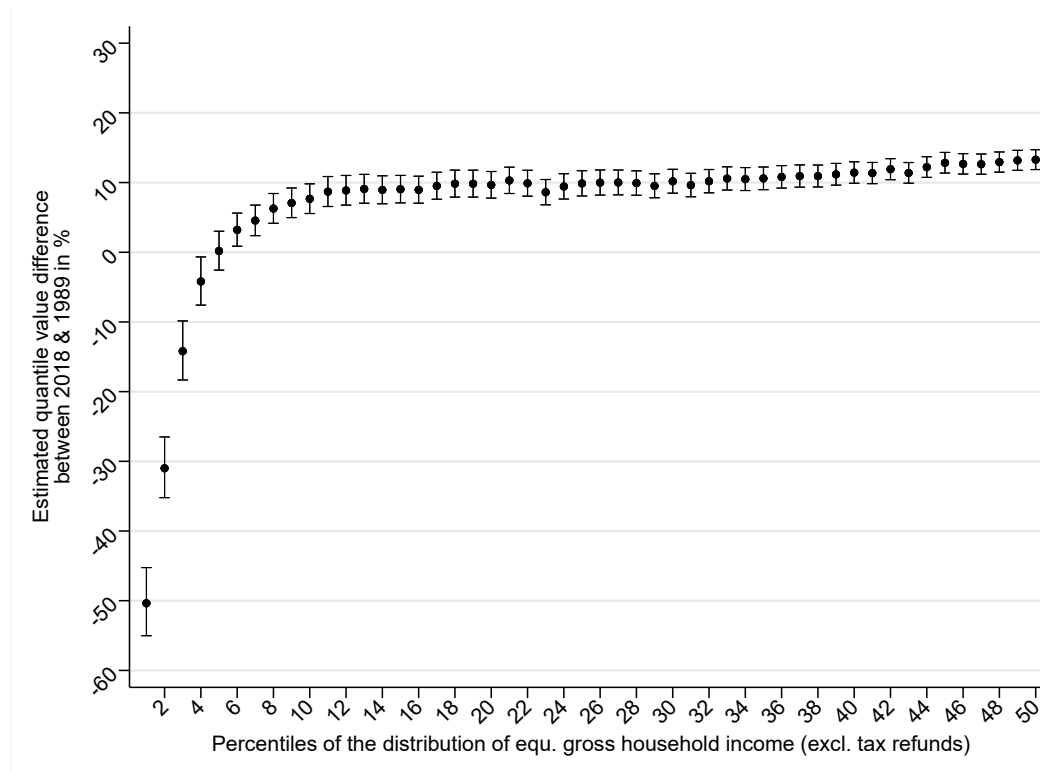


Figure 19: Full analysis sample: Estimated differences in percentile values of equivalized gross household income (excl. tax refunds) between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

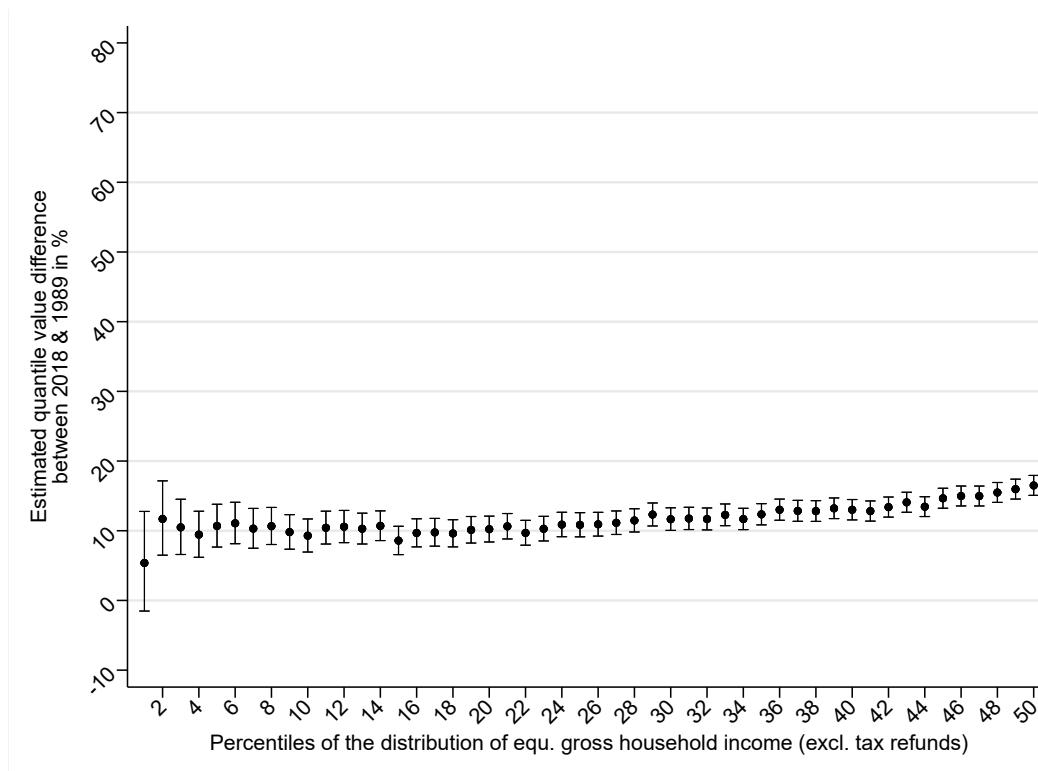


Figure 20: Market income sample: Estimated differences in percentile values of equivalized gross household income (excl. tax refunds) between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

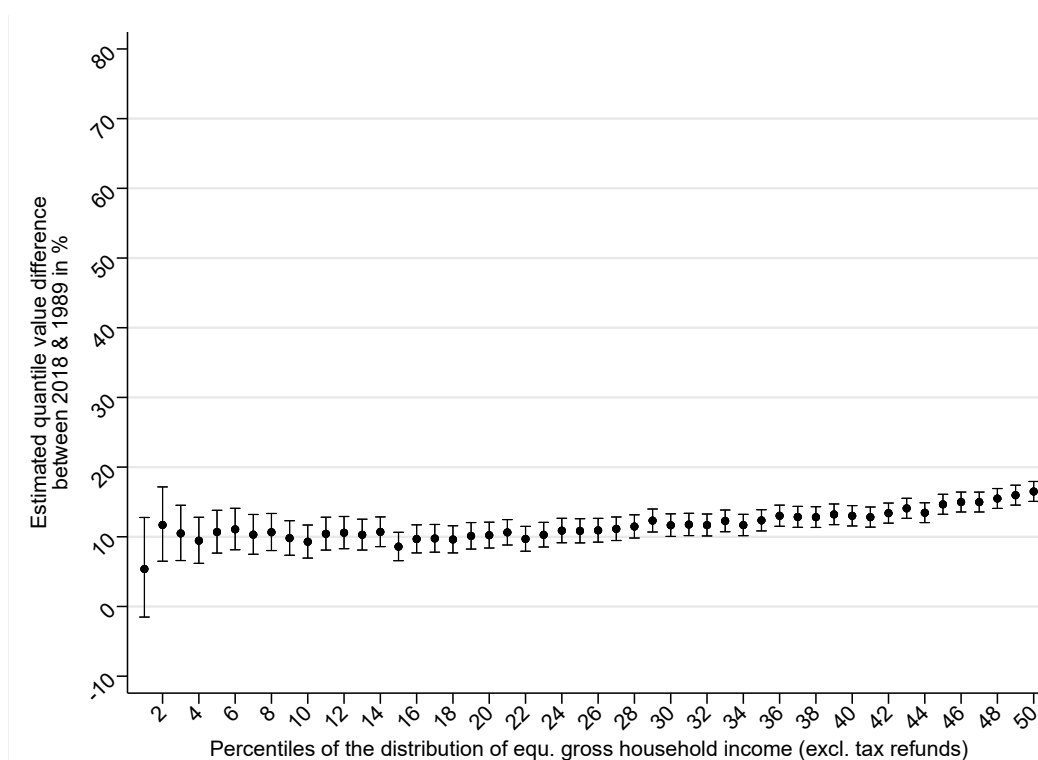


Figure 21: Labor income sample: Estimated differences in percentile values of equivalized gross household income (excl. tax refunds) between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

4. Household labor income

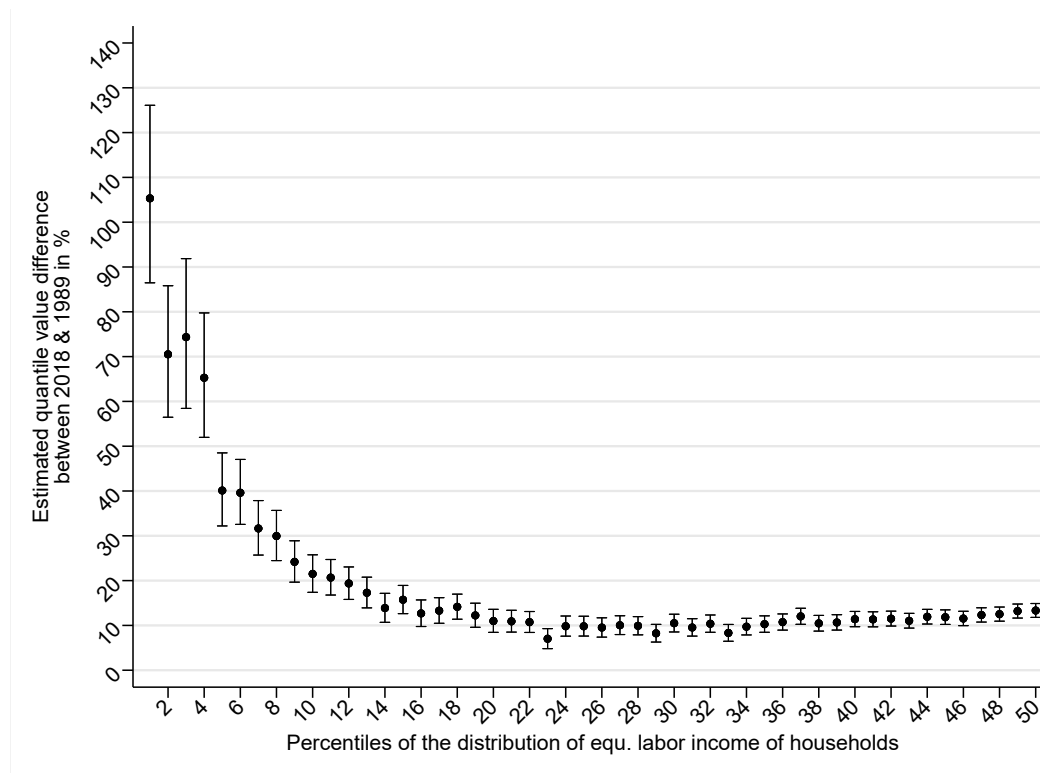


Figure 22: Labor income sample: Estimated differences in percentile values of equivalized household labor income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

5. Household market income

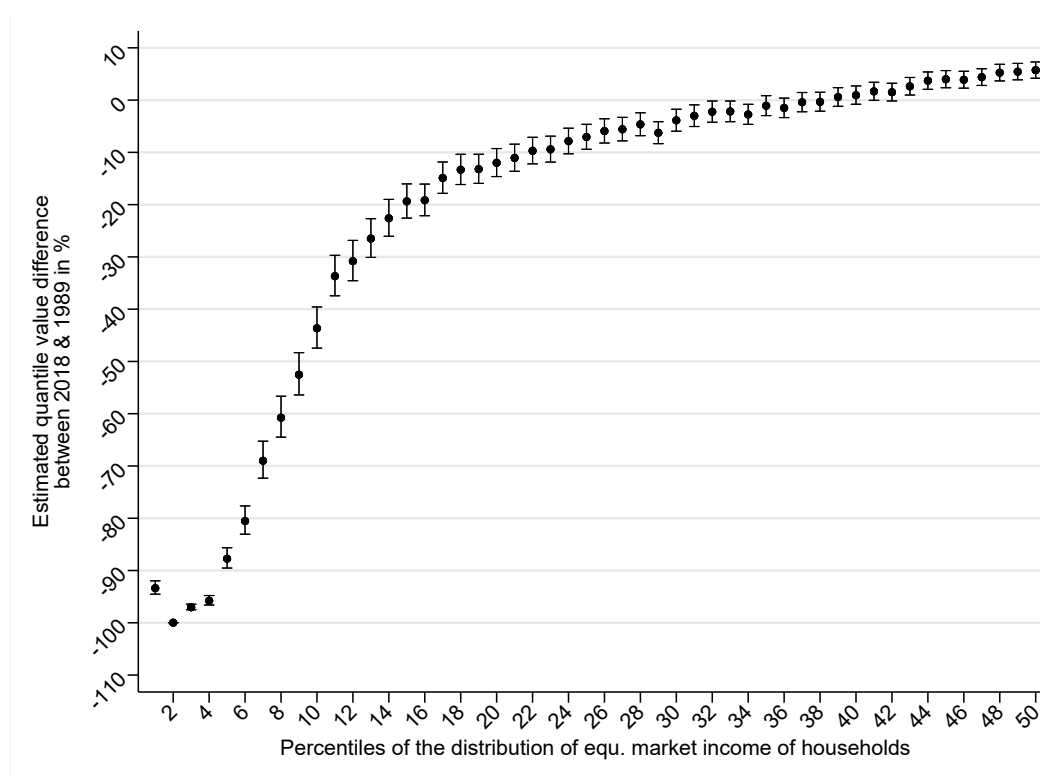


Figure 23: Market income sample: Estimated differences in percentile values of equivalized household market income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

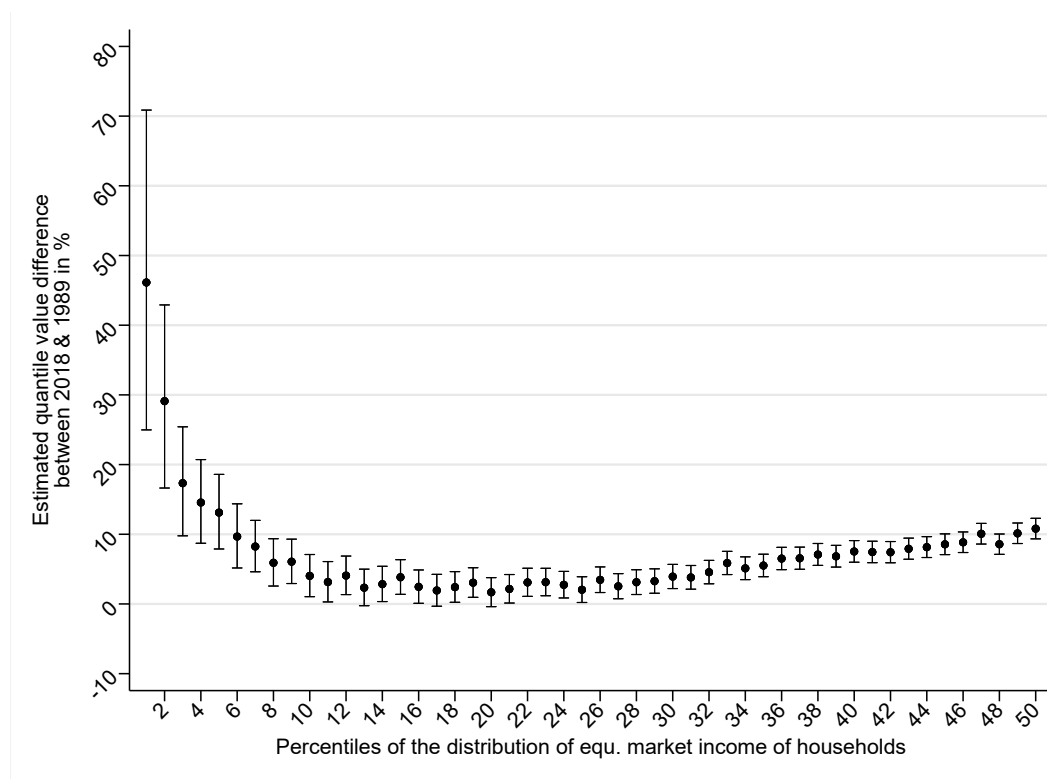


Figure 24: Labor income sample: Estimated differences in percentile values of equivalized household market income between 1989 and 2018, in percent

Note: Incomes are inflated to 2018 dollars. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

C. Supplemental results for Chapter 8.2: Empirical overview

1. Share of households with minimum wage earners in the non-pensioner population

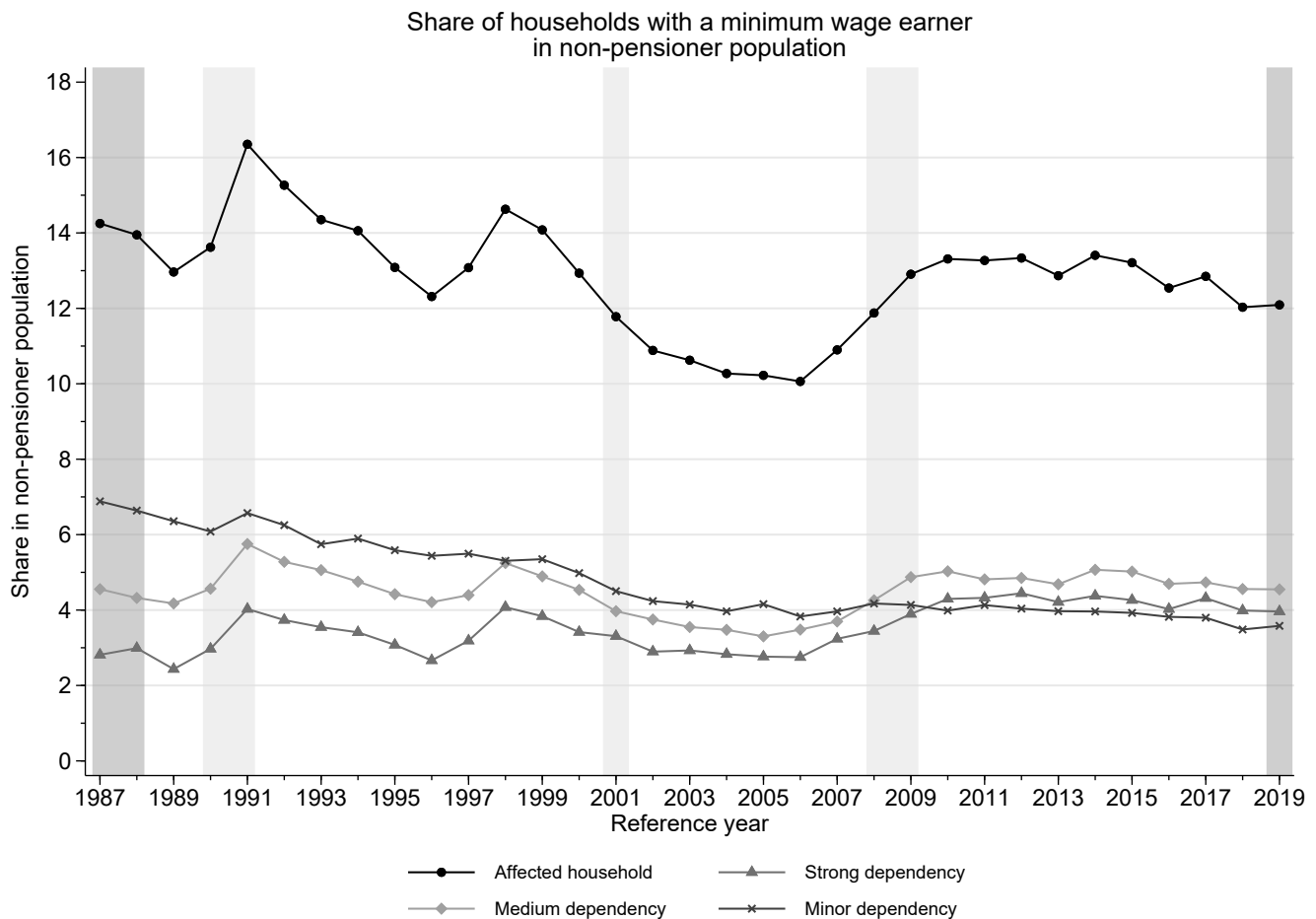


Figure 25: Mean shares of households with minimum wage earners in the non-pensioner population, distinguishing between households with a strong dependency, a medium dependency, and a minor dependency on the minimum wage.

Note: Minimum wage earners are defined as those whose average hourly wage rate over the last calendar year was in a bandwidth of 20 percent around the statutory minimum wage (the higher of federal and state minimum wage floor) in the given state and year. Data on federal and state-level minimum wages are obtained the US Department of Labor. The average hourly wage rate of workers for the last calendar year is based on own calculations: they are proxied following a large literature using the number of weeks worked in the previous year, usual hours worked per week last year, and last year's personal income from wage and salary from all jobs. I exclude those who were self-employed or family workers in the previous year, and side incomes from farming and business of dependent employees. Annualized minimum wage data from year t is matched with the CPS ASEC survey data of year $t + 1$. The years in the horizontal axis represent the income reference year t . Minimum wage percentiles are weighted by population size in the state using 1988-2020 CPS ASEC surveys and person weights. Shaded areas represent years outside of main analysis period (1987, 1988, and 2019) and recessionary years as defined by NBER (1990, 1991, 2001, 2008, 2009). Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

D. Supplemental results for Chapter 8.3: Empirical overview

1. Income trends of different income types, per household type

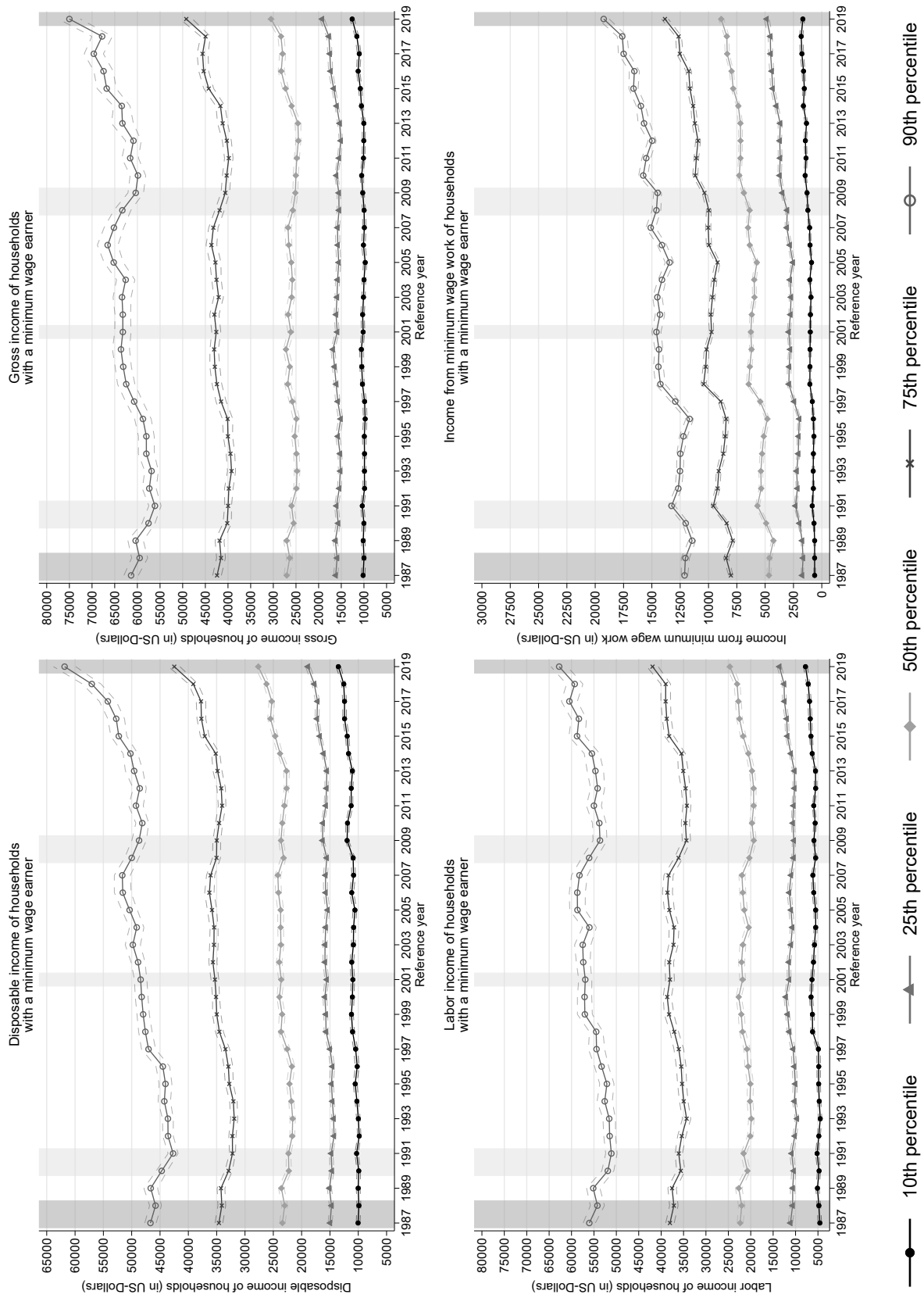


Figure 26: Income trends of different income types, for households with a minimum wage earner
 Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

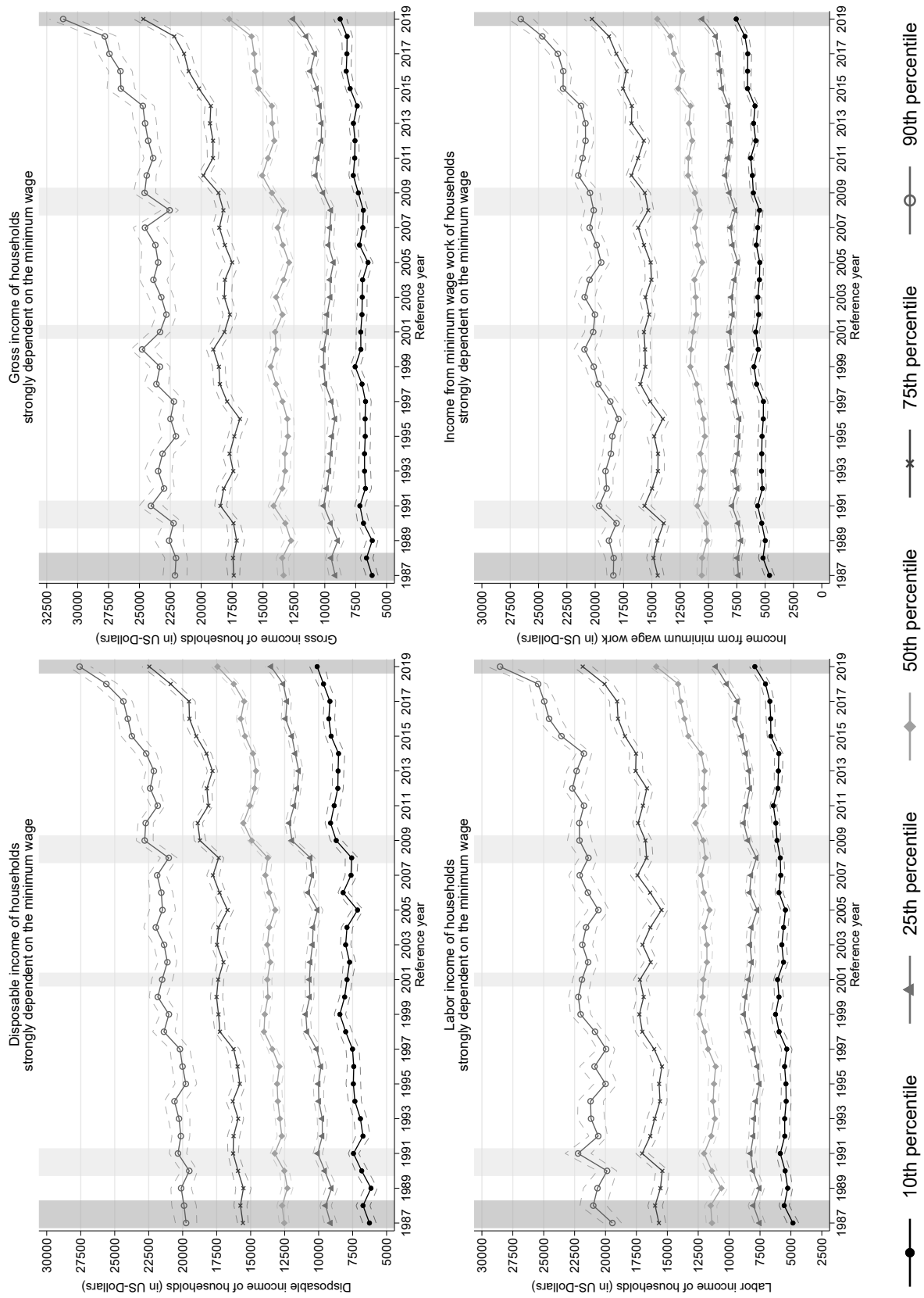


Figure 27: Income trends of different income types, for households strongly dependent on the minimum wage
 Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

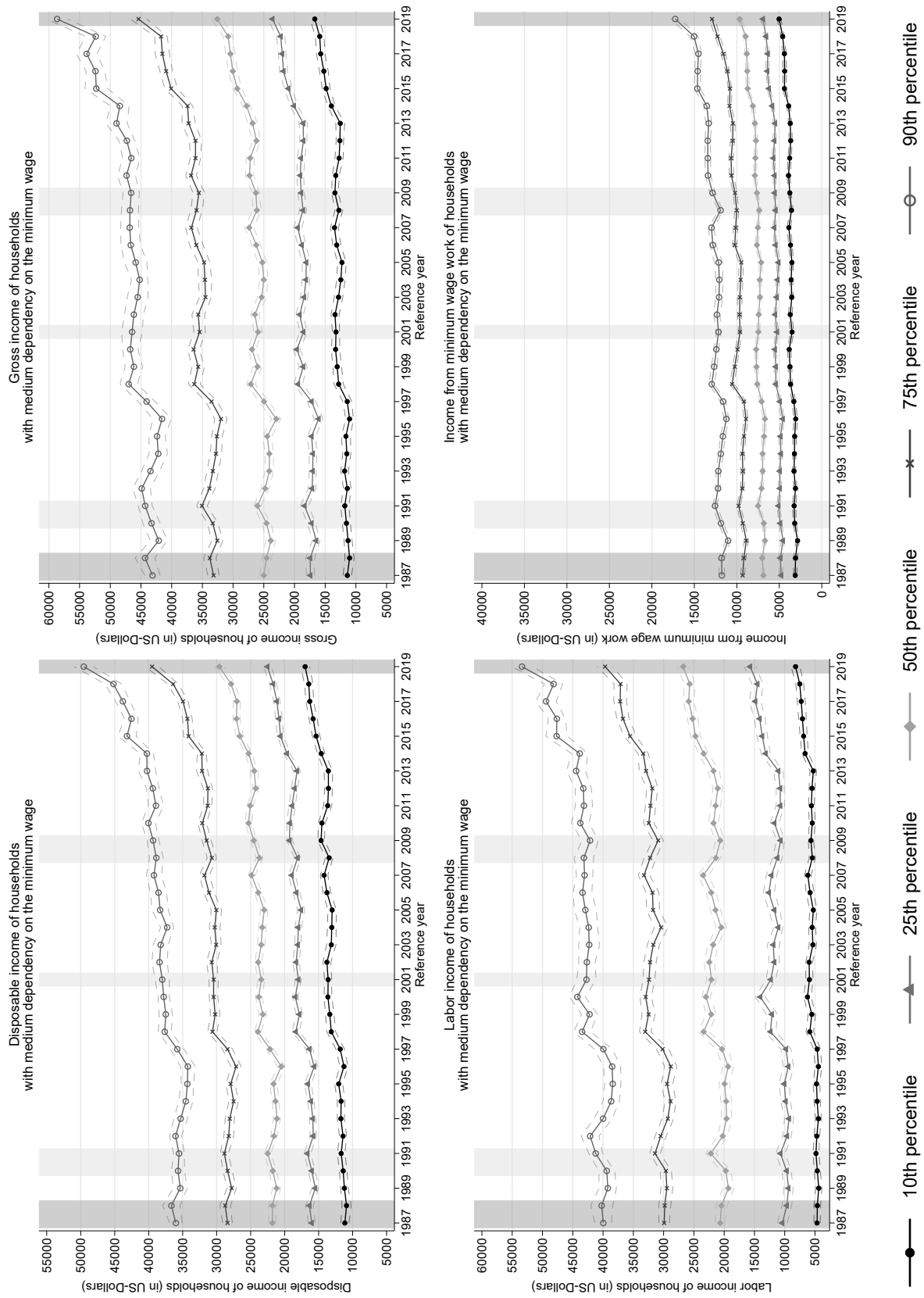


Figure 28: Income trends of different income types, for households with medium dependency on the minimum wage
 Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

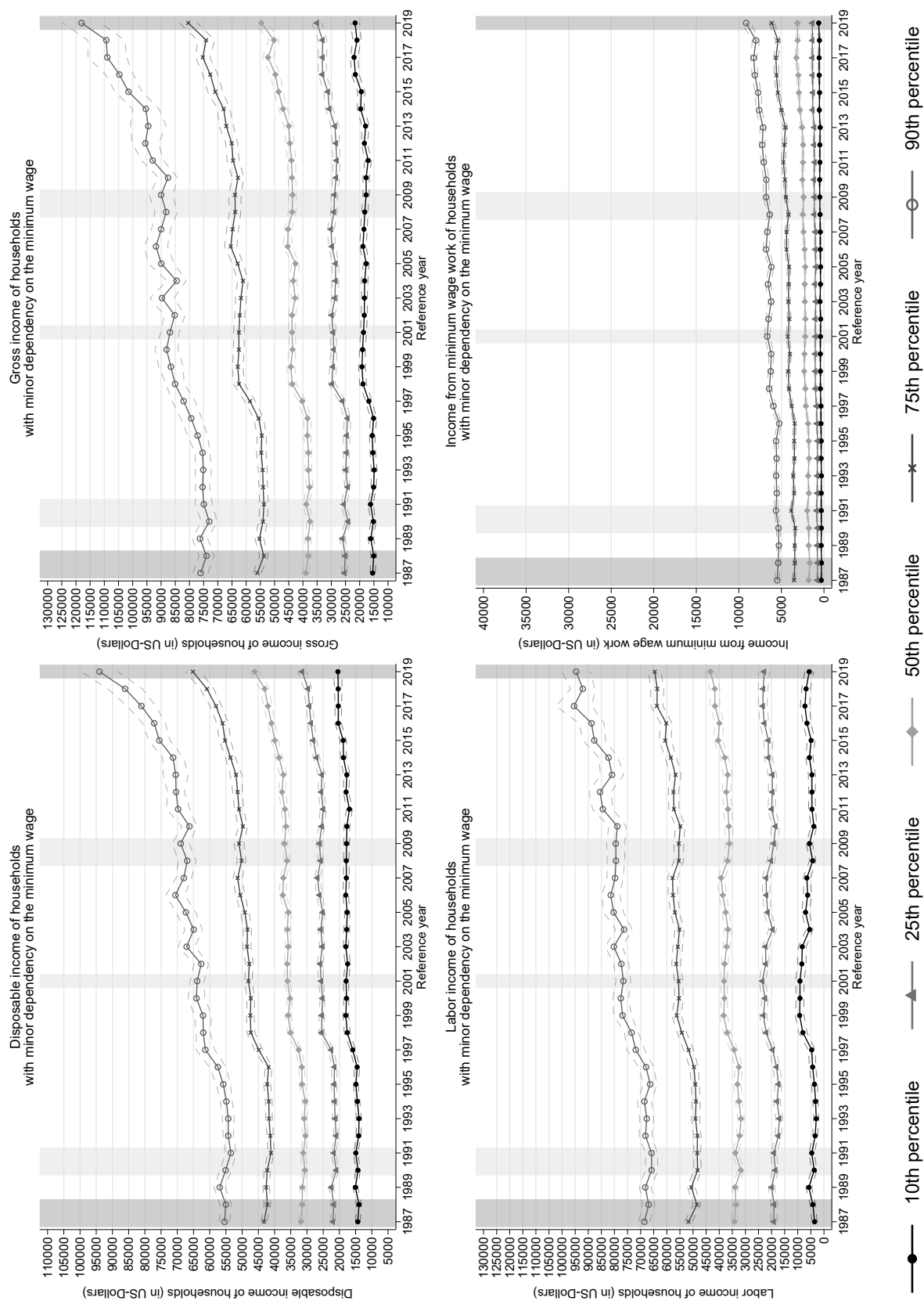


Figure 29: Income trends of different income types, for households with minor dependency on the minimum wage
 Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

2. Share of income from minimum wage work in different household types

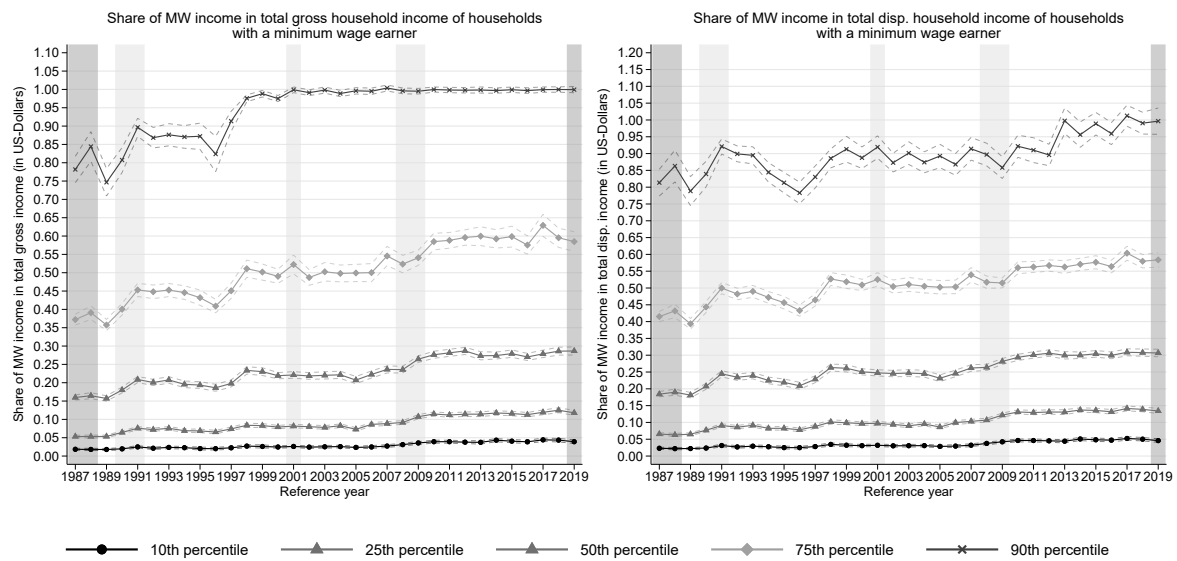


Figure 30: Share of income from minimum wage work in total gross (pre-tax) and disposable (post-tax) household income, for households with a minimum wage earner

Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

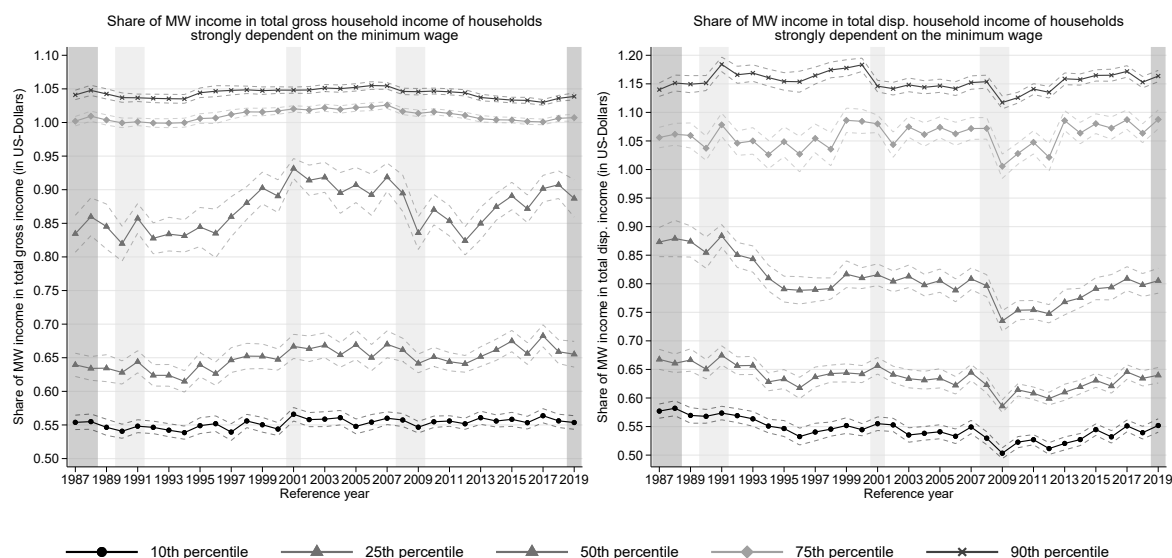


Figure 31: Share of income from minimum wage work in total gross (pre-tax) and disposable (post-tax) household income, for households with a minimum wage earner

Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

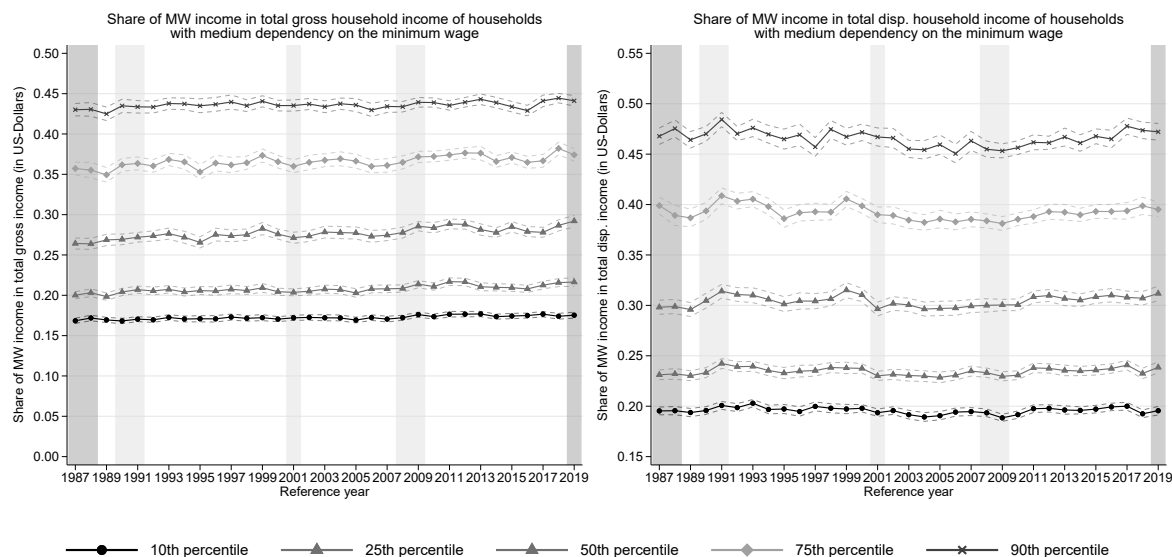


Figure 32: Share of income from minimum wage work in total gross (pre-tax) and disposable (post-tax) household income, for households with a minimum wage earner

Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

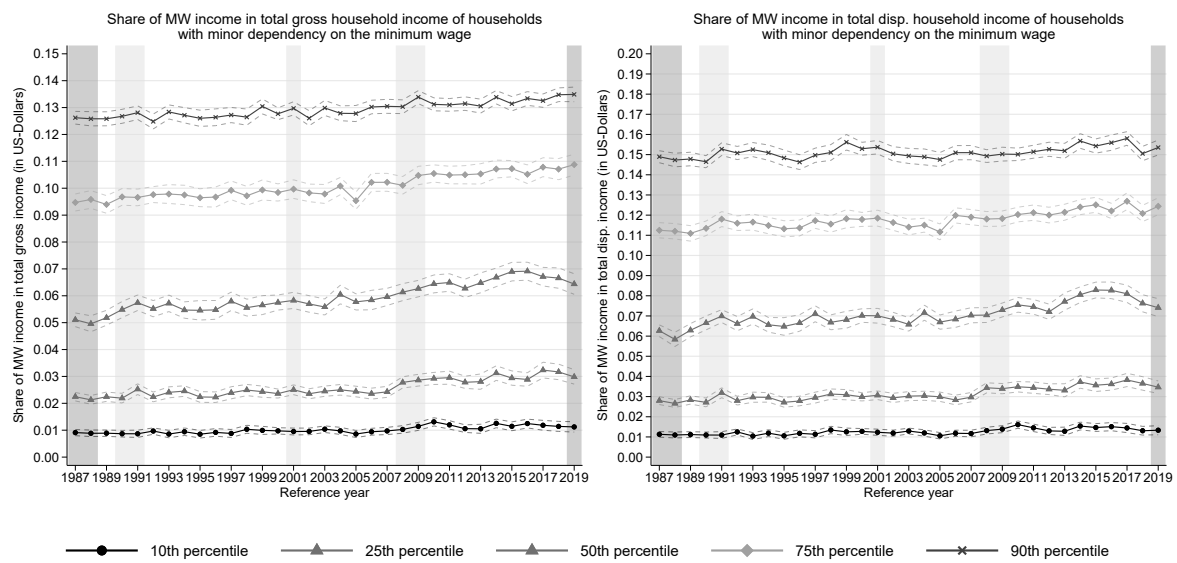


Figure 33: Share of income from minimum wage work in total gross (pre-tax) and disposable (post-tax) household income, for households with a minimum wage earner

Note: See footnote below figure 25. Source: IPUMS-CPS ASEC 1988 to 2020, UKCPR National Welfare Data 1980-2019.

E. Supplemental results for Chapter 10.2: Multivariate results, different income concepts

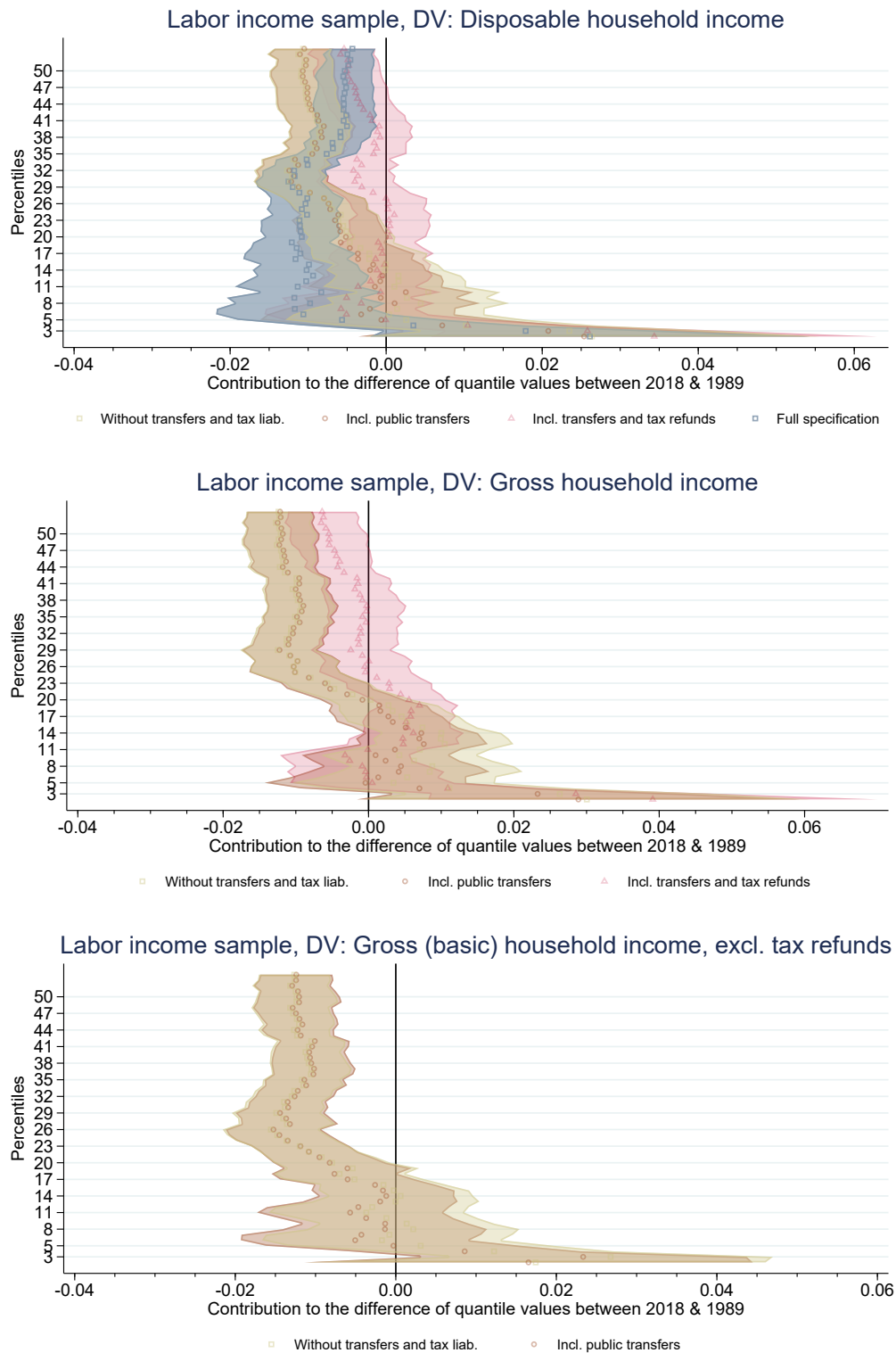


Figure 34: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications (from base model to full specification), labor income sample.

Note: “DV” indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications, where “Without transfers and tax liab.” refers to the base model which excludes covariates on household tax liability and transfer receipt. The base model includes the main covariate of households with minimum wage earners and control variables for households’ demographics, family status, ethnicity, self-employment status, educational composition, labor market activity. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

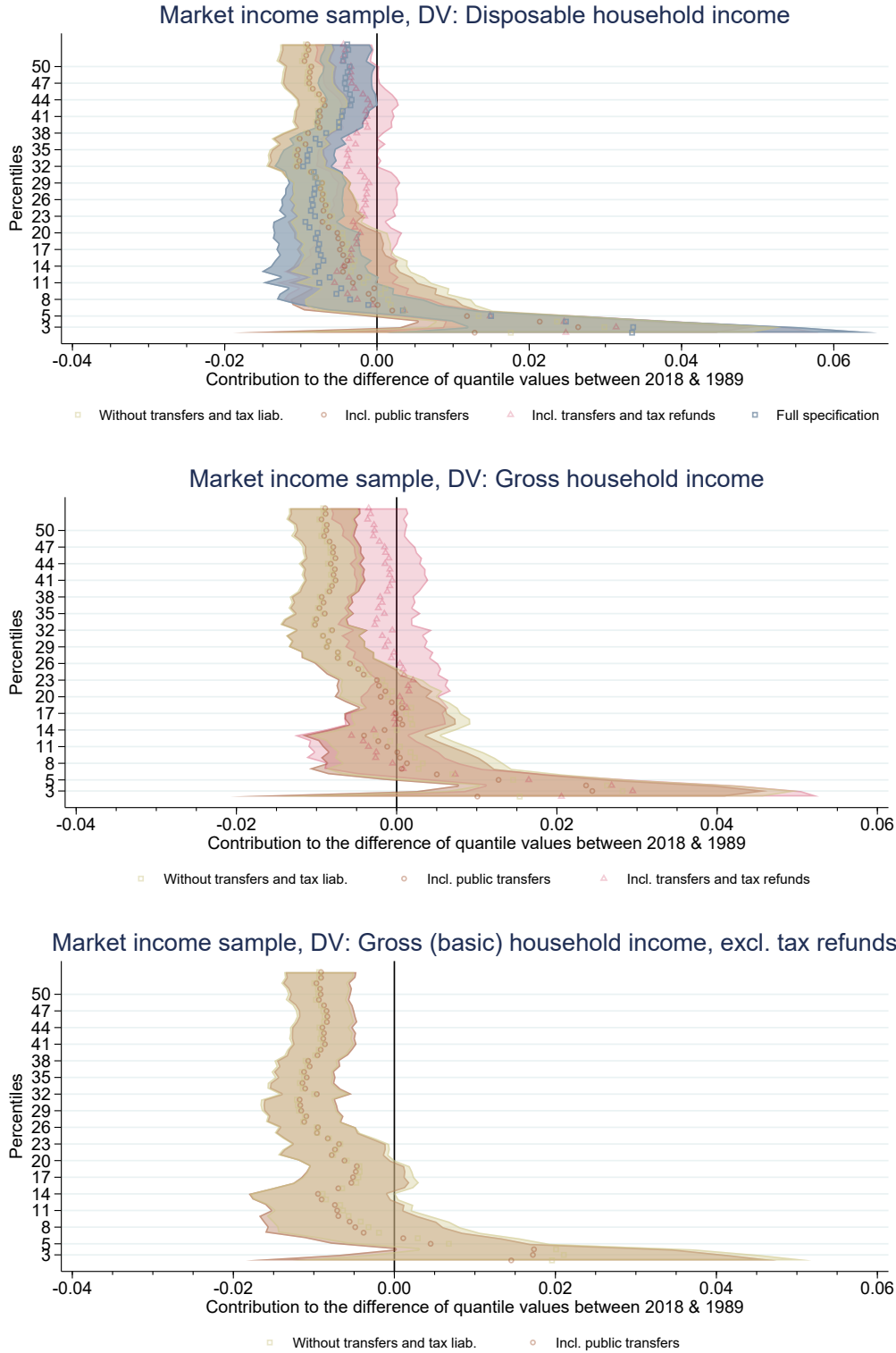


Figure 35: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications (from base model to full specification), market income sample.

Note: “DV” indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications, where “Without transfers and tax liab.” refers to the base model, which excludes covariates on household tax liability and transfer receipt. The base model includes the main covariate of households with minimum wage earners and control variables for households’ demographics, family status, ethnicity, self-employment status, educational composition, labor market activity. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

F. Supplemental results for Chapter 10.3: Multivariate results for different model specifications

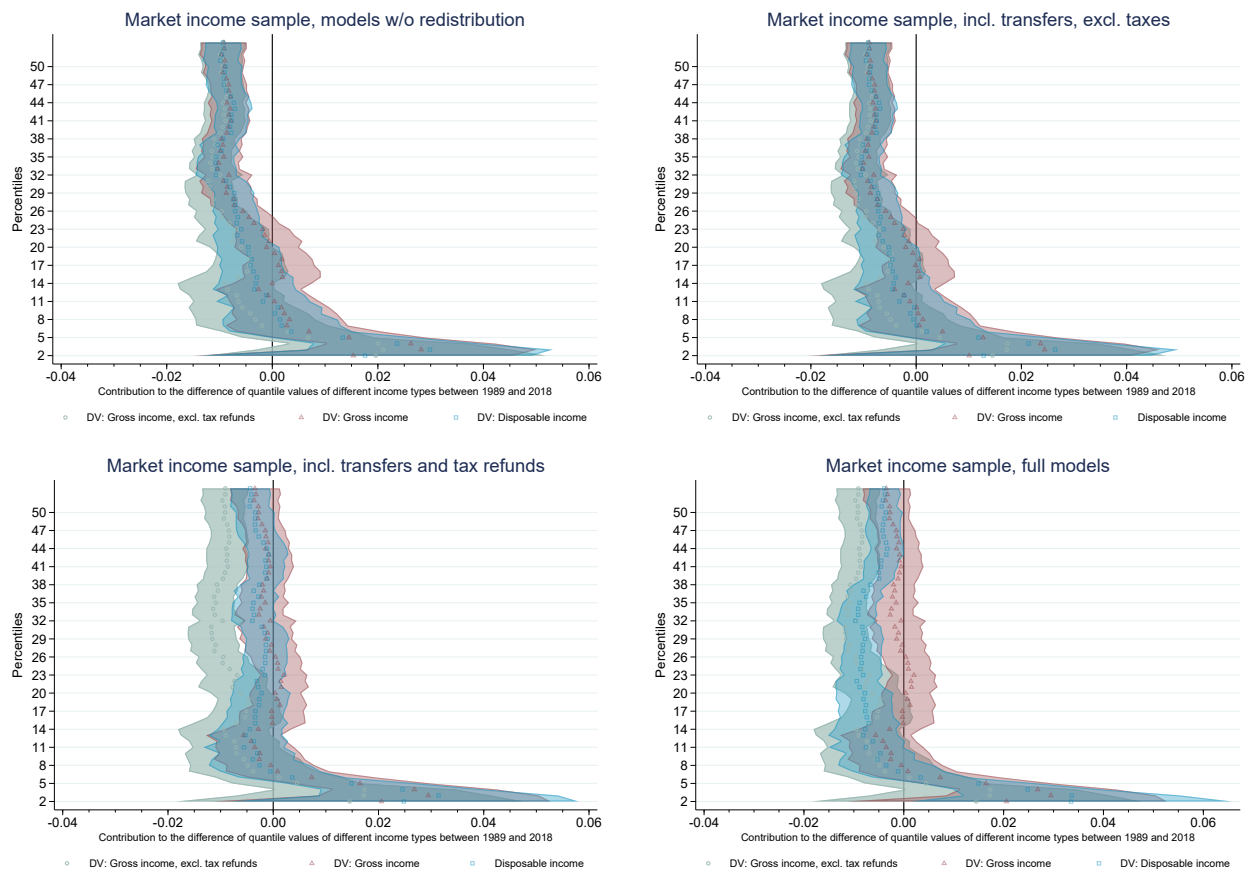


Figure 36: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of gross and disposable income, for different model specifications, market income sample

Note: “DV” indicates the income concept of which changes in percentile values are estimated. Results in different colors show results using different income concepts. “Models w/o redistribution” refers to the base model which excludes covariates on household tax liability and transfer receipt. Other models gradually include the transfer receipt of households, their receipt of tax refunds and their tax liability. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

G. Supplemental results for Chapter 10.4: Multivariate results and interaction effects

1. Results of OB-decompositions with interaction terms, market income sample

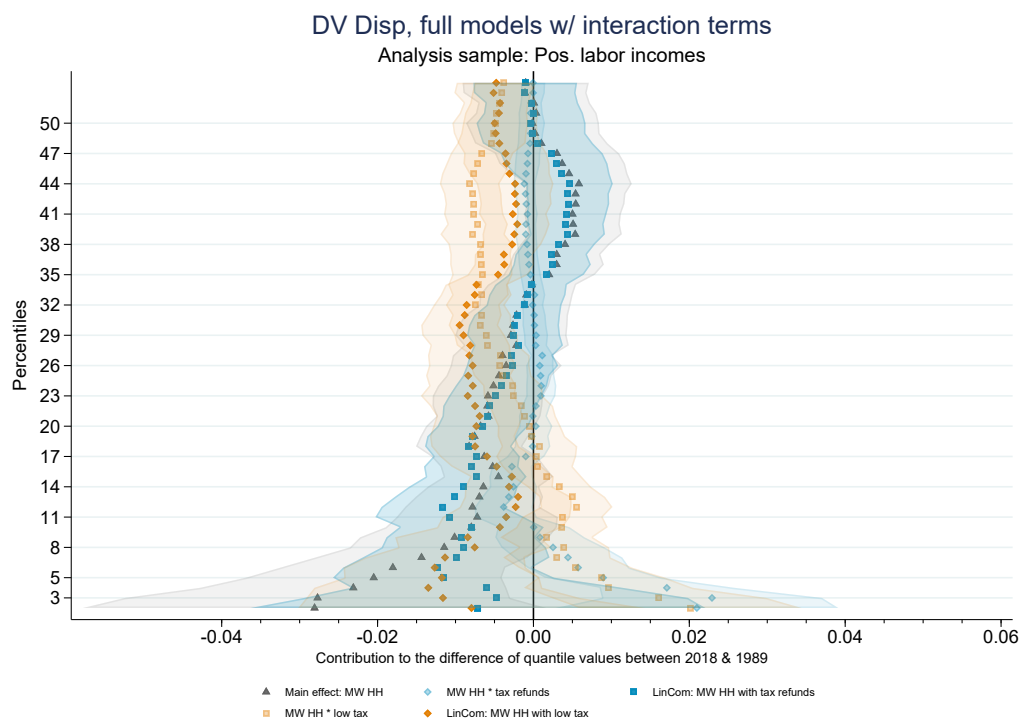


Figure 37: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, market income sample

Note: “DV” indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. “MW HH” means minimum wage households. “LinCom” refers to the linear combination of the main effect and the interaction effect. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

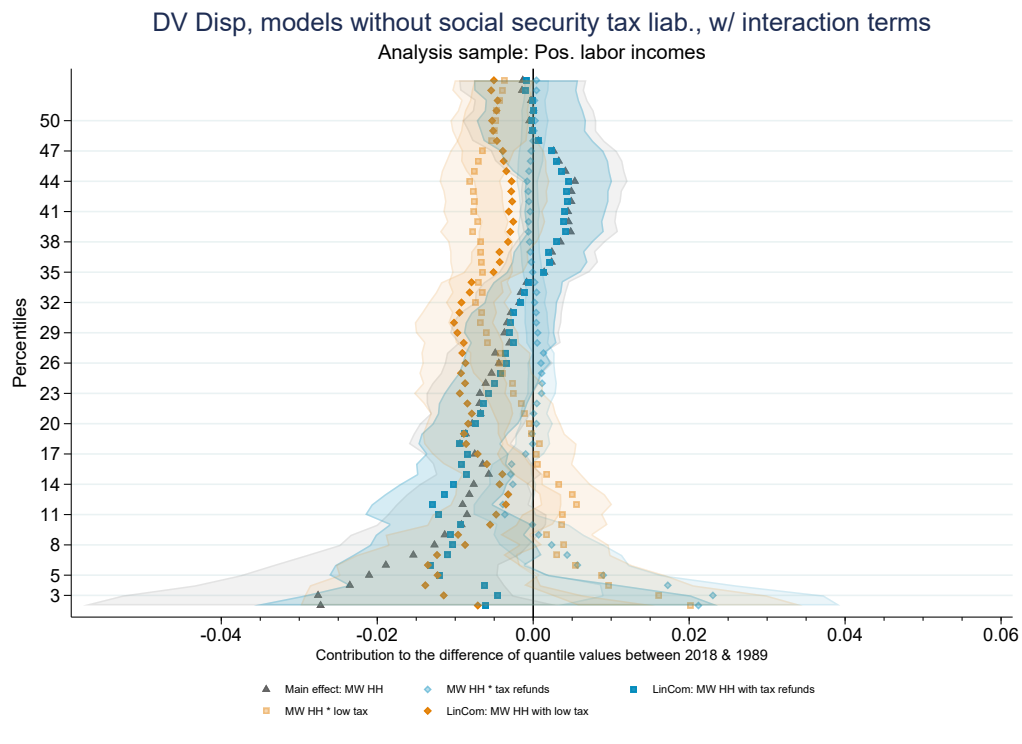


Figure 38: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household social security tax liability, market income sample

Note: See footnote below Figure 37. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

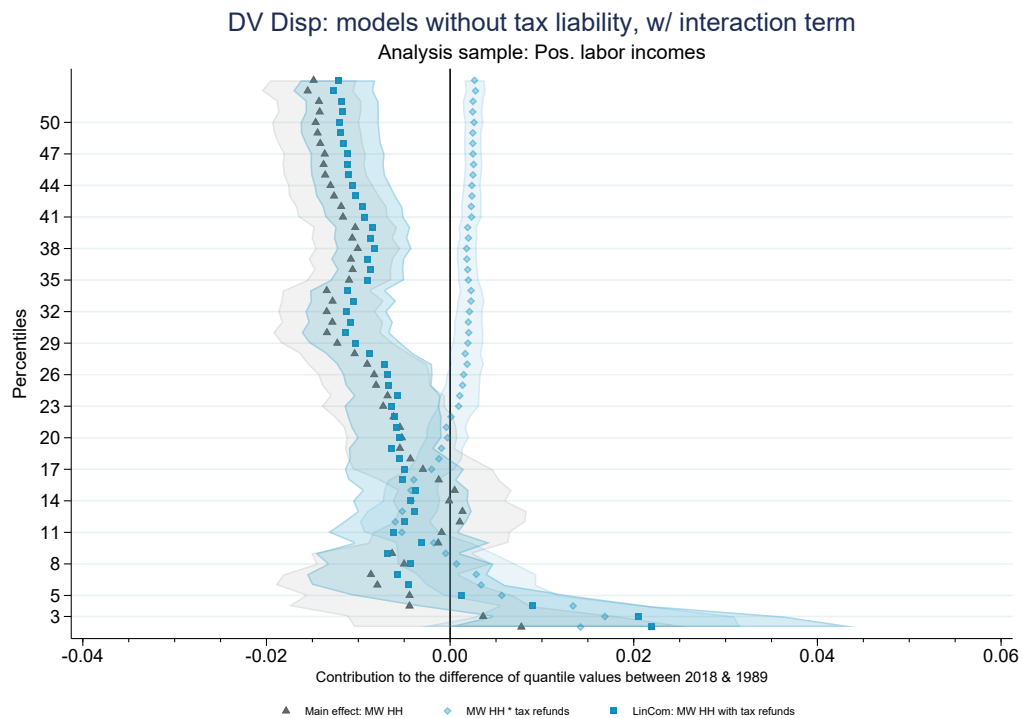


Figure 39: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 37. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

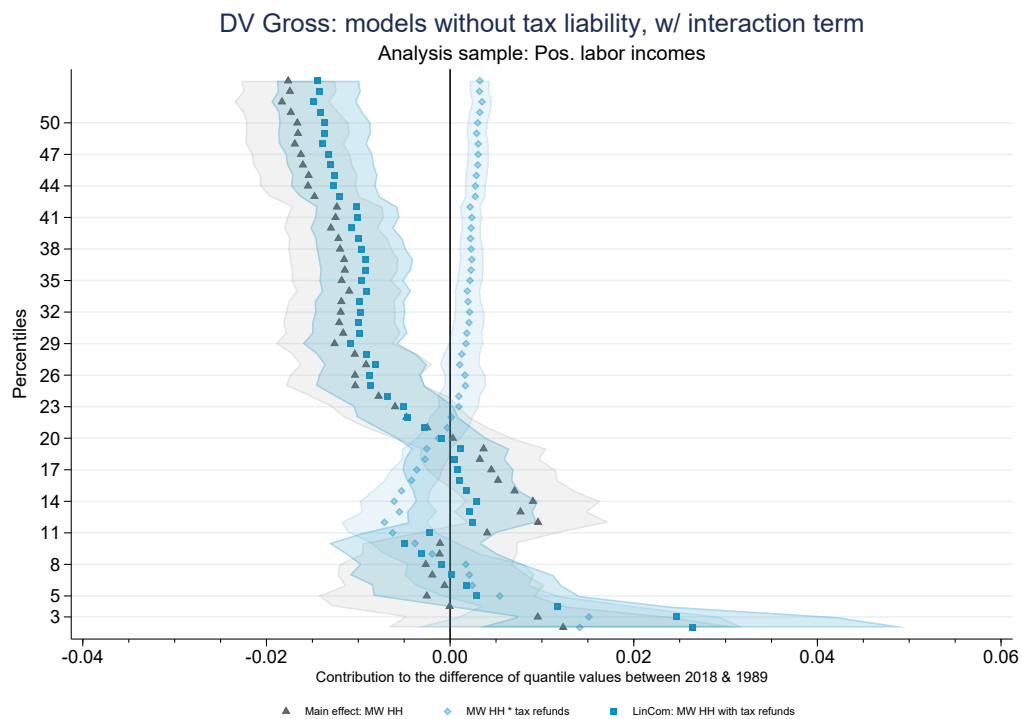


Figure 40: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of gross household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 37. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2. Results of OB-decompositions with interaction terms, focusing on income tax covariates

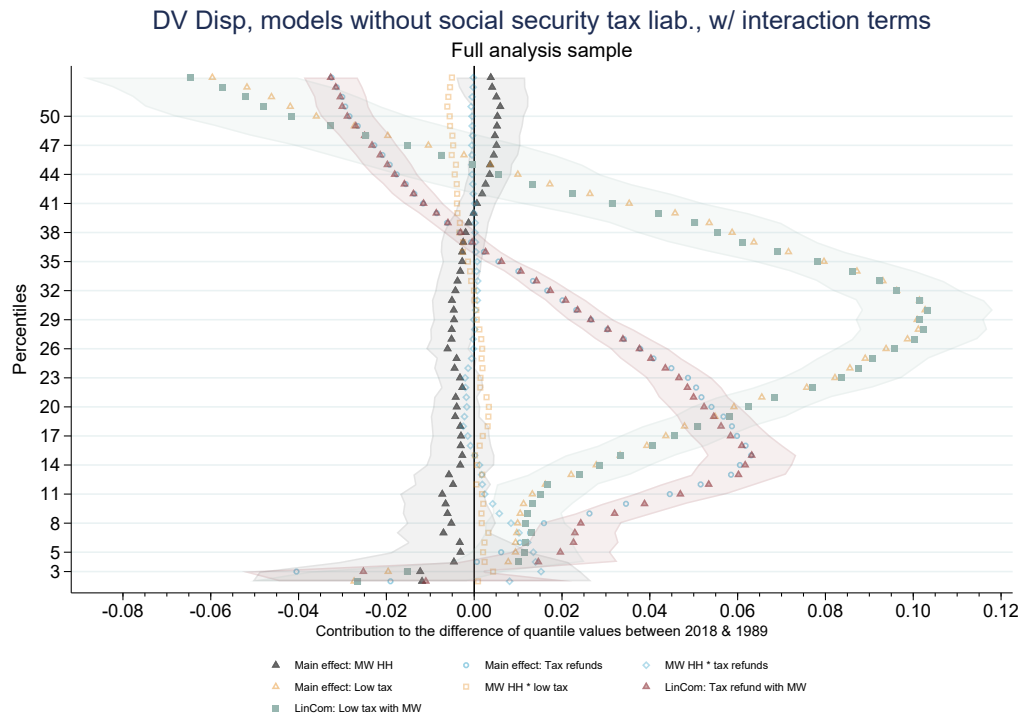


Figure 41: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households who receive tax refunds or have a low tax liability on percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household social security tax liability, market income sample

Note: See footnote below Figure 37. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

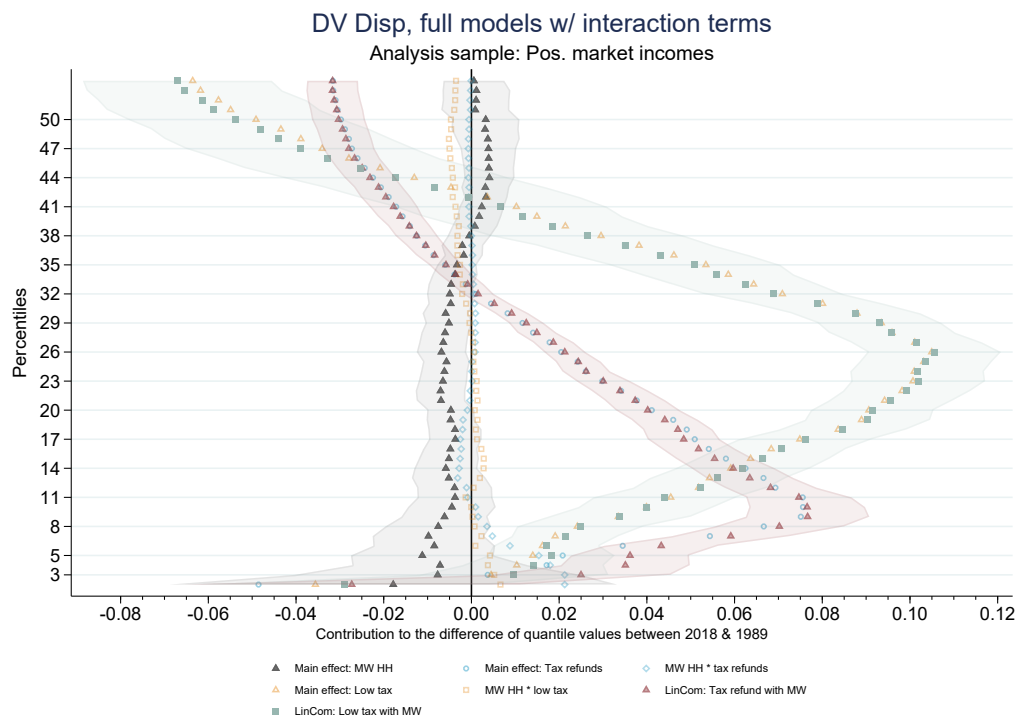


Figure 42: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households who receive tax refunds or have a low tax liability on percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, market income sample

Note: See footnote below Figure 37. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3. Results of OB-decompositions without interaction terms, focusing on income tax covariates

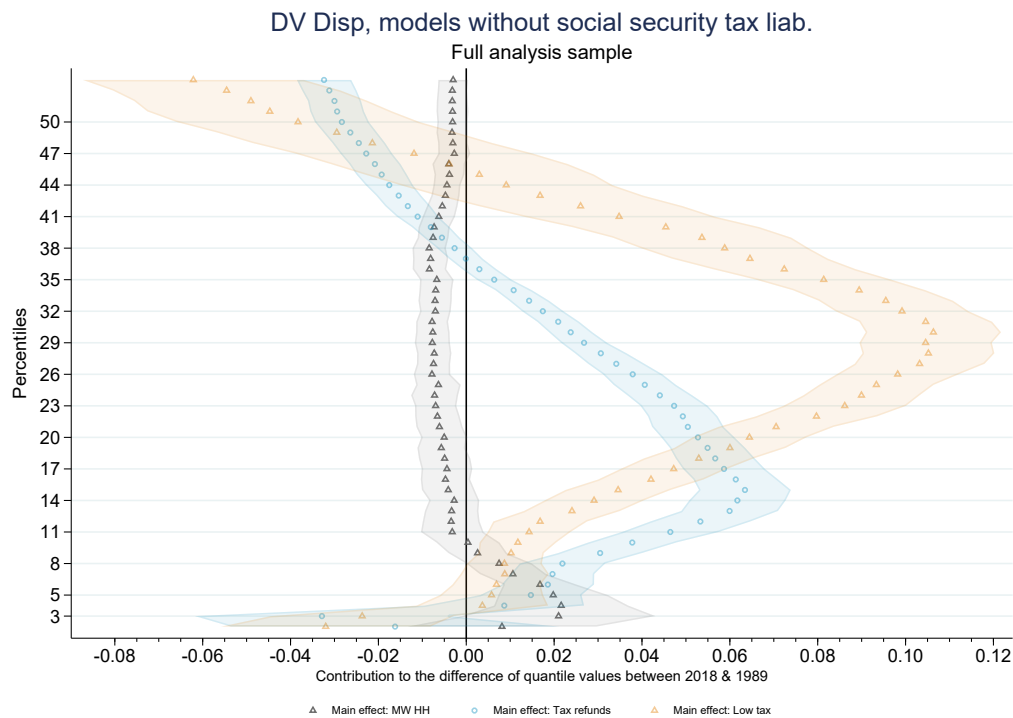


Figure 43: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of minimum wage households and households who receive tax refunds or have a low tax liability on percentile values of the distribution of disposable household income, based on a model specification without interaction effects, excluding household social security tax liability, full analysis sample

Note: See footnote below Figure 37. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

H. Supplementary tables

1. Income concept used for dependent variable: Disposable household income

1.1. Full analysis sample, using different model specifications

Table 1: Full analysis sample, full models: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.713*** (0.053)	9.119*** (0.025)	9.469*** (0.018)	9.676*** (0.018)	9.968*** (0.020)	10.492*** (0.028)
1989	8.826*** (0.031)	9.065*** (0.023)	9.338*** (0.022)	9.538*** (0.024)	9.826*** (0.025)	10.325*** (0.026)
Difference	-0.113** (0.038)	0.054** (0.018)	0.131*** (0.016)	0.138*** (0.017)	0.142*** (0.015)	0.167*** (0.014)
Composition	-0.348*** (0.086)	-0.044 (0.031)	0.117*** (0.022)	0.124*** (0.022)	0.079*** (0.021)	-0.031 (0.017)
Income Structure	0.235** (0.090)	0.098*** (0.030)	0.014 (0.021)	0.014 (0.020)	0.063*** (0.019)	0.199*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Household: inactive / jobless	-0.027*** (0.006)	-0.011*** (0.003)	-0.008*** (0.002)	-0.007*** (0.001)	-0.004*** (0.001)	-0.000 (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.067 (0.059)	0.073*** (0.022)	0.183*** (0.012)	0.189*** (0.010)	0.160*** (0.008)	0.081*** (0.005)
Single, medium education	-0.029 (0.019)	-0.018** (0.007)	-0.038*** (0.004)	-0.049*** (0.005)	-0.048*** (0.005)	-0.032*** (0.003)
Single, high education	-0.025 (0.016)	-0.009 (0.006)	-0.024*** (0.003)	-0.028*** (0.003)	-0.018*** (0.002)	0.002 (0.002)
Couple, low/low education	-0.012 (0.035)	0.047** (0.014)	0.099*** (0.011)	0.117*** (0.009)	0.103*** (0.010)	0.058*** (0.006)
Couple, medium/low education	0.006 (0.012)	0.010 (0.005)	0.013*** (0.003)	0.015*** (0.003)	0.021*** (0.002)	0.018*** (0.002)
Couple, high/medium education	-0.015*** (0.004)	-0.004* (0.002)	-0.002* (0.001)	-0.001 (0.001)	0.005*** (0.001)	0.013*** (0.001)
Couple, high/high education	-0.037*** (0.006)	-0.015*** (0.003)	-0.009*** (0.002)	-0.003 (0.002)	0.007*** (0.001)	0.031*** (0.002)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.072*** (0.013)	0.024*** (0.004)	0.012*** (0.002)	0.009*** (0.002)	0.007*** (0.001)	0.005*** (0.001)
Jobless household	-0.032 (0.018)	-0.012 (0.006)	-0.005 (0.003)	-0.003 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Double-earner household	-0.002 (0.001)	-0.001* (0.000)	-0.001* (0.000)	-0.000 (0.000)	0.001** (0.000)	0.003*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.001 (0.001)
Both in part-time	-0.000 (0.001)	0.000 (0.000)	0.001* (0.000)	0.001** (0.000)	0.001*** (0.000)	0.000* (0.000)
Precarious	0.015*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.001*** (0.000)
Single working fulltime	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
Single working part-time	0.002 (0.001)	0.002* (0.001)	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)	0.000 (0.000)

PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.144*** (0.019)	-0.076*** (0.008)	-0.066*** (0.006)	-0.072*** (0.006)	-0.098*** (0.008)	-0.097*** (0.008)
No income tax	-0.149*** (0.030)	-0.064*** (0.013)	-0.045*** (0.008)	-0.044*** (0.007)	-0.052*** (0.007)	-0.060*** (0.008)
Low, >0% - 10%	-0.014*** (0.003)	-0.003*** (0.001)	-0.003* (0.001)	-0.005*** (0.001)	-0.015*** (0.002)	-0.041*** (0.004)
High, >15%	0.003 (0.003)	0.005*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	0.010*** (0.001)	-0.020*** (0.004)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	-0.019*** (0.006)	-0.005* (0.002)	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.005*** (0.001)
Low, >0% - 6%	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.010*** (0.003)	-0.004** (0.001)	0.000 (0.001)	0.002* (0.001)	0.003** (0.001)	0.002*** (0.001)
Medium, >5% - 20%	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20%	0.005 (0.004)	0.010*** (0.003)	0.013*** (0.003)	0.009*** (0.002)	0.004*** (0.001)	-0.000 (0.000)
Young household	0.030*** (0.006)	0.011*** (0.002)	0.003* (0.001)	0.002** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Single-mother household	-0.008 (0.004)	-0.001 (0.002)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Large household (3+ children)	0.000 (0.002)	0.001 (0.001)	-0.000 (0.001)	0.001 (0.000)	0.001** (0.000)	0.001*** (0.000)
Household with self-employed member	-0.012*** (0.003)	-0.004*** (0.001)	-0.001* (0.001)	-0.001* (0.000)	-0.000 (0.000)	0.001** (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.007 (0.008)	0.000 (0.003)	-0.005* (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)
Household with Black (non-Hispanic) members	-0.012*** (0.003)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
Household with members from other ethnicity	-0.001 (0.005)	0.001 (0.002)	-0.003* (0.001)	-0.005*** (0.001)	-0.004** (0.001)	-0.003*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)
Southern	-0.005 (0.004)	-0.004 (0.002)	-0.004* (0.002)	-0.002* (0.001)	-0.001 (0.001)	-0.000 (0.001)
Pacific and Mountain states	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.021 (0.011)	0.020** (0.006)	0.001 (0.004)	-0.003 (0.003)	-0.006* (0.003)	-0.004* (0.002)
Household: inactive / jobless	-0.297*** (0.056)	-0.113*** (0.022)	-0.079*** (0.017)	-0.061*** (0.012)	-0.036*** (0.009)	-0.011* (0.006)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.063 (0.071)	-0.057 (0.029)	-0.156*** (0.017)	-0.140*** (0.014)	-0.099*** (0.010)	-0.036*** (0.006)
Single, medium education	-0.026 (0.025)	-0.012 (0.010)	-0.026*** (0.005)	-0.029*** (0.005)	-0.026*** (0.005)	-0.020*** (0.003)
Single, high education	-0.003 (0.006)	0.001 (0.002)	-0.003 (0.002)	-0.002 (0.001)	0.002 (0.001)	0.004** (0.001)
Couple, low/low education	0.008 (0.038)	-0.057*** (0.016)	-0.105*** (0.011)	-0.120*** (0.008)	-0.095*** (0.011)	-0.032*** (0.006)
Couple, medium/low education	-0.007 (0.018)	-0.013 (0.008)	-0.021*** (0.005)	-0.024*** (0.004)	-0.030*** (0.003)	-0.019*** (0.002)
Couple, high/medium education	-0.010* (0.004)	-0.002 (0.002)	-0.000 (0.001)	0.001 (0.001)	0.005*** (0.001)	0.011*** (0.001)
Couple, high/high education	-0.004*** (0.001)	-0.001* (0.001)	-0.000 (0.000)	0.000 (0.000)	0.002*** (0.000)	0.005*** (0.000)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.480*** (0.057)	0.099*** (0.018)	0.039** (0.013)	0.011 (0.011)	-0.006 (0.008)	0.001 (0.006)
Jobless household	-0.219*** (0.029)	-0.065*** (0.010)	-0.022*** (0.006)	-0.012** (0.004)	-0.011*** (0.002)	-0.010*** (0.002)
Double-earner household	-0.007 (0.006)	-0.006* (0.003)	-0.005* (0.003)	-0.005* (0.002)	-0.004 (0.003)	0.004 (0.002)
Trad. breadwinner	0.040*** (0.008)	0.014*** (0.004)	0.002 (0.003)	-0.005* (0.002)	-0.015*** (0.003)	-0.012*** (0.002)

Both in part-time	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Precarious	-0.040*** (0.008)	-0.014*** (0.004)	-0.010*** (0.002)	-0.011*** (0.002)	-0.010*** (0.001)	-0.004*** (0.001)
Single working fulltime	0.025 (0.034)	-0.001 (0.013)	0.008 (0.009)	0.005 (0.007)	-0.008 (0.006)	-0.015** (0.005)
Single working part-time	0.011 (0.014)	-0.007 (0.006)	-0.005 (0.004)	-0.006 (0.003)	-0.009*** (0.002)	-0.006** (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.032* (0.015)	0.015* (0.006)	0.039*** (0.005)	0.066*** (0.005)	0.043*** (0.004)	-0.028*** (0.003)
No income tax	-0.236** (0.089)	-0.001 (0.038)	0.065** (0.024)	0.113*** (0.019)	0.130*** (0.010)	-0.028*** (0.007)
Low, >0% - 10%	-0.024* (0.011)	0.006 (0.006)	0.015*** (0.004)	0.040*** (0.006)	0.100*** (0.007)	-0.034* (0.014)
High, >15%	-0.009 (0.007)	-0.003 (0.003)	0.000 (0.002)	0.001 (0.002)	-0.010*** (0.003)	-0.109*** (0.011)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	-0.158** (0.060)	-0.039 (0.023)	-0.015 (0.013)	-0.024* (0.011)	-0.044*** (0.007)	-0.010 (0.005)
Low, >0% - 6%	-0.030 (0.015)	-0.005 (0.007)	-0.019*** (0.005)	-0.036*** (0.003)	-0.031*** (0.003)	0.005 (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.039*** (0.009)	0.011* (0.005)	0.003 (0.004)	-0.001 (0.004)	-0.006* (0.003)	-0.010*** (0.001)
Medium, >5% - 20%	0.013 (0.010)	-0.017*** (0.005)	-0.011 (0.006)	-0.009* (0.004)	-0.003 (0.002)	-0.003** (0.001)
High, >20%	-0.015 (0.018)	-0.000 (0.010)	-0.008 (0.005)	0.000 (0.003)	-0.002 (0.001)	-0.003** (0.001)
Young household	-0.076*** (0.019)	-0.026*** (0.008)	-0.008* (0.004)	-0.003 (0.003)	-0.005 (0.003)	-0.004* (0.002)
Single-mother household	0.047** (0.017)	0.018* (0.008)	0.009* (0.004)	-0.001 (0.004)	0.005* (0.002)	0.012*** (0.002)
Couple without children	0.001 (0.007)	-0.001 (0.003)	-0.006** (0.002)	-0.008*** (0.002)	-0.007*** (0.002)	-0.011*** (0.002)
Large household (3+ children)	0.020 (0.011)	0.015* (0.006)	0.019*** (0.003)	0.015*** (0.003)	0.014*** (0.002)	0.009*** (0.001)
Household with self-employed member	0.080*** (0.015)	0.036*** (0.007)	0.021*** (0.004)	0.017*** (0.003)	0.015*** (0.002)	0.006*** (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.014 (0.008)	0.010 (0.005)	0.006 (0.004)	0.002 (0.003)	0.001 (0.002)	-0.002 (0.001)
Household with Black (non-Hispanic) members	-0.016 (0.013)	0.005 (0.005)	0.007 (0.004)	0.007* (0.003)	0.003 (0.002)	-0.006*** (0.001)
Household with members from other ethnicity	-0.003 (0.004)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.000)
REGION (Ref.: Atlantic)						
Midwest	0.013 (0.019)	0.016 (0.009)	0.009 (0.006)	0.011 (0.006)	0.013* (0.006)	0.010 (0.006)
Southern	0.025 (0.023)	0.022* (0.011)	0.020* (0.010)	0.022* (0.009)	0.013 (0.008)	0.011 (0.007)
Pacific and Mountain states	0.008 (0.012)	0.002 (0.006)	0.002 (0.005)	0.005 (0.006)	0.007 (0.005)	0.011 (0.007)
Constant	0.662*** (0.074)	0.250*** (0.046)	0.247*** (0.027)	0.200*** (0.023)	0.173*** (0.022)	0.526*** (0.038)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income and payroll tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 2: Full analysis sample, models incl. transfers and tax refunds, excl. tax liabilities: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.713*** (0.051)	9.119*** (0.024)	9.469*** (0.018)	9.676*** (0.017)	9.968*** (0.018)	10.492*** (0.018)
1989	8.826*** (0.030)	9.065*** (0.022)	9.338*** (0.021)	9.538*** (0.022)	9.826*** (0.020)	10.325*** (0.018)
Difference	-0.113** (0.039)	0.054** (0.018)	0.131*** (0.016)	0.138*** (0.016)	0.142*** (0.015)	0.167*** (0.012)
Composition	-0.077 (0.079)	0.061* (0.030)	0.186*** (0.023)	0.198*** (0.022)	0.187*** (0.019)	0.189*** (0.015)
Income Structure	-0.036 (0.088)	-0.007 (0.031)	-0.055* (0.022)	-0.060** (0.018)	-0.045** (0.014)	-0.022 (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.002)	0.003 (0.002)
Household: inactive / jobless	-0.062*** (0.013)	-0.026*** (0.005)	-0.017*** (0.003)	-0.015*** (0.003)	-0.012*** (0.003)	-0.007*** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.107 (0.057)	0.092*** (0.021)	0.196*** (0.013)	0.200*** (0.012)	0.170*** (0.010)	0.081*** (0.005)
Single, medium education	-0.048* (0.020)	-0.027*** (0.007)	-0.044*** (0.005)	-0.054*** (0.005)	-0.053*** (0.005)	-0.031*** (0.003)
Single, high education	-0.025 (0.016)	-0.010 (0.006)	-0.025*** (0.004)	-0.028*** (0.003)	-0.015*** (0.003)	0.018*** (0.003)
Couple, low/low education	0.022 (0.035)	0.062*** (0.015)	0.109*** (0.010)	0.127*** (0.009)	0.115*** (0.011)	0.067*** (0.007)
Couple, medium/low education	0.015 (0.012)	0.014** (0.005)	0.016*** (0.003)	0.018*** (0.003)	0.024*** (0.002)	0.021*** (0.002)
Couple, high/medium education	-0.008 (0.004)	-0.001 (0.002)	-0.001 (0.001)	0.001 (0.001)	0.008*** (0.001)	0.020*** (0.001)
Couple, high/high education	-0.018** (0.006)	-0.008* (0.003)	-0.003 (0.002)	0.003 (0.002)	0.019*** (0.002)	0.064*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.043*** (0.008)	0.013*** (0.002)	0.006*** (0.001)	0.003*** (0.001)	0.001* (0.001)	-0.000 (0.000)
Jobless household	-0.035 (0.020)	-0.013 (0.007)	-0.005 (0.003)	-0.003 (0.002)	-0.002 (0.001)	-0.001 (0.001)
Double-earner household	0.002 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.002*** (0.000)	0.006*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.001 (0.001)
Both in part-time	0.000 (0.001)	0.001 (0.000)	0.001* (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001** (0.000)
Precarious	0.016*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.001*** (0.000)
Single working fulltime	0.001 (0.003)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)
Single working part-time	0.001 (0.001)	0.002* (0.001)	0.001* (0.000)	0.001* (0.000)	0.000 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.081*** (0.017)	-0.050*** (0.007)	-0.048*** (0.005)	-0.053*** (0.005)	-0.068*** (0.006)	-0.047*** (0.004)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.009** (0.003)	-0.003** (0.001)	0.000 (0.001)	0.002* (0.001)	0.003** (0.001)	0.002*** (0.001)
Medium, >5% - 20%	-0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20%	0.012* (0.005)	0.013*** (0.004)	0.015*** (0.004)	0.011*** (0.003)	0.006*** (0.001)	0.001** (0.000)
Young household	0.035*** (0.007)	0.013*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.007*** (0.001)	0.010*** (0.001)
Single-mother household	-0.001 (0.004)	0.001 (0.002)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.001 (0.000)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)

Large household (3+ children)	0.003 (0.002)	0.002* (0.001)	0.001 (0.001)	0.001** (0.000)	0.002*** (0.000)	0.003*** (0.001)
Household with self-employed member	-0.026*** (0.005)	-0.011*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.005 (0.007)	-0.001 (0.003)	-0.005* (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.010*** (0.002)
Household with Black (non-Hispanic) members	-0.013*** (0.003)	-0.006*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Household with members from other ethnicity	-0.002 (0.004)	-0.000 (0.002)	-0.003* (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.000 (0.002)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)
Southern	-0.008 (0.005)	-0.005* (0.002)	-0.004* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.000 (0.001)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.015 (0.012)	0.019** (0.007)	0.001 (0.004)	-0.002 (0.003)	0.000 (0.003)	-0.003 (0.002)
Household: inactive / jobless	-0.629*** (0.052)	-0.205*** (0.020)	-0.098*** (0.014)	-0.056*** (0.012)	-0.049*** (0.009)	-0.047*** (0.006)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.046 (0.071)	-0.034 (0.029)	-0.127*** (0.018)	-0.102*** (0.016)	-0.050*** (0.010)	0.026*** (0.006)
Single, medium education	-0.033 (0.026)	-0.011 (0.010)	-0.022*** (0.006)	-0.022*** (0.006)	-0.019*** (0.004)	-0.009* (0.003)
Single, high education	-0.003 (0.007)	0.001 (0.003)	-0.003 (0.002)	-0.002 (0.002)	0.002 (0.001)	0.005*** (0.001)
Couple, low/low education	0.001 (0.039)	-0.053** (0.017)	-0.096*** (0.010)	-0.102*** (0.007)	-0.061*** (0.011)	0.021** (0.007)
Couple, medium/low education	-0.018 (0.018)	-0.017* (0.008)	-0.024*** (0.004)	-0.025*** (0.004)	-0.027*** (0.003)	-0.009** (0.003)
Couple, high/medium education	-0.006 (0.004)	-0.001 (0.002)	-0.000 (0.001)	0.000 (0.001)	0.003* (0.001)	0.008*** (0.001)
Couple, high/high education	-0.002 (0.001)	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)	0.006*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.353*** (0.032)	0.093*** (0.014)	0.054*** (0.009)	0.040*** (0.007)	0.047*** (0.008)	0.034*** (0.006)
Jobless household	-0.229*** (0.031)	-0.064*** (0.011)	-0.021*** (0.006)	-0.010* (0.004)	-0.005* (0.002)	-0.007*** (0.002)
Double-earner household	0.011 (0.006)	-0.000 (0.003)	-0.002 (0.002)	-0.003 (0.002)	-0.008* (0.003)	0.000 (0.003)
Trad. breadwinner	0.050*** (0.007)	0.018*** (0.004)	0.003 (0.003)	-0.004 (0.002)	-0.010** (0.003)	-0.007* (0.003)
Both in part-time	0.001 (0.003)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Precarious	-0.038*** (0.008)	-0.012** (0.004)	-0.009*** (0.002)	-0.010*** (0.002)	-0.006*** (0.001)	-0.001 (0.001)
Single working fulltime	0.081* (0.035)	0.013 (0.011)	0.011 (0.010)	0.005 (0.009)	-0.004 (0.007)	-0.003 (0.005)
Single working part-time	0.024 (0.014)	-0.001 (0.006)	-0.002 (0.004)	-0.003 (0.004)	-0.002 (0.003)	0.002 (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.006 (0.015)	0.018** (0.006)	0.035*** (0.005)	0.055*** (0.005)	0.024*** (0.004)	-0.016*** (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.039*** (0.009)	0.013** (0.005)	0.006 (0.004)	0.003 (0.003)	-0.001 (0.002)	-0.006** (0.002)
Medium, >5% - 20%	0.018 (0.011)	-0.010* (0.005)	-0.003 (0.006)	-0.001 (0.004)	0.008** (0.002)	0.006*** (0.001)
High, >20%	-0.014 (0.018)	0.008 (0.010)	0.003 (0.005)	0.013*** (0.004)	0.009*** (0.001)	0.002 (0.001)
Young household	-0.091*** (0.021)	-0.032*** (0.008)	-0.010* (0.004)	-0.002 (0.003)	-0.001 (0.003)	-0.001 (0.002)
Single-mother household	0.022 (0.017)	0.008 (0.008)	0.003 (0.004)	-0.007 (0.004)	0.005* (0.002)	0.014*** (0.002)
Couple without children	0.010 (0.007)	0.002 (0.003)	-0.003 (0.002)	-0.005** (0.002)	-0.006*** (0.002)	-0.011*** (0.002)
Large household (3+ children)	0.004 (0.011)	0.009 (0.006)	0.015*** (0.003)	0.013*** (0.002)	0.015*** (0.002)	0.011*** (0.002)
Household with self-employed member	0.143*** (0.013)	0.058*** (0.005)	0.031*** (0.003)	0.023*** (0.004)	0.024*** (0.002)	0.021*** (0.002)

HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.015 (0.008)	0.013* (0.006)	0.008 (0.004)	0.006 (0.003)	0.006* (0.003)	0.001 (0.002)
Household with Black (non-Hispanic) members	-0.012 (0.013)	0.009 (0.006)	0.012** (0.005)	0.013*** (0.004)	0.010*** (0.003)	-0.001 (0.002)
Household with members from other ethnicity	-0.002 (0.004)	-0.000 (0.002)	0.000 (0.001)	-0.000 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.016 (0.025)	0.016 (0.011)	0.009 (0.007)	0.011 (0.007)	0.013 (0.009)	0.009 (0.006)
Southern	0.006 (0.026)	0.018 (0.011)	0.020 (0.010)	0.025* (0.010)	0.023* (0.010)	0.012 (0.007)
Pacific and Mountain states	0.007 (0.014)	0.002 (0.007)	0.002 (0.006)	0.007 (0.008)	0.011 (0.007)	0.011 (0.009)
Constant	0.275*** (0.061)	0.116** (0.039)	0.152*** (0.026)	0.085*** (0.023)	-0.000 (0.022)	-0.097*** (0.025)
Observations	125826	125826	125826	125826	125826	125826
Standard errors in parentheses						
Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income tax liability						
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$						
IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.						

Table 3: Full analysis sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.713*** (0.049)	9.119*** (0.022)	9.469*** (0.017)	9.676*** (0.016)	9.968*** (0.016)	10.492*** (0.017)
1989	8.826*** (0.030)	9.065*** (0.023)	9.338*** (0.021)	9.538*** (0.022)	9.826*** (0.020)	10.325*** (0.018)
Difference	-0.113** (0.037)	0.054** (0.017)	0.131*** (0.015)	0.138*** (0.016)	0.142*** (0.014)	0.167*** (0.012)
Composition	0.091 (0.085)	0.165*** (0.030)	0.286*** (0.020)	0.307*** (0.021)	0.327*** (0.019)	0.286*** (0.014)
Income Structure	-0.204* (0.091)	-0.111*** (0.031)	-0.155*** (0.019)	-0.169*** (0.019)	-0.185*** (0.015)	-0.119*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.000 (0.001)	0.002 (0.001)	0.003 (0.002)	0.003 (0.002)	0.004 (0.003)
Household: inactive / jobless	-0.060*** (0.012)	-0.024*** (0.005)	-0.016*** (0.003)	-0.013*** (0.003)	-0.011*** (0.002)	-0.006*** (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.105 (0.058)	0.090*** (0.022)	0.195*** (0.012)	0.199*** (0.011)	0.168*** (0.009)	0.080*** (0.005)
Single, medium education	-0.044* (0.020)	-0.024*** (0.007)	-0.042*** (0.005)	-0.052*** (0.005)	-0.049*** (0.005)	-0.029*** (0.003)
Single, high education	-0.016 (0.017)	-0.005 (0.006)	-0.020*** (0.004)	-0.022*** (0.003)	-0.008** (0.003)	0.023*** (0.003)
Couple, low/low education	0.057 (0.035)	0.085*** (0.016)	0.131*** (0.010)	0.150*** (0.010)	0.145*** (0.011)	0.088*** (0.007)

Pensioner household	0.339*** (0.033)	0.090*** (0.013)	0.055*** (0.009)	0.044*** (0.008)	0.042*** (0.008)	0.023*** (0.006)
Jobless household	-0.232*** (0.032)	-0.067*** (0.011)	-0.024*** (0.006)	-0.015** (0.005)	-0.009*** (0.003)	-0.008*** (0.002)
Double-earner household	0.015* (0.006)	0.002 (0.003)	-0.000 (0.003)	-0.002 (0.003)	-0.005 (0.004)	0.003 (0.003)
Trad. breadwinner	0.040*** (0.005)	0.014*** (0.003)	0.001 (0.003)	-0.004 (0.003)	-0.015*** (0.003)	-0.014*** (0.003)
Both in part-time	0.001 (0.003)	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Precarious	-0.040*** (0.009)	-0.011* (0.004)	-0.006* (0.003)	-0.004* (0.002)	-0.004** (0.002)	-0.003* (0.001)
Single working fulltime	0.084* (0.035)	0.016 (0.012)	0.014 (0.010)	0.009 (0.009)	-0.000 (0.007)	-0.002 (0.005)
Single working part-time	0.023 (0.014)	-0.000 (0.006)	0.000 (0.004)	0.001 (0.004)	-0.000 (0.003)	-0.000 (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.034*** (0.009)	0.011* (0.005)	0.004 (0.004)	0.002 (0.004)	-0.004 (0.002)	-0.009*** (0.002)
Medium, >5% - 20%	0.017 (0.010)	-0.008 (0.005)	0.000 (0.006)	0.005 (0.005)	0.010*** (0.003)	0.004*** (0.001)
High, >20%	-0.014 (0.019)	0.009 (0.010)	0.004 (0.005)	0.014*** (0.004)	0.009*** (0.002)	0.002 (0.001)
Young household	-0.092*** (0.020)	-0.030*** (0.008)	-0.006 (0.004)	0.004 (0.003)	0.001 (0.003)	-0.003 (0.002)
Single-mother household	0.007 (0.013)	0.007 (0.008)	0.009** (0.003)	0.006* (0.003)	0.003 (0.002)	0.001 (0.002)
Couple without children	0.014* (0.006)	0.003 (0.003)	-0.004 (0.002)	-0.006*** (0.002)	-0.005** (0.002)	-0.008*** (0.002)
Large household (3+ children)	-0.011 (0.010)	0.002 (0.006)	0.011*** (0.003)	0.011*** (0.003)	0.006** (0.002)	0.001 (0.001)
Household with self-employed member	0.136*** (0.013)	0.055*** (0.005)	0.030*** (0.003)	0.023*** (0.003)	0.021*** (0.002)	0.016*** (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.012 (0.008)	0.012* (0.006)	0.009 (0.005)	0.008 (0.004)	0.006 (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	-0.014 (0.013)	0.009 (0.006)	0.012** (0.005)	0.014*** (0.004)	0.010** (0.003)	-0.002 (0.002)
Household with members from other ethnicity	-0.003 (0.004)	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.010 (0.022)	0.013 (0.008)	0.006 (0.005)	0.008 (0.005)	0.008 (0.005)	0.005 (0.005)
Southern	0.009 (0.025)	0.023* (0.010)	0.027* (0.012)	0.036** (0.012)	0.030** (0.011)	0.013 (0.007)
Pacific and Mountain states	0.007 (0.013)	0.003 (0.007)	0.004 (0.006)	0.009 (0.008)	0.012 (0.007)	0.011 (0.009)
Constant	0.192** (0.061)	0.051 (0.034)	0.079** (0.026)	-0.005 (0.021)	-0.088*** (0.021)	-0.137*** (0.024)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 4: Full analysis sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.713*** (0.049)	9.119*** (0.023)	9.469*** (0.017)	9.676*** (0.016)	9.968*** (0.016)	10.492*** (0.017)
1989	8.826*** (0.030)	9.065*** (0.023)	9.338*** (0.022)	9.538*** (0.023)	9.826*** (0.020)	10.325*** (0.018)
Difference	-0.113** (0.036)	0.054*** (0.016)	0.131*** (0.015)	0.138*** (0.016)	0.142*** (0.014)	0.167*** (0.012)
Composition	0.095 (0.085)	0.185*** (0.030)	0.315*** (0.021)	0.333*** (0.021)	0.347*** (0.018)	0.295*** (0.013)
Income Structure	-0.208* (0.090)	-0.131*** (0.031)	-0.184*** (0.022)	-0.195*** (0.020)	-0.205*** (0.016)	-0.128*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.001 (0.001)	0.002 (0.002)	0.003 (0.002)	0.004 (0.003)	0.004 (0.003)
Household: inactive / jobless	-0.063*** (0.013)	-0.027*** (0.006)	-0.019*** (0.004)	-0.015*** (0.003)	-0.012*** (0.002)	-0.006*** (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.116 (0.061)	0.113*** (0.022)	0.226*** (0.013)	0.225*** (0.011)	0.186*** (0.008)	0.087*** (0.005)
Single, medium education	-0.043* (0.020)	-0.027*** (0.007)	-0.046*** (0.005)	-0.056*** (0.005)	-0.053*** (0.005)	-0.031*** (0.003)
Single, high education	-0.016 (0.017)	-0.005 (0.006)	-0.020*** (0.004)	-0.023*** (0.003)	-0.008** (0.003)	0.023*** (0.003)
Couple, low/low education	0.058 (0.035)	0.091*** (0.017)	0.141*** (0.011)	0.159*** (0.011)	0.152*** (0.011)	0.091*** (0.007)
Couple, medium/low education	0.024* (0.012)	0.021*** (0.005)	0.025*** (0.003)	0.027*** (0.003)	0.033*** (0.003)	0.027*** (0.002)
Couple, high/medium education	-0.005 (0.004)	0.002 (0.002)	0.003* (0.001)	0.005*** (0.001)	0.012*** (0.001)	0.023*** (0.001)
Couple, high/high education	-0.008 (0.006)	0.001 (0.003)	0.007*** (0.002)	0.015*** (0.002)	0.033*** (0.002)	0.074*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.042*** (0.007)	0.014*** (0.003)	0.007*** (0.002)	0.003*** (0.001)	0.000 (0.001)	-0.001* (0.001)
Jobless household	-0.037 (0.021)	-0.015 (0.008)	-0.008 (0.004)	-0.005 (0.003)	-0.003 (0.002)	-0.001 (0.001)
Double-earner household	0.002* (0.001)	0.001* (0.000)	0.001** (0.000)	0.002*** (0.000)	0.004*** (0.001)	0.007*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Both in part-time	0.001 (0.001)	0.001* (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.018*** (0.004)	0.010*** (0.002)	0.007*** (0.002)	0.006*** (0.001)	0.005*** (0.001)	0.002*** (0.001)
Single working fulltime	0.001 (0.003)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
Single working part-time	0.002 (0.001)	0.003* (0.001)	0.002* (0.001)	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)
Young household	0.039*** (0.007)	0.017*** (0.003)	0.009*** (0.001)	0.008*** (0.001)	0.010*** (0.001)	0.012*** (0.001)
Single-mother household	0.007* (0.003)	0.008*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.006*** (0.001)
Household with self-employed member	-0.026*** (0.004)	-0.011*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.000 (0.007)	-0.005 (0.003)	-0.009*** (0.003)	-0.013*** (0.003)	-0.014*** (0.003)	-0.014*** (0.002)

Household with Black (non-Hispanic) members	-0.014*** (0.003)	-0.007*** (0.002)	-0.008*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.004 (0.005)	-0.002 (0.002)	-0.005*** (0.002)	-0.007*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.000 (0.001)	0.001 (0.001)	0.000 (0.000)	0.001 (0.001)	0.002* (0.001)
Southern	-0.009 (0.005)	-0.005* (0.002)	-0.004* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.011 (0.011)	0.019** (0.007)	0.003 (0.005)	0.003 (0.004)	-0.001 (0.003)	-0.009*** (0.002)
Household: inactive / jobless	-0.628*** (0.047)	-0.195*** (0.020)	-0.100*** (0.015)	-0.055*** (0.013)	-0.040*** (0.008)	-0.035*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.050 (0.075)	-0.047 (0.031)	-0.145*** (0.020)	-0.112*** (0.017)	-0.054*** (0.009)	0.024*** (0.006)
Single, medium education	-0.028 (0.026)	-0.009 (0.011)	-0.021*** (0.007)	-0.023*** (0.006)	-0.019*** (0.004)	-0.007* (0.003)
Single, high education	0.001 (0.007)	0.004 (0.003)	0.000 (0.002)	-0.000 (0.002)	0.004** (0.001)	0.007*** (0.001)
Couple, low/low education	-0.027 (0.039)	-0.072*** (0.018)	-0.113*** (0.011)	-0.116*** (0.008)	-0.084*** (0.011)	0.000 (0.007)
Couple, medium/low education	-0.029 (0.018)	-0.027*** (0.008)	-0.034*** (0.005)	-0.034*** (0.004)	-0.038*** (0.003)	-0.016*** (0.003)
Couple, high/medium education	-0.004 (0.004)	0.002 (0.002)	0.003 (0.001)	0.003* (0.001)	0.006*** (0.001)	0.011*** (0.001)
Couple, high/high education	-0.000 (0.001)	0.001 (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.004*** (0.001)	0.007*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.352*** (0.033)	0.090*** (0.015)	0.061*** (0.012)	0.044*** (0.008)	0.043*** (0.008)	0.025*** (0.006)
Jobless household	-0.233*** (0.029)	-0.057*** (0.009)	-0.015** (0.005)	-0.003 (0.004)	-0.001 (0.003)	-0.006*** (0.002)
Double-earner household	0.013* (0.006)	0.003 (0.003)	0.000 (0.003)	-0.002 (0.003)	-0.006 (0.004)	0.003 (0.003)
Trad. breadwinner	0.041*** (0.006)	0.013*** (0.003)	-0.000 (0.003)	-0.007* (0.003)	-0.017*** (0.003)	-0.015*** (0.003)
Both in part-time	0.002 (0.003)	0.001 (0.002)	0.002 (0.001)	0.002 (0.001)	0.003* (0.001)	0.001 (0.001)
Precarious	-0.038*** (0.009)	-0.009* (0.004)	-0.003 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.003* (0.001)
Single working fulltime	0.073* (0.035)	0.007 (0.014)	0.005 (0.013)	-0.000 (0.011)	-0.005 (0.007)	-0.001 (0.005)
Single working part-time	0.023 (0.014)	-0.002 (0.006)	-0.000 (0.004)	0.001 (0.004)	0.001 (0.002)	0.000 (0.002)
Young household	-0.088*** (0.020)	-0.026** (0.008)	-0.002 (0.005)	0.007* (0.003)	0.003 (0.003)	-0.002 (0.002)
Single-mother household	0.018 (0.013)	0.019* (0.009)	0.020*** (0.003)	0.016*** (0.002)	0.008*** (0.002)	0.001 (0.001)
Couple without children	0.014* (0.006)	0.003 (0.003)	-0.003 (0.002)	-0.006** (0.002)	-0.004* (0.002)	-0.008*** (0.002)
Large household (3+ children)	-0.007 (0.010)	0.007 (0.006)	0.015*** (0.003)	0.015*** (0.003)	0.009*** (0.002)	0.001 (0.001)
Household with self-employed member	0.139*** (0.012)	0.055*** (0.005)	0.031*** (0.004)	0.022*** (0.004)	0.020*** (0.002)	0.016*** (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.015 (0.008)	0.014* (0.006)	0.012* (0.006)	0.010* (0.005)	0.007* (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	-0.009 (0.012)	0.014** (0.005)	0.018*** (0.005)	0.020*** (0.005)	0.014*** (0.003)	-0.001 (0.002)
Household with members from other ethnicity	-0.001 (0.004)	0.001 (0.002)	0.002 (0.001)	0.001 (0.001)	0.002* (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.011 (0.021)	0.016 (0.009)	0.011 (0.006)	0.012* (0.006)	0.011* (0.006)	0.007 (0.005)
Southern	0.008 (0.026)	0.025* (0.011)	0.032* (0.013)	0.040*** (0.013)	0.033** (0.012)	0.015* (0.007)
Pacific and Mountain states	0.008 (0.014)	0.005 (0.007)	0.006 (0.007)	0.011 (0.009)	0.013 (0.008)	0.012 (0.009)
Constant	0.204*** (0.058)	0.011 (0.035)	0.029 (0.027)	-0.046* (0.019)	-0.116*** (0.020)	-0.154*** (0.023)

Observations	125826	125826	125826	125826	125826	125826
Standard errors in parentheses						
Model includes households' educational composition, labor force composition, family formation, demographics						
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$						
IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.						

1.2. Market income sample, using different model specifications

Table 5: Market income sample, full models: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.017*** (0.034)	9.311*** (0.024)	9.642*** (0.019)	9.829*** (0.018)	10.087*** (0.022)	10.563*** (0.028)
1989	8.991*** (0.033)	9.215*** (0.025)	9.500*** (0.024)	9.673*** (0.023)	9.924*** (0.026)	10.367*** (0.025)
Difference	0.026 (0.024)	0.095*** (0.015)	0.143*** (0.015)	0.156*** (0.014)	0.162*** (0.014)	0.196*** (0.014)
Composition	-0.240*** (0.066)	-0.045 (0.040)	0.070** (0.023)	0.060** (0.021)	0.026 (0.018)	-0.049** (0.015)
Income Structure	0.266*** (0.065)	0.140*** (0.040)	0.073** (0.023)	0.095*** (0.021)	0.136*** (0.017)	0.244*** (0.011)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.002 (0.002)	0.001 (0.001)	0.001 (0.001)
Household: inactive / jobless	0.003 (0.002)	0.002 (0.002)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	-0.000 (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.100* (0.043)	0.158*** (0.023)	0.149*** (0.011)	0.140*** (0.010)	0.118*** (0.009)	0.061*** (0.006)
Single, medium education	-0.024* (0.011)	-0.027*** (0.006)	-0.030*** (0.004)	-0.033*** (0.004)	-0.031*** (0.004)	-0.020*** (0.003)
Single, high education	-0.017 (0.013)	-0.027*** (0.008)	-0.024*** (0.004)	-0.021*** (0.003)	-0.013*** (0.002)	0.005 (0.003)
Couple, low/low education	0.020 (0.030)	0.043* (0.021)	0.107*** (0.011)	0.097*** (0.009)	0.083*** (0.008)	0.041*** (0.005)
Couple, medium/low education	-0.002 (0.009)	0.007 (0.005)	0.015*** (0.004)	0.018*** (0.003)	0.020*** (0.002)	0.016*** (0.002)
Couple, high/medium education	-0.010*** (0.003)	-0.004* (0.002)	-0.002 (0.001)	0.000 (0.001)	0.006*** (0.001)	0.013*** (0.001)
Couple, high/high education	-0.033*** (0.005)	-0.019*** (0.004)	-0.007** (0.002)	-0.001 (0.002)	0.009*** (0.001)	0.031*** (0.002)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.007 (0.008)	-0.003 (0.004)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Jobless household	-0.039*** (0.008)	-0.020*** (0.004)	-0.008*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.002*** (0.000)

Double-earner household	-0.003** (0.001)	-0.002** (0.001)	-0.001* (0.000)	-0.000 (0.000)	0.002*** (0.000)	0.003*** (0.001)
Trad. breadwinner	-0.000 (0.001)	-0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
Both in part-time	0.000 (0.001)	0.000 (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)
Precarious	0.013*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.002*** (0.001)	0.001*** (0.000)
Single working fulltime	0.000 (0.001)	0.001 (0.001)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)
Single working part-time	0.003 (0.002)	0.002 (0.001)	0.002* (0.001)	0.001* (0.001)	0.001 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.157*** (0.015)	-0.119*** (0.010)	-0.096*** (0.007)	-0.100*** (0.007)	-0.116*** (0.008)	-0.090*** (0.006)
No income tax	-0.073*** (0.015)	-0.042*** (0.008)	-0.030*** (0.005)	-0.028*** (0.005)	-0.031*** (0.005)	-0.032*** (0.005)
Low, >0% - 10%	-0.013*** (0.002)	-0.007*** (0.002)	-0.009*** (0.002)	-0.014*** (0.002)	-0.027*** (0.003)	-0.047*** (0.004)
High, >15%	0.004 (0.003)	0.006*** (0.001)	0.006*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	-0.030*** (0.005)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	0.001 (0.001)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.001)
Low, >0% - 6%	-0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)	0.002*** (0.000)	0.003*** (0.001)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.010*** (0.003)	-0.004** (0.001)	-0.000 (0.001)	0.001 (0.001)	0.002** (0.001)	0.002*** (0.001)
Medium, >5% - 20%	0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
High, >20%	0.013*** (0.004)	0.011*** (0.003)	0.006*** (0.001)	0.003*** (0.001)	0.001*** (0.000)	-0.000 (0.000)
Young household	0.014*** (0.004)	0.006** (0.002)	0.003** (0.001)	0.003** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Single-mother household	-0.008*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.002*** (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Large household (3+ children)	-0.002 (0.001)	-0.001 (0.001)	0.000 (0.000)	0.001* (0.000)	0.000* (0.000)	0.001*** (0.000)
Household with self-employed member	-0.005*** (0.002)	-0.002* (0.001)	-0.000 (0.000)	0.000 (0.000)	0.001** (0.000)	0.001*** (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.004 (0.004)	0.001 (0.003)	-0.006** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)	-0.003* (0.001)
Household with Black (non-Hispanic) members	-0.006** (0.002)	-0.005** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Household with members from other ethnicity	-0.001 (0.003)	0.001 (0.002)	-0.003* (0.001)	-0.004** (0.001)	-0.003** (0.001)	-0.002*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.000 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)
Southern	-0.004 (0.002)	-0.004* (0.002)	-0.002 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.000 (0.002)
Pacific and Mountain states	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.034** (0.011)	0.015* (0.006)	-0.005 (0.004)	-0.007* (0.003)	-0.008*** (0.002)	-0.004* (0.002)
Household: inactive / jobless	-0.136*** (0.031)	-0.091*** (0.018)	-0.060*** (0.011)	-0.036*** (0.008)	-0.018** (0.006)	-0.004 (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.063 (0.052)	-0.123*** (0.029)	-0.102*** (0.015)	-0.087*** (0.013)	-0.064*** (0.010)	-0.018** (0.006)
Single, medium education	-0.015 (0.020)	-0.020 (0.011)	-0.016** (0.006)	-0.019*** (0.005)	-0.023*** (0.004)	-0.013** (0.004)
Single, high education	0.003 (0.005)	-0.002 (0.003)	-0.001 (0.002)	0.001 (0.001)	0.002* (0.001)	0.005*** (0.001)
Couple, low/low education	-0.029 (0.033)	-0.045* (0.022)	-0.107*** (0.012)	-0.090*** (0.010)	-0.072*** (0.009)	-0.013* (0.005)
Couple, medium/low education	0.003 (0.013)	-0.012 (0.007)	-0.023*** (0.005)	-0.025*** (0.004)	-0.026*** (0.003)	-0.014*** (0.002)
Couple, high/medium education	-0.005 (0.003)	-0.000 (0.002)	0.001 (0.001)	0.002 (0.001)	0.005*** (0.001)	0.011*** (0.001)

Couple, high/high education	-0.002* (0.001)	-0.001* (0.001)	0.000 (0.000)	0.001* (0.000)	0.002*** (0.000)	0.005*** (0.000)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.223*** (0.035)	0.098*** (0.019)	0.029* (0.012)	0.007 (0.008)	-0.012 (0.007)	0.005 (0.005)
Jobless household	-0.085*** (0.012)	-0.040*** (0.007)	-0.013*** (0.003)	-0.010*** (0.002)	-0.009*** (0.001)	-0.008*** (0.001)
Double-earner household	-0.007 (0.005)	-0.005 (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.003 (0.003)	0.004 (0.003)
Trad. breadwinner	0.027*** (0.007)	0.011* (0.005)	-0.009* (0.004)	-0.017*** (0.003)	-0.017*** (0.003)	-0.010*** (0.002)
Both in part-time	0.001 (0.002)	0.003* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
Precarious	-0.025*** (0.007)	-0.018*** (0.005)	-0.015*** (0.002)	-0.013*** (0.002)	-0.008*** (0.001)	-0.004*** (0.001)
Single working fulltime	-0.014 (0.024)	0.005 (0.017)	-0.012 (0.008)	-0.016* (0.006)	-0.018** (0.005)	-0.024*** (0.006)
Single working part-time	-0.004 (0.011)	-0.010 (0.008)	-0.013** (0.004)	-0.013*** (0.003)	-0.010*** (0.002)	-0.006** (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	0.016 (0.010)	0.031*** (0.007)	0.077*** (0.007)	0.056*** (0.005)	0.025*** (0.003)	-0.030*** (0.003)
No income tax	-0.059 (0.040)	0.014 (0.023)	0.063*** (0.012)	0.071*** (0.009)	0.079*** (0.006)	-0.025*** (0.005)
Low, >0% - 10%	-0.001 (0.012)	0.011 (0.007)	0.040*** (0.007)	0.068*** (0.008)	0.106*** (0.008)	-0.051*** (0.013)
High, >15%	-0.007 (0.007)	-0.002 (0.004)	0.001 (0.003)	-0.000 (0.002)	-0.018*** (0.004)	-0.102*** (0.010)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	-0.077** (0.027)	-0.034* (0.016)	-0.019** (0.007)	-0.026*** (0.006)	-0.028*** (0.005)	0.002 (0.004)
Low, >0% - 6%	-0.023* (0.012)	-0.023** (0.008)	-0.044*** (0.004)	-0.038*** (0.004)	-0.021*** (0.003)	0.008** (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.029*** (0.008)	0.012 (0.006)	0.002 (0.004)	0.002 (0.003)	-0.006** (0.002)	-0.008*** (0.002)
Medium, >5% - 20%	-0.007 (0.007)	-0.018** (0.007)	-0.010** (0.004)	-0.007*** (0.002)	-0.004* (0.001)	-0.001 (0.001)
High, >20%	-0.018 (0.012)	-0.010* (0.005)	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Young household	-0.049*** (0.015)	-0.020** (0.008)	-0.006 (0.004)	-0.003 (0.003)	-0.006* (0.003)	-0.003 (0.002)
Single-mother household	0.048*** (0.012)	0.029*** (0.006)	-0.000 (0.004)	0.001 (0.003)	0.009*** (0.002)	0.011*** (0.002)
Couple without children	-0.002 (0.006)	-0.005 (0.004)	-0.008*** (0.002)	-0.009*** (0.002)	-0.009*** (0.001)	-0.011*** (0.002)
Large household (3+ children)	0.036*** (0.010)	0.028*** (0.006)	0.017*** (0.003)	0.016*** (0.002)	0.016*** (0.002)	0.008*** (0.001)
Household with self-employed member	0.049*** (0.011)	0.031*** (0.007)	0.021*** (0.004)	0.017*** (0.003)	0.010*** (0.001)	0.003 (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.017 (0.010)	0.011 (0.007)	0.002 (0.003)	-0.000 (0.002)	0.001 (0.002)	-0.001 (0.001)
Household with Black (non-Hispanic) members	0.003 (0.008)	0.005 (0.005)	0.005 (0.004)	0.004 (0.002)	0.002 (0.002)	-0.003* (0.001)
Household with members from other ethnicity	-0.001 (0.003)	0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.000)
REGION (Ref.: Atlantic)						
Midwest	0.030* (0.015)	0.013 (0.008)	0.011 (0.006)	0.015* (0.007)	0.017* (0.007)	0.010 (0.006)
Southern	0.040* (0.017)	0.020* (0.010)	0.021* (0.009)	0.022* (0.009)	0.016* (0.007)	0.017* (0.008)
Pacific and Mountain states	0.016 (0.012)	0.011 (0.008)	0.011 (0.007)	0.015 (0.008)	0.010 (0.005)	0.011 (0.008)
Constant	0.322*** (0.069)	0.273*** (0.041)	0.242*** (0.023)	0.224*** (0.019)	0.219*** (0.022)	0.501*** (0.033)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income and payroll tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Market income sample, models incl. transfers and tax refunds, excl. tax liabilities: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.017*** (0.032)	9.311*** (0.022)	9.642*** (0.017)	9.829*** (0.016)	10.087*** (0.017)	10.563*** (0.016)
1989	8.991*** (0.031)	9.215*** (0.023)	9.500*** (0.022)	9.673*** (0.019)	9.924*** (0.019)	10.367*** (0.017)
Difference	0.026 (0.024)	0.095*** (0.016)	0.143*** (0.014)	0.156*** (0.014)	0.162*** (0.014)	0.196*** (0.011)
Composition	-0.049 (0.063)	0.061 (0.039)	0.152*** (0.023)	0.147*** (0.020)	0.151*** (0.017)	0.180*** (0.013)
Income Structure	0.075 (0.065)	0.035 (0.040)	-0.009 (0.022)	0.009 (0.018)	0.011 (0.014)	0.016 (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.000 (0.001)	0.001 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Household: inactive / jobless	0.008 (0.006)	0.005 (0.003)	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.123** (0.045)	0.171*** (0.024)	0.158*** (0.012)	0.147*** (0.012)	0.123*** (0.009)	0.059*** (0.005)
Single, medium education	-0.036** (0.012)	-0.034*** (0.007)	-0.033*** (0.004)	-0.036*** (0.004)	-0.034*** (0.004)	-0.018*** (0.003)
Single, high education	-0.018 (0.013)	-0.028*** (0.008)	-0.024*** (0.004)	-0.019*** (0.003)	-0.007* (0.003)	0.023*** (0.003)
Couple, low/low education	0.041 (0.030)	0.055** (0.021)	0.115*** (0.011)	0.105*** (0.010)	0.092*** (0.008)	0.049*** (0.006)
Couple, medium/low education	0.003 (0.008)	0.010 (0.005)	0.017*** (0.004)	0.020*** (0.003)	0.023*** (0.002)	0.018*** (0.002)
Couple, high/medium education	-0.005 (0.003)	-0.001 (0.002)	0.000 (0.001)	0.003** (0.001)	0.010*** (0.001)	0.021*** (0.001)
Couple, high/high education	-0.017*** (0.005)	-0.010** (0.004)	0.001 (0.003)	0.009*** (0.002)	0.026*** (0.002)	0.068*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.005)	-0.002 (0.002)	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Jobless household	-0.043*** (0.009)	-0.021*** (0.005)	-0.010*** (0.002)	-0.007*** (0.001)	-0.004*** (0.001)	-0.002*** (0.001)
Double-earner household	0.000 (0.001)	-0.000 (0.001)	0.000 (0.000)	0.001** (0.000)	0.004*** (0.001)	0.008*** (0.001)
Trad. breadwinner	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Both in part-time	0.001 (0.001)	0.000 (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000* (0.000)
Precarious	0.013*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.002*** (0.001)	0.001*** (0.000)
Single working fulltime	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.111*** (0.012)	-0.093*** (0.009)	-0.075*** (0.006)	-0.076*** (0.006)	-0.082*** (0.006)	-0.043*** (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.009*** (0.003)	-0.004** (0.001)	-0.000 (0.001)	0.001 (0.001)	0.002** (0.001)	0.002** (0.001)
Medium, >5% - 20%	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)

High, >20%	0.015*** (0.004)	0.013*** (0.003)	0.006*** (0.002)	0.004*** (0.001)	0.002*** (0.001)	0.000 (0.000)
Young household	0.018*** (0.004)	0.009*** (0.002)	0.005*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.009*** (0.001)
Single-mother household	-0.006** (0.002)	-0.005*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.002*** (0.000)	-0.000 (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Large household (3+ children)	-0.000 (0.001)	-0.000 (0.001)	0.001* (0.000)	0.001** (0.000)	0.001** (0.000)	0.002*** (0.000)
Household with self-employed member	-0.015*** (0.003)	-0.008*** (0.002)	-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.003 (0.004)	-0.000 (0.003)	-0.007*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)
Household with Black (non-Hispanic) members	-0.006** (0.002)	-0.005** (0.002)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Household with members from other ethnicity	-0.002 (0.003)	0.000 (0.002)	-0.004* (0.002)	-0.004** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.005* (0.002)	-0.003* (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.003* (0.001)
Pacific and Mountain states	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.032** (0.012)	0.015* (0.006)	-0.003 (0.004)	-0.003 (0.003)	-0.001 (0.002)	-0.003 (0.002)
Household: inactive / jobless	-0.311*** (0.030)	-0.162*** (0.016)	-0.073*** (0.011)	-0.050*** (0.007)	-0.037*** (0.007)	-0.028*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.037 (0.056)	-0.099*** (0.030)	-0.073*** (0.016)	-0.055*** (0.015)	-0.023* (0.011)	0.031*** (0.007)
Single, medium education	-0.019 (0.020)	-0.020 (0.011)	-0.012* (0.006)	-0.015** (0.005)	-0.018*** (0.004)	-0.003 (0.004)
Single, high education	0.002 (0.005)	-0.002 (0.003)	-0.002 (0.002)	0.000 (0.001)	0.002 (0.001)	0.007*** (0.001)
Couple, low/low education	-0.017 (0.035)	-0.032 (0.023)	-0.087*** (0.011)	-0.065*** (0.009)	-0.032*** (0.008)	0.039*** (0.007)
Couple, medium/low education	-0.001 (0.012)	-0.014* (0.007)	-0.023*** (0.005)	-0.023*** (0.003)	-0.021*** (0.003)	-0.004 (0.003)
Couple, high/medium education	-0.003 (0.003)	-0.000 (0.002)	-0.000 (0.001)	0.000 (0.001)	0.003** (0.001)	0.008*** (0.001)
Couple, high/high education	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.000)	0.001* (0.000)	0.002*** (0.000)	0.006*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.181*** (0.023)	0.094*** (0.014)	0.045*** (0.008)	0.035*** (0.006)	0.042*** (0.006)	0.033*** (0.006)
Jobless household	-0.087*** (0.012)	-0.040*** (0.007)	-0.012*** (0.003)	-0.009*** (0.002)	-0.005** (0.002)	-0.006*** (0.001)
Double-earner household	0.005 (0.005)	0.001 (0.003)	-0.004 (0.003)	-0.007* (0.003)	-0.009** (0.003)	0.000 (0.003)
Trad. breadwinner	0.035*** (0.007)	0.015** (0.005)	-0.008* (0.003)	-0.014*** (0.003)	-0.010*** (0.003)	-0.006* (0.003)
Both in part-time	0.002 (0.003)	0.003* (0.001)	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
Precarious	-0.021** (0.007)	-0.015*** (0.005)	-0.013*** (0.002)	-0.010*** (0.002)	-0.003* (0.001)	-0.001 (0.001)
Single working fulltime	0.028 (0.024)	0.024 (0.017)	-0.004 (0.009)	-0.008 (0.007)	-0.007 (0.006)	-0.012 (0.006)
Single working part-time	0.010 (0.011)	-0.003 (0.008)	-0.008 (0.004)	-0.007* (0.003)	0.000 (0.002)	0.001 (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	0.025* (0.011)	0.030*** (0.007)	0.066*** (0.006)	0.041*** (0.004)	0.005* (0.003)	-0.017*** (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.030*** (0.007)	0.014* (0.006)	0.005 (0.004)	0.005 (0.003)	-0.002 (0.003)	-0.004 (0.002)
Medium, >5% - 20%	-0.002 (0.007)	-0.014* (0.006)	-0.006 (0.004)	-0.002 (0.002)	0.004* (0.002)	0.005*** (0.001)
High, >20%	-0.015 (0.012)	-0.006 (0.005)	0.003 (0.002)	0.003* (0.001)	0.002* (0.001)	0.001 (0.001)
Young household	-0.060*** (0.016)	-0.025** (0.008)	-0.006 (0.005)	-0.001 (0.003)	-0.001 (0.003)	0.001 (0.002)

Single-mother household	0.033** (0.012)	0.020*** (0.006)	-0.005 (0.004)	-0.000 (0.003)	0.012*** (0.002)	0.014*** (0.002)
Couple without children	0.005 (0.006)	-0.001 (0.004)	-0.006* (0.002)	-0.007*** (0.002)	-0.008*** (0.002)	-0.011*** (0.002)
Large household (3+ children)	0.026** (0.010)	0.024*** (0.005)	0.016*** (0.003)	0.017*** (0.002)	0.019*** (0.002)	0.011*** (0.001)
Household with self-employed member	0.095*** (0.009)	0.053*** (0.006)	0.030*** (0.004)	0.025*** (0.003)	0.022*** (0.002)	0.017*** (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.019* (0.010)	0.013 (0.007)	0.006 (0.004)	0.004 (0.003)	0.006** (0.002)	0.002 (0.002)
Household with Black (non-Hispanic) members	0.007 (0.008)	0.009 (0.006)	0.010* (0.004)	0.009** (0.003)	0.008** (0.003)	-0.000 (0.002)
Household with members from other ethnicity	0.000 (0.003)	0.002 (0.002)	0.000 (0.001)	0.000 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.028 (0.018)	0.012 (0.010)	0.010 (0.007)	0.014 (0.009)	0.016* (0.008)	0.007 (0.005)
Southern	0.030 (0.016)	0.016 (0.010)	0.023* (0.009)	0.027** (0.010)	0.026** (0.010)	0.015* (0.007)
Pacific and Mountain states	0.017 (0.012)	0.012 (0.008)	0.013 (0.008)	0.017 (0.009)	0.013 (0.008)	0.011 (0.008)
Constant	0.042 (0.054)	0.115** (0.036)	0.109*** (0.023)	0.086*** (0.019)	0.003 (0.021)	-0.102*** (0.026)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 7: Market income sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.017*** (0.030)	9.311*** (0.020)	9.642*** (0.016)	9.829*** (0.014)	10.087*** (0.015)	10.563*** (0.015)
1989	8.991*** (0.031)	9.215*** (0.023)	9.500*** (0.022)	9.673*** (0.019)	9.924*** (0.019)	10.367*** (0.017)
Difference	0.026 (0.022)	0.095*** (0.014)	0.143*** (0.014)	0.156*** (0.013)	0.162*** (0.013)	0.196*** (0.011)
Composition	0.187** (0.057)	0.258*** (0.034)	0.310*** (0.023)	0.309*** (0.019)	0.325*** (0.017)	0.272*** (0.012)
Income Structure	-0.161** (0.059)	-0.163*** (0.034)	-0.168*** (0.023)	-0.153*** (0.018)	-0.163*** (0.014)	-0.076*** (0.011)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Household: inactive / jobless	0.008 (0.006)	0.004 (0.003)	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						

Single, low education	0.124** (0.045)	0.172*** (0.024)	0.159*** (0.012)	0.148*** (0.011)	0.124*** (0.009)	0.060*** (0.005)
Single, medium education	-0.032** (0.012)	-0.030*** (0.006)	-0.031*** (0.004)	-0.033*** (0.004)	-0.030*** (0.004)	-0.017*** (0.003)
Single, high education	-0.005 (0.013)	-0.017* (0.008)	-0.015*** (0.004)	-0.010*** (0.003)	0.003 (0.003)	0.028*** (0.003)
Couple, low/low education	0.098** (0.031)	0.102*** (0.021)	0.153*** (0.013)	0.145*** (0.011)	0.134*** (0.009)	0.071*** (0.007)
Couple, medium/low education	0.016 (0.009)	0.021*** (0.005)	0.026*** (0.004)	0.029*** (0.003)	0.032*** (0.003)	0.023*** (0.002)
Couple, high/medium education	0.000 (0.003)	0.004 (0.002)	0.004** (0.001)	0.007*** (0.001)	0.014*** (0.001)	0.023*** (0.001)
Couple, high/high education	0.000 (0.005)	0.005 (0.004)	0.013*** (0.003)	0.021*** (0.002)	0.039*** (0.002)	0.075*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.003 (0.004)	-0.001 (0.002)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Jobless household	-0.042*** (0.009)	-0.021*** (0.005)	-0.009*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.002*** (0.000)
Double-earner household	0.002* (0.001)	0.001 (0.001)	0.001*** (0.000)	0.002*** (0.000)	0.005*** (0.001)	0.008*** (0.001)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Both in part-time	0.001 (0.001)	0.001* (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001** (0.000)
Precarious	0.015*** (0.004)	0.010*** (0.003)	0.007*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.002*** (0.000)
Single working fulltime	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.003 (0.001)	0.002* (0.001)	0.001* (0.001)	0.001* (0.000)	0.000 (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007*** (0.002)	-0.002* (0.001)	0.001 (0.001)	0.002** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Medium, >5% - 20%	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)
High, >20%	0.016*** (0.005)	0.013*** (0.003)	0.007*** (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.001** (0.000)
Young household	0.022*** (0.004)	0.011*** (0.002)	0.007*** (0.001)	0.007*** (0.001)	0.010*** (0.001)	0.010*** (0.001)
Single-mother household	0.002 (0.002)	0.002** (0.001)	0.002*** (0.001)	0.003*** (0.000)	0.004*** (0.001)	0.003*** (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.003** (0.001)	0.003** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Household with self-employed member	-0.013*** (0.003)	-0.006*** (0.001)	-0.003*** (0.001)	-0.002*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.006 (0.004)	-0.007** (0.003)	-0.012*** (0.003)	-0.013*** (0.002)	-0.014*** (0.002)	-0.013*** (0.002)
Household with Black (non-Hispanic) members	-0.008*** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.005 (0.003)	-0.002 (0.002)	-0.006** (0.002)	-0.006*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.002* (0.001)
Southern	-0.007* (0.003)	-0.006* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.003* (0.001)	-0.003* (0.002)
Pacific and Mountain states	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.027* (0.012)	0.012 (0.007)	-0.000 (0.004)	-0.004 (0.003)	-0.007** (0.002)	-0.009*** (0.002)
Household: inactive / jobless	-0.298*** (0.028)	-0.152*** (0.016)	-0.071*** (0.011)	-0.044*** (0.007)	-0.025*** (0.005)	-0.020*** (0.003)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.038 (0.056)	-0.101*** (0.030)	-0.074*** (0.015)	-0.056*** (0.014)	-0.024* (0.010)	0.031*** (0.006)
Single, medium education	-0.021 (0.021)	-0.022* (0.011)	-0.017** (0.006)	-0.018*** (0.004)	-0.018*** (0.004)	-0.001 (0.004)
Single, high education	0.004 (0.005)	-0.001 (0.003)	-0.001 (0.002)	0.002 (0.001)	0.004** (0.001)	0.008*** (0.001)
Couple, low/low education	-0.059 (0.033)	-0.066** (0.022)	-0.106*** (0.012)	-0.089*** (0.010)	-0.065*** (0.009)	0.017** (0.007)

Couple, medium/low education	-0.016 (0.013)	-0.026*** (0.007)	-0.031*** (0.005)	-0.033*** (0.004)	-0.032*** (0.004)	-0.010** (0.003)
Couple, high/medium education	0.001 (0.004)	0.003 (0.002)	0.002 (0.001)	0.003** (0.001)	0.006*** (0.001)	0.010*** (0.001)
Couple, high/high education	0.001 (0.001)	0.001 (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.004*** (0.000)	0.007*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.167*** (0.022)	0.084*** (0.013)	0.044*** (0.008)	0.029*** (0.006)	0.030*** (0.006)	0.023*** (0.006)
Jobless household	-0.089*** (0.013)	-0.042*** (0.008)	-0.015*** (0.004)	-0.011*** (0.002)	-0.006*** (0.002)	-0.006*** (0.001)
Double-earner household	0.010* (0.005)	0.005 (0.004)	-0.002 (0.003)	-0.004 (0.003)	-0.005 (0.004)	0.003 (0.003)
Trad. breadwinner	0.025*** (0.006)	0.008 (0.005)	-0.009* (0.004)	-0.018*** (0.004)	-0.019*** (0.003)	-0.013*** (0.003)
Both in part-time	0.003 (0.003)	0.004** (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Precarious	-0.021* (0.008)	-0.014* (0.006)	-0.007* (0.003)	-0.007*** (0.002)	-0.004* (0.002)	-0.003** (0.001)
Single working fulltime	0.032 (0.025)	0.027 (0.018)	-0.001 (0.009)	-0.005 (0.007)	-0.004 (0.006)	-0.011 (0.006)
Single working part-time	0.010 (0.011)	-0.002 (0.008)	-0.004 (0.004)	-0.005 (0.003)	-0.000 (0.002)	-0.001 (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.024*** (0.007)	0.009 (0.006)	0.002 (0.004)	0.001 (0.004)	-0.007** (0.003)	-0.008*** (0.002)
Medium, >5% - 20%	0.000 (0.007)	-0.011 (0.007)	0.001 (0.004)	0.003 (0.003)	0.005* (0.002)	0.003** (0.001)
High, >20%	-0.013 (0.012)	-0.004 (0.005)	0.006* (0.002)	0.005*** (0.001)	0.003** (0.001)	0.001 (0.001)
Young household	-0.057*** (0.016)	-0.021* (0.008)	0.002 (0.005)	0.004 (0.003)	-0.001 (0.002)	-0.001 (0.002)
Single-mother household	0.026* (0.011)	0.018*** (0.005)	0.009** (0.003)	0.004 (0.003)	0.002 (0.002)	0.002 (0.001)
Couple without children	0.008 (0.006)	0.001 (0.004)	-0.006** (0.002)	-0.006*** (0.002)	-0.005** (0.002)	-0.008*** (0.002)
Large household (3+ children)	0.011 (0.009)	0.013** (0.005)	0.013*** (0.003)	0.010*** (0.003)	0.007*** (0.002)	0.002 (0.001)
Household with self-employed member	0.088*** (0.009)	0.048*** (0.006)	0.029*** (0.004)	0.022*** (0.003)	0.016*** (0.002)	0.012*** (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.018 (0.010)	0.013 (0.008)	0.008 (0.005)	0.005 (0.003)	0.004 (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	0.007 (0.008)	0.008 (0.005)	0.011* (0.004)	0.009** (0.003)	0.006* (0.003)	-0.001 (0.002)
Household with members from other ethnicity	-0.001 (0.003)	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.023 (0.015)	0.008 (0.007)	0.007 (0.006)	0.011 (0.007)	0.012* (0.005)	0.005 (0.005)
Southern	0.037* (0.016)	0.024* (0.010)	0.034** (0.012)	0.035** (0.012)	0.030** (0.010)	0.014* (0.006)
Pacific and Mountain states	0.019 (0.012)	0.014 (0.009)	0.016 (0.009)	0.019 (0.010)	0.014 (0.008)	0.011 (0.008)
Constant	-0.089 (0.052)	0.000 (0.036)	-0.011 (0.025)	-0.019 (0.021)	-0.085*** (0.023)	-0.135*** (0.024)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 8: Market income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.017*** (0.030)	9.311*** (0.021)	9.642*** (0.016)	9.829*** (0.015)	10.087*** (0.015)	10.563*** (0.015)
1989	8.991*** (0.032)	9.215*** (0.023)	9.500*** (0.022)	9.673*** (0.019)	9.924*** (0.019)	10.367*** (0.017)
Difference	0.026 (0.021)	0.095*** (0.014)	0.143*** (0.014)	0.156*** (0.013)	0.162*** (0.013)	0.196*** (0.011)
Composition	0.199*** (0.058)	0.280*** (0.033)	0.330*** (0.023)	0.326*** (0.019)	0.338*** (0.016)	0.277*** (0.012)
Income Structure	-0.173** (0.060)	-0.184*** (0.034)	-0.187*** (0.025)	-0.170*** (0.019)	-0.175*** (0.014)	-0.081*** (0.011)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Household: inactive / jobless	0.008 (0.006)	0.005 (0.003)	0.003 (0.002)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.145** (0.045)	0.196*** (0.024)	0.175*** (0.012)	0.161*** (0.011)	0.133*** (0.008)	0.063*** (0.005)
Single, medium education	-0.035** (0.012)	-0.034*** (0.007)	-0.034*** (0.004)	-0.036*** (0.004)	-0.032*** (0.004)	-0.018*** (0.003)
Single, high education	-0.009 (0.013)	-0.020* (0.008)	-0.016*** (0.004)	-0.011*** (0.003)	0.003 (0.003)	0.028*** (0.003)
Couple, low/low education	0.101** (0.032)	0.109*** (0.020)	0.159*** (0.013)	0.149*** (0.011)	0.138*** (0.009)	0.073*** (0.006)
Couple, medium/low education	0.018 (0.010)	0.024*** (0.006)	0.028*** (0.004)	0.031*** (0.003)	0.034*** (0.003)	0.024*** (0.002)
Couple, high/medium education	0.000 (0.003)	0.004* (0.002)	0.005*** (0.002)	0.008*** (0.001)	0.015*** (0.001)	0.023*** (0.001)
Couple, high/high education	0.000 (0.005)	0.007 (0.004)	0.016*** (0.003)	0.024*** (0.002)	0.042*** (0.002)	0.077*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.004)	-0.002 (0.002)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Jobless household	-0.046*** (0.010)	-0.024*** (0.005)	-0.011*** (0.002)	-0.007*** (0.002)	-0.005*** (0.001)	-0.002*** (0.001)
Double-earner household	0.002* (0.001)	0.002* (0.001)	0.002*** (0.000)	0.003*** (0.001)	0.006*** (0.001)	0.009*** (0.001)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Both in part-time	0.002* (0.001)	0.001** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.016*** (0.004)	0.011*** (0.003)	0.007*** (0.002)	0.006*** (0.001)	0.004*** (0.001)	0.002*** (0.000)
Single working fulltime	0.003 (0.002)	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.003 (0.001)	0.002* (0.001)	0.002* (0.001)	0.001* (0.001)	0.000 (0.000)
Young household	0.025*** (0.004)	0.015*** (0.002)	0.009*** (0.001)	0.009*** (0.001)	0.011*** (0.001)	0.011*** (0.001)
Single-mother household	0.003 (0.002)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.003*** (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004** (0.001)	0.003** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Household with self-employed member	-0.014*** (0.003)	-0.007*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)	-0.002*** (0.000)	-0.002*** (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.005 (0.004)	-0.007* (0.003)	-0.013*** (0.003)	-0.014*** (0.002)	-0.015*** (0.002)	-0.013*** (0.002)

Household with Black (non-Hispanic) members	-0.009*** (0.002)	-0.008*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.006 (0.004)	-0.003 (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.005* (0.002)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.003* (0.001)
Pacific and Mountain states	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.030* (0.012)	0.013 (0.007)	0.001 (0.004)	-0.003 (0.004)	-0.007** (0.002)	-0.009*** (0.002)
Household: inactive / jobless	-0.311*** (0.029)	-0.160*** (0.015)	-0.074*** (0.011)	-0.047*** (0.007)	-0.028*** (0.006)	-0.021*** (0.003)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.049 (0.056)	-0.113*** (0.031)	-0.081*** (0.017)	-0.061*** (0.014)	-0.028** (0.009)	0.029*** (0.006)
Single, medium education	-0.016 (0.021)	-0.018 (0.012)	-0.013 (0.007)	-0.015** (0.005)	-0.016*** (0.004)	-0.001 (0.004)
Single, high education	0.006 (0.005)	0.001 (0.004)	0.001 (0.002)	0.003* (0.001)	0.005*** (0.001)	0.008*** (0.001)
Couple, low/low education	-0.061 (0.034)	-0.070*** (0.021)	-0.109*** (0.012)	-0.092*** (0.010)	-0.067*** (0.008)	0.017** (0.006)
Couple, medium/low education	-0.019 (0.014)	-0.030*** (0.007)	-0.034*** (0.005)	-0.035*** (0.004)	-0.033*** (0.004)	-0.011*** (0.003)
Couple, high/medium education	0.002 (0.004)	0.005* (0.002)	0.003* (0.002)	0.004** (0.001)	0.007*** (0.001)	0.011*** (0.001)
Couple, high/high education	0.002 (0.001)	0.002** (0.001)	0.002*** (0.001)	0.003*** (0.000)	0.004*** (0.001)	0.007*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.176*** (0.024)	0.090*** (0.015)	0.047*** (0.008)	0.031*** (0.006)	0.032*** (0.006)	0.024*** (0.006)
Jobless household	-0.088*** (0.013)	-0.039*** (0.008)	-0.010** (0.004)	-0.007** (0.002)	-0.004 (0.002)	-0.005*** (0.001)
Double-earner household	0.010* (0.004)	0.006 (0.004)	-0.001 (0.003)	-0.004 (0.004)	-0.005 (0.004)	0.003 (0.003)
Trad. breadwinner	0.025*** (0.006)	0.007 (0.005)	-0.011** (0.004)	-0.020*** (0.003)	-0.020*** (0.003)	-0.013*** (0.003)
Both in part-time	0.003 (0.003)	0.005** (0.002)	0.003* (0.001)	0.003* (0.001)	0.002* (0.001)	0.001 (0.001)
Precarious	-0.017* (0.008)	-0.011* (0.005)	-0.004 (0.003)	-0.005* (0.002)	-0.002 (0.001)	-0.003* (0.001)
Single working fulltime	0.022 (0.025)	0.020 (0.020)	-0.008 (0.011)	-0.009 (0.009)	-0.006 (0.006)	-0.010 (0.006)
Single working part-time	0.008 (0.011)	-0.004 (0.008)	-0.003 (0.004)	-0.004 (0.003)	0.001 (0.002)	-0.001 (0.002)
Young household	-0.057*** (0.017)	-0.021* (0.008)	0.003 (0.005)	0.005 (0.004)	-0.000 (0.003)	-0.001 (0.002)
Single-mother household	0.038** (0.013)	0.028*** (0.006)	0.016*** (0.003)	0.009*** (0.002)	0.005** (0.002)	0.002 (0.001)
Couple without children	0.008 (0.006)	0.001 (0.004)	-0.006** (0.002)	-0.006** (0.002)	-0.005** (0.002)	-0.008*** (0.002)
Large household (3+ children)	0.016 (0.010)	0.016** (0.005)	0.016*** (0.003)	0.012*** (0.003)	0.008*** (0.002)	0.002 (0.001)
Household with self-employed member	0.091*** (0.008)	0.050*** (0.006)	0.029*** (0.004)	0.022*** (0.003)	0.016*** (0.002)	0.012*** (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.020 (0.011)	0.014 (0.008)	0.009 (0.005)	0.005 (0.004)	0.005 (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	0.011 (0.008)	0.012 (0.006)	0.015** (0.005)	0.012*** (0.003)	0.008** (0.003)	-0.001 (0.001)
Household with members from other ethnicity	0.001 (0.003)	0.003 (0.002)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.000 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.027 (0.015)	0.012 (0.008)	0.011 (0.006)	0.014 (0.007)	0.014* (0.006)	0.006 (0.005)
Southern	0.038* (0.017)	0.026* (0.011)	0.036** (0.013)	0.036** (0.012)	0.031** (0.011)	0.015* (0.007)
Pacific and Mountain states	0.021 (0.013)	0.016 (0.009)	0.017 (0.010)	0.019 (0.011)	0.014 (0.008)	0.011 (0.009)
Constant	-0.111* (0.050)	-0.045 (0.036)	-0.045 (0.024)	-0.042* (0.019)	-0.108*** (0.022)	-0.147*** (0.023)

Observations	116963	116963	116963	116963	116963	116963
Standard errors in parentheses						
Model includes households' educational composition, labor force composition, family formation, demographics						
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$						
IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.						

1.3. Labor income sample, using different model specifications

Table 9: Labor income sample, full models: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.259*** (0.028)	9.473*** (0.022)	9.741*** (0.020)	9.911*** (0.022)	10.155*** (0.027)	10.606*** (0.032)
1989	9.062*** (0.036)	9.276*** (0.029)	9.563*** (0.029)	9.745*** (0.030)	10.000*** (0.031)	10.418*** (0.028)
Difference	0.197*** (0.020)	0.197*** (0.018)	0.178*** (0.018)	0.167*** (0.017)	0.155*** (0.016)	0.189*** (0.015)
Composition	0.015 (0.049)	0.090** (0.032)	0.101*** (0.022)	0.064** (0.022)	0.002 (0.023)	-0.074*** (0.016)
Income Structure	0.183*** (0.053)	0.107** (0.036)	0.076** (0.024)	0.102*** (0.023)	0.153*** (0.021)	0.263*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.000 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)
Household: inactive / jobless	0.002* (0.001)	0.002** (0.001)	0.001* (0.001)	0.001* (0.000)	0.000* (0.000)	-0.000 (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.181*** (0.031)	0.150*** (0.017)	0.119*** (0.013)	0.102*** (0.010)	0.083*** (0.008)	0.039*** (0.006)
Single, medium education	-0.039*** (0.010)	-0.031*** (0.006)	-0.021*** (0.004)	-0.021*** (0.004)	-0.019*** (0.003)	-0.014*** (0.003)
Single, high education	-0.052*** (0.012)	-0.037*** (0.006)	-0.019*** (0.005)	-0.015*** (0.004)	-0.008* (0.003)	0.002 (0.003)
Couple, low/low education	0.041 (0.023)	0.102*** (0.015)	0.117*** (0.010)	0.098*** (0.010)	0.072*** (0.008)	0.035*** (0.004)
Couple, medium/low education	0.011 (0.007)	0.017** (0.005)	0.021*** (0.003)	0.021*** (0.003)	0.019*** (0.002)	0.015*** (0.002)
Couple, high/medium education	-0.003 (0.002)	-0.003 (0.001)	0.001 (0.001)	0.002** (0.001)	0.006*** (0.001)	0.011*** (0.001)
Couple, high/high education	-0.017*** (0.005)	-0.010*** (0.003)	-0.002 (0.002)	0.002 (0.002)	0.012*** (0.002)	0.029*** (0.002)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.001 (0.002)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Jobless household	-0.003* (0.002)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)

Double-earner household	-0.003* (0.001)	-0.002* (0.001)	-0.000 (0.001)	0.001 (0.000)	0.003*** (0.001)	0.004*** (0.001)
Trad. breadwinner	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
Both in part-time	0.001 (0.001)	0.001* (0.001)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.000 (0.000)
Precarious	0.012*** (0.003)	0.009*** (0.002)	0.006*** (0.001)	0.004*** (0.001)	0.002*** (0.001)	0.001** (0.000)
Single working fulltime	0.003 (0.002)	0.002 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Single working part-time	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.158*** (0.013)	-0.129*** (0.010)	-0.120*** (0.008)	-0.125*** (0.009)	-0.137*** (0.009)	-0.091*** (0.006)
No income tax	0.033*** (0.006)	0.024*** (0.004)	0.018*** (0.003)	0.017*** (0.003)	0.017*** (0.003)	0.014*** (0.002)
Low, >0% - 10%	-0.008** (0.003)	-0.011** (0.003)	-0.021*** (0.003)	-0.031*** (0.004)	-0.055*** (0.005)	-0.079*** (0.005)
High, >15%	0.007*** (0.002)	0.007*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	0.005** (0.002)	-0.044*** (0.006)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.001** (0.000)
Low, >0% - 6%	0.001 (0.001)	0.001 (0.001)	0.001* (0.000)	0.001*** (0.000)	0.003*** (0.001)	0.004*** (0.001)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007*** (0.002)	-0.005** (0.001)	-0.002* (0.001)	-0.000 (0.001)	0.001* (0.000)	0.001** (0.000)
Medium, >5% - 20%	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
High, >20%	0.016*** (0.003)	0.012*** (0.002)	0.005*** (0.001)	0.002*** (0.001)	0.001 (0.000)	-0.001** (0.000)
Young household	0.006* (0.003)	0.002 (0.002)	0.002* (0.001)	0.004** (0.001)	0.006*** (0.001)	0.005*** (0.001)
Single-mother household	-0.009*** (0.002)	-0.007*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.002*** (0.000)
Couple without children	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Large household (3+ children)	-0.002 (0.001)	-0.001 (0.000)	0.000 (0.000)	0.001* (0.000)	0.000 (0.000)	0.001** (0.000)
Household with self-employed member	-0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001* (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.003 (0.004)	-0.001 (0.003)	-0.006*** (0.002)	-0.005** (0.002)	-0.005*** (0.001)	-0.003* (0.001)
Household with Black (non-Hispanic) members	-0.004* (0.002)	-0.004** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Household with members from other ethnicity	0.001 (0.002)	-0.001 (0.001)	-0.004* (0.001)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.000 (0.001)	-0.000 (0.001)	0.000 (0.000)	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)
Southern	-0.005* (0.002)	-0.002* (0.001)	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)
Pacific and Mountain states	0.000 (0.000)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.018 (0.009)	-0.006 (0.007)	-0.008* (0.004)	-0.010** (0.003)	-0.011*** (0.002)	-0.005** (0.002)
Household: inactive / jobless	-0.007 (0.006)	-0.009* (0.004)	-0.006 (0.003)	-0.005 (0.003)	-0.002 (0.002)	0.000 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.077 (0.042)	-0.087*** (0.023)	-0.065*** (0.017)	-0.062*** (0.014)	-0.050*** (0.009)	-0.018** (0.006)
Single, medium education	-0.020 (0.025)	-0.027* (0.014)	-0.008 (0.010)	-0.016* (0.008)	-0.025*** (0.005)	-0.020*** (0.005)
Single, high education	-0.001 (0.007)	-0.003 (0.004)	0.002 (0.003)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)
Couple, low/low education	-0.047 (0.027)	-0.105*** (0.016)	-0.117*** (0.010)	-0.093*** (0.010)	-0.058*** (0.008)	-0.013** (0.004)
Couple, medium/low education	-0.014 (0.010)	-0.025*** (0.007)	-0.029*** (0.004)	-0.030*** (0.004)	-0.022*** (0.003)	-0.013*** (0.002)
Couple, high/medium education	0.002 (0.003)	0.001 (0.002)	0.003* (0.001)	0.004** (0.001)	0.007*** (0.001)	0.011*** (0.001)

Couple, high/high education	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.000)	0.001* (0.000)	0.003*** (0.000)	0.005*** (0.000)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.031*** (0.007)	-0.014** (0.004)	-0.010** (0.003)	-0.005 (0.003)	-0.003 (0.002)	0.006** (0.002)
Jobless household	-0.016** (0.006)	-0.009* (0.004)	-0.008*** (0.002)	-0.006*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)
Double-earner household	-0.008 (0.005)	-0.006 (0.004)	-0.005 (0.004)	-0.006 (0.004)	0.000 (0.003)	0.006 (0.003)
Trad. breadwinner	-0.001 (0.008)	-0.010* (0.005)	-0.018*** (0.004)	-0.023*** (0.003)	-0.020*** (0.003)	-0.012*** (0.002)
Both in part-time	0.000 (0.002)	0.001 (0.002)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
Precarious	-0.024** (0.008)	-0.018*** (0.004)	-0.018*** (0.003)	-0.014*** (0.002)	-0.009*** (0.001)	-0.004*** (0.001)
Single working fulltime	-0.024 (0.039)	-0.010 (0.023)	-0.033* (0.015)	-0.025 (0.014)	-0.019* (0.009)	-0.017 (0.009)
Single working part-time	-0.026* (0.013)	-0.019* (0.008)	-0.023*** (0.005)	-0.017*** (0.005)	-0.011*** (0.003)	-0.003 (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	0.059*** (0.010)	0.081*** (0.009)	0.116*** (0.008)	0.079*** (0.006)	0.022*** (0.003)	-0.039*** (0.004)
No income tax	0.056*** (0.012)	0.045*** (0.006)	0.048*** (0.005)	0.037*** (0.004)	0.023*** (0.003)	-0.012*** (0.001)
Low, >0% - 10%	0.010 (0.010)	0.015* (0.006)	0.063*** (0.009)	0.107*** (0.010)	0.122*** (0.009)	-0.060*** (0.012)
High, >15%	-0.004 (0.006)	0.001 (0.004)	0.003 (0.003)	-0.001 (0.004)	-0.038*** (0.007)	-0.125*** (0.012)
PAYABLE PAYROLL TAX (Ref.: Full, >6 - 8 percent)						
No Payroll Tax	0.003 (0.004)	0.004 (0.003)	-0.003 (0.002)	-0.003 (0.002)	-0.004*** (0.001)	0.000 (0.001)
Low, >0% - 6%	0.004 (0.013)	-0.028** (0.009)	-0.058*** (0.005)	-0.054*** (0.004)	-0.031*** (0.004)	0.007* (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.014* (0.006)	0.013* (0.007)	0.007 (0.004)	0.000 (0.003)	-0.006* (0.003)	-0.006*** (0.002)
Medium, >5% - 20%	-0.032*** (0.005)	-0.015** (0.005)	-0.008** (0.003)	-0.003 (0.002)	-0.002 (0.002)	0.001 (0.001)
High, >20%	-0.007 (0.006)	-0.004 (0.003)	0.000 (0.002)	0.000 (0.001)	0.000 (0.001)	0.001* (0.000)
Young household	-0.028* (0.012)	-0.011 (0.007)	-0.002 (0.003)	-0.005 (0.004)	-0.007* (0.003)	-0.004* (0.002)
Single-mother household	0.041*** (0.009)	0.018*** (0.005)	-0.009* (0.004)	-0.000 (0.003)	0.012*** (0.002)	0.013*** (0.001)
Couple without children	-0.005 (0.007)	-0.009* (0.004)	-0.011*** (0.003)	-0.010*** (0.002)	-0.012*** (0.002)	-0.013*** (0.002)
Large household (3+ children)	0.041*** (0.011)	0.031*** (0.006)	0.021*** (0.004)	0.019*** (0.002)	0.020*** (0.002)	0.008*** (0.001)
Household with self-employed member	0.006 (0.006)	0.007 (0.005)	0.009** (0.003)	0.009*** (0.003)	0.006** (0.002)	0.001 (0.002)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.016 (0.012)	0.009 (0.007)	0.000 (0.003)	0.001 (0.003)	0.000 (0.002)	-0.002 (0.001)
Household with Black (non-Hispanic) members	0.006 (0.006)	0.004 (0.005)	0.007 (0.004)	0.006* (0.003)	0.001 (0.002)	-0.005*** (0.001)
Household with members from other ethnicity	0.003 (0.002)	0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.000 (0.000)
REGION (Ref.: Atlantic)						
Midwest	0.021* (0.010)	0.017 (0.009)	0.013* (0.006)	0.015* (0.007)	0.015* (0.007)	0.009 (0.007)
Southern	0.017 (0.012)	0.017 (0.011)	0.021* (0.010)	0.019* (0.009)	0.016* (0.007)	0.019* (0.009)
Pacific and Mountain states	0.005 (0.010)	0.013 (0.009)	0.019 (0.010)	0.015 (0.008)	0.014 (0.007)	0.014 (0.009)
Constant	0.233*** (0.058)	0.244*** (0.037)	0.184*** (0.023)	0.179*** (0.020)	0.224*** (0.030)	0.539*** (0.036)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income and payroll tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: Labor income sample, models incl. transfers and tax refunds, excl. tax liabilities: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.259*** (0.027)	9.473*** (0.021)	9.741*** (0.018)	9.911*** (0.019)	10.155*** (0.020)	10.606*** (0.018)
1989	9.062*** (0.034)	9.276*** (0.026)	9.563*** (0.025)	9.745*** (0.024)	10.000*** (0.022)	10.418*** (0.019)
Difference	0.197*** (0.019)	0.197*** (0.018)	0.178*** (0.017)	0.167*** (0.015)	0.155*** (0.015)	0.189*** (0.011)
Composition	0.031 (0.047)	0.108*** (0.031)	0.139*** (0.021)	0.124*** (0.020)	0.116*** (0.018)	0.160*** (0.012)
Income Structure	0.166** (0.051)	0.089* (0.035)	0.038 (0.022)	0.043* (0.019)	0.038** (0.015)	0.029** (0.011)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.000 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Household: inactive / jobless	0.003** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.000)	0.001* (0.000)	0.000* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.190*** (0.032)	0.157*** (0.017)	0.123*** (0.013)	0.106*** (0.010)	0.085*** (0.008)	0.037*** (0.005)
Single, medium education	-0.043*** (0.010)	-0.034*** (0.006)	-0.023*** (0.004)	-0.021*** (0.004)	-0.019*** (0.003)	-0.011*** (0.002)
Single, high education	-0.055*** (0.013)	-0.038*** (0.006)	-0.018*** (0.005)	-0.011** (0.004)	0.001 (0.004)	0.023*** (0.004)
Couple, low/low education	0.050* (0.023)	0.109*** (0.015)	0.122*** (0.010)	0.104*** (0.010)	0.078*** (0.008)	0.040*** (0.005)
Couple, medium/low education	0.015* (0.007)	0.020*** (0.005)	0.023*** (0.003)	0.023*** (0.003)	0.022*** (0.002)	0.017*** (0.002)
Couple, high/medium education	-0.001 (0.002)	-0.002 (0.002)	0.002* (0.001)	0.004*** (0.001)	0.011*** (0.001)	0.019*** (0.001)
Couple, high/high education	-0.011* (0.004)	-0.005 (0.003)	0.006* (0.002)	0.013*** (0.002)	0.033*** (0.002)	0.072*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Jobless household	-0.004* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.000)
Double-earner household	-0.002* (0.001)	-0.001 (0.001)	0.001 (0.001)	0.002*** (0.001)	0.006*** (0.001)	0.009*** (0.001)
Trad. breadwinner	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Both in part-time	0.001 (0.001)	0.002** (0.001)	0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001* (0.000)
Precarious	0.013*** (0.003)	0.009*** (0.002)	0.006*** (0.002)	0.004*** (0.001)	0.002*** (0.001)	0.001*** (0.000)
Single working fulltime	0.004 (0.003)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.137*** (0.012)	-0.111*** (0.009)	-0.100*** (0.007)	-0.100*** (0.007)	-0.099*** (0.006)	-0.045*** (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007*** (0.002)	-0.005** (0.001)	-0.002* (0.001)	-0.000 (0.001)	0.001* (0.001)	0.002** (0.001)
Medium, >5% - 20%	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)

High, >20%	0.018*** (0.003)	0.013*** (0.002)	0.006*** (0.001)	0.003*** (0.001)	0.001* (0.000)	-0.000 (0.000)
Young household	0.009** (0.003)	0.005* (0.002)	0.005*** (0.001)	0.006*** (0.001)	0.010*** (0.001)	0.011*** (0.001)
Single-mother household	-0.008*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.000)	-0.000 (0.000)
Couple without children	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	-0.001 (0.001)	-0.000 (0.000)	0.001* (0.000)	0.001** (0.000)	0.001** (0.000)	0.002** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001* (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.002 (0.004)	-0.002 (0.003)	-0.007*** (0.002)	-0.007*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)
Household with Black (non-Hispanic) members	-0.004* (0.002)	-0.004** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	0.001 (0.002)	-0.002 (0.001)	-0.004** (0.002)	-0.003* (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	-0.000 (0.001)	0.001 (0.001)	0.002 (0.001)
Southern	-0.006* (0.002)	-0.003* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.003* (0.002)
Pacific and Mountain states	0.000 (0.000)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.026** (0.009)	0.000 (0.007)	-0.001 (0.004)	-0.000 (0.003)	0.000 (0.002)	-0.005* (0.002)
Household: inactive / jobless	-0.002 (0.006)	-0.004 (0.004)	-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.019 (0.044)	-0.041 (0.025)	-0.022 (0.018)	-0.022 (0.015)	-0.010 (0.009)	0.018** (0.006)
Single, medium education	0.013 (0.028)	-0.002 (0.014)	0.015 (0.009)	0.001 (0.008)	-0.013** (0.005)	-0.010* (0.004)
Single, high education	0.006 (0.007)	0.002 (0.004)	0.006* (0.003)	0.005* (0.002)	0.004* (0.002)	0.005** (0.002)
Couple, low/low education	-0.032 (0.027)	-0.091*** (0.016)	-0.093*** (0.009)	-0.061*** (0.010)	-0.011 (0.009)	0.041*** (0.006)
Couple, medium/low education	-0.017 (0.010)	-0.026*** (0.007)	-0.028*** (0.004)	-0.026*** (0.004)	-0.015*** (0.003)	-0.001 (0.003)
Couple, high/medium education	0.001 (0.003)	-0.000 (0.002)	0.001 (0.002)	0.000 (0.001)	0.003* (0.001)	0.007*** (0.001)
Couple, high/high education	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.000)	0.001* (0.000)	0.003*** (0.001)	0.007*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.004 (0.007)	0.009* (0.004)	0.010*** (0.003)	0.014*** (0.003)	0.017*** (0.002)	0.012*** (0.002)
Jobless household	-0.015* (0.007)	-0.008* (0.004)	-0.008** (0.003)	-0.006** (0.002)	-0.004** (0.002)	-0.004*** (0.001)
Double-earner household	-0.007 (0.005)	-0.005 (0.004)	-0.007 (0.004)	-0.014** (0.004)	-0.013** (0.004)	-0.001 (0.004)
Trad. breadwinner	0.002 (0.008)	-0.010 (0.005)	-0.016*** (0.004)	-0.019*** (0.003)	-0.012** (0.004)	-0.008* (0.003)
Both in part-time	0.002 (0.003)	0.002 (0.002)	-0.000 (0.001)	0.001 (0.001)	0.002* (0.001)	0.002* (0.001)
Precarious	-0.016* (0.007)	-0.013*** (0.004)	-0.013*** (0.002)	-0.009*** (0.002)	-0.002 (0.002)	-0.001 (0.001)
Single working fulltime	-0.060 (0.043)	-0.038 (0.024)	-0.056*** (0.015)	-0.039** (0.015)	-0.022* (0.009)	-0.008 (0.010)
Single working part-time	-0.021 (0.015)	-0.016* (0.008)	-0.019*** (0.006)	-0.011* (0.005)	-0.000 (0.003)	0.003 (0.003)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	0.037*** (0.010)	0.062*** (0.008)	0.089*** (0.007)	0.047*** (0.004)	-0.007** (0.002)	-0.023*** (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.014* (0.006)	0.013* (0.006)	0.008* (0.004)	0.002 (0.003)	-0.002 (0.003)	-0.003 (0.002)
Medium, >5% - 20%	-0.021*** (0.005)	-0.008 (0.006)	-0.002 (0.003)	0.003 (0.003)	0.007** (0.002)	0.007*** (0.001)
High, >20%	0.002 (0.006)	0.002 (0.003)	0.005** (0.002)	0.004*** (0.001)	0.003* (0.001)	0.002* (0.001)
Young household	-0.037** (0.012)	-0.015* (0.008)	0.000 (0.004)	0.001 (0.005)	0.001 (0.003)	0.002 (0.002)

Single-mother household	0.029*** (0.008)	0.008 (0.005)	-0.013*** (0.004)	0.002 (0.003)	0.020*** (0.002)	0.020*** (0.002)
Couple without children	0.001 (0.006)	-0.005 (0.004)	-0.008** (0.003)	-0.008** (0.002)	-0.011*** (0.002)	-0.013*** (0.002)
Large household (3+ children)	0.036*** (0.010)	0.028*** (0.005)	0.023*** (0.004)	0.024*** (0.003)	0.028*** (0.002)	0.013*** (0.001)
Household with self-employed member	0.012 (0.006)	0.013* (0.005)	0.012*** (0.003)	0.014*** (0.003)	0.014*** (0.003)	0.010*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.021 (0.013)	0.013 (0.008)	0.006 (0.004)	0.008* (0.004)	0.008** (0.003)	0.001 (0.001)
Household with Black (non-Hispanic) members	0.014* (0.006)	0.010 (0.006)	0.014** (0.004)	0.013*** (0.004)	0.008* (0.003)	-0.002 (0.002)
Household with members from other ethnicity	0.003 (0.002)	0.002 (0.002)	0.000 (0.001)	0.001 (0.001)	0.002* (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.020* (0.010)	0.017 (0.009)	0.013* (0.007)	0.015* (0.007)	0.015* (0.007)	0.006 (0.005)
Southern	0.027* (0.012)	0.025* (0.012)	0.036** (0.012)	0.037** (0.012)	0.036** (0.012)	0.020** (0.007)
Pacific and Mountain states	0.012 (0.011)	0.019 (0.011)	0.026* (0.013)	0.023 (0.012)	0.021 (0.011)	0.015 (0.009)
Constant	0.131** (0.050)	0.145*** (0.033)	0.060** (0.019)	0.043* (0.019)	-0.031 (0.022)	-0.078** (0.024)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 11: Labor income sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.259*** (0.025)	9.473*** (0.019)	9.741*** (0.017)	9.911*** (0.017)	10.155*** (0.018)	10.606*** (0.017)
1989	9.062*** (0.034)	9.276*** (0.026)	9.563*** (0.025)	9.745*** (0.023)	10.000*** (0.022)	10.418*** (0.019)
Difference	0.197*** (0.020)	0.197*** (0.019)	0.178*** (0.018)	0.167*** (0.016)	0.155*** (0.014)	0.189*** (0.011)
Composition	0.325*** (0.043)	0.347*** (0.030)	0.355*** (0.021)	0.340*** (0.020)	0.330*** (0.018)	0.257*** (0.012)
Income Structure	-0.128** (0.049)	-0.150*** (0.038)	-0.177*** (0.024)	-0.173*** (0.020)	-0.176*** (0.015)	-0.068*** (0.010)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.002)	0.003 (0.003)	0.003 (0.004)	0.003 (0.003)	0.003 (0.004)	0.003 (0.003)
Household: inactive / jobless	0.003** (0.001)	0.003** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.000)	0.001* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						

Single, low education	0.197*** (0.033)	0.162*** (0.018)	0.128*** (0.015)	0.111*** (0.011)	0.090*** (0.008)	0.039*** (0.005)
Single, medium education	-0.040*** (0.010)	-0.032*** (0.007)	-0.021*** (0.005)	-0.019*** (0.004)	-0.017*** (0.003)	-0.010*** (0.002)
Single, high education	-0.039** (0.013)	-0.025*** (0.007)	-0.007 (0.005)	0.000 (0.005)	0.012** (0.004)	0.028*** (0.004)
Couple, low/low education	0.118*** (0.025)	0.164*** (0.016)	0.172*** (0.012)	0.154*** (0.012)	0.128*** (0.009)	0.063*** (0.005)
Couple, medium/low education	0.032*** (0.008)	0.034*** (0.006)	0.035*** (0.003)	0.036*** (0.004)	0.034*** (0.003)	0.023*** (0.002)
Couple, high/medium education	0.006* (0.002)	0.004* (0.002)	0.007*** (0.001)	0.009*** (0.001)	0.015*** (0.001)	0.021*** (0.001)
Couple, high/high education	0.012** (0.004)	0.014*** (0.003)	0.023*** (0.003)	0.030*** (0.002)	0.050*** (0.002)	0.079*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Jobless household	-0.003* (0.002)	-0.002 (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.000)
Double-earner household	0.000 (0.001)	0.001 (0.001)	0.002*** (0.001)	0.004*** (0.001)	0.007*** (0.001)	0.010*** (0.001)
Trad. breadwinner	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.002* (0.001)	0.002*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001** (0.000)
Precarious	0.015*** (0.004)	0.011*** (0.003)	0.007*** (0.002)	0.006*** (0.002)	0.004*** (0.001)	0.002*** (0.001)
Single working fulltime	0.005 (0.003)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.003 (0.001)	0.003 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.004** (0.001)	-0.002 (0.001)	0.000 (0.001)	0.002** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Medium, >5% - 20%	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20%	0.021*** (0.004)	0.015*** (0.002)	0.008*** (0.001)	0.005*** (0.001)	0.003*** (0.001)	0.000 (0.000)
Young household	0.014*** (0.003)	0.009*** (0.002)	0.008*** (0.001)	0.010*** (0.002)	0.013*** (0.001)	0.012*** (0.001)
Single-mother household	0.002* (0.001)	0.002*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004** (0.001)	0.003** (0.001)	0.004** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Household with self-employed member	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.009* (0.004)	-0.011*** (0.003)	-0.015*** (0.003)	-0.015*** (0.002)	-0.018*** (0.003)	-0.014*** (0.002)
Household with Black (non-Hispanic) members	-0.006** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.003 (0.002)	-0.005** (0.002)	-0.007*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.000 (0.001)	0.001 (0.000)	0.000 (0.001)	0.001 (0.001)	0.002* (0.001)
Southern	-0.008* (0.003)	-0.005* (0.002)	-0.003* (0.001)	-0.002 (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	-0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.021* (0.010)	-0.001 (0.008)	0.003 (0.004)	-0.002 (0.003)	-0.007** (0.002)	-0.011*** (0.002)
Household: inactive / jobless	-0.007 (0.006)	-0.007 (0.004)	-0.004 (0.004)	-0.005 (0.003)	-0.005 (0.002)	-0.004** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.045 (0.045)	-0.066** (0.025)	-0.048* (0.019)	-0.043** (0.016)	-0.026** (0.010)	0.014* (0.006)
Single, medium education	-0.006 (0.028)	-0.023 (0.014)	-0.010 (0.010)	-0.017* (0.009)	-0.021*** (0.005)	-0.011* (0.004)
Single, high education	0.006 (0.007)	0.001 (0.004)	0.004 (0.003)	0.004 (0.002)	0.005** (0.002)	0.006*** (0.002)
Couple, low/low education	-0.082** (0.027)	-0.127*** (0.016)	-0.120*** (0.011)	-0.095*** (0.011)	-0.054*** (0.009)	0.018*** (0.005)

Couple, medium/low education	-0.037*** (0.010)	-0.043*** (0.008)	-0.042*** (0.005)	-0.040*** (0.005)	-0.030*** (0.004)	-0.009** (0.003)
Couple, high/medium education	0.007* (0.003)	0.004* (0.002)	0.005** (0.002)	0.005** (0.001)	0.007*** (0.001)	0.009*** (0.002)
Couple, high/high education	0.003** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.006*** (0.001)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.003 (0.005)	0.006 (0.004)	0.009** (0.003)	0.010*** (0.003)	0.010*** (0.002)	0.007** (0.002)
Jobless household	-0.012 (0.007)	-0.007 (0.004)	-0.006* (0.003)	-0.004 (0.002)	-0.002 (0.002)	-0.003** (0.001)
Double-earner household	0.001 (0.005)	0.001 (0.004)	-0.004 (0.005)	-0.009 (0.005)	-0.006 (0.005)	0.003 (0.004)
Trad. breadwinner	-0.006 (0.007)	-0.014* (0.006)	-0.017*** (0.005)	-0.023*** (0.004)	-0.021*** (0.005)	-0.014*** (0.004)
Both in part-time	0.003 (0.003)	0.004 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002* (0.001)	0.001 (0.001)
Precarious	-0.014 (0.009)	-0.008 (0.005)	-0.006 (0.003)	-0.005* (0.002)	-0.004 (0.002)	-0.004** (0.001)
Single working fulltime	-0.024 (0.045)	-0.003 (0.025)	-0.020 (0.017)	-0.009 (0.017)	0.000 (0.010)	-0.001 (0.010)
Single working part-time	-0.013 (0.015)	-0.006 (0.008)	-0.007 (0.006)	-0.002 (0.005)	0.003 (0.003)	0.002 (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.006 (0.005)	0.007 (0.006)	0.004 (0.004)	-0.003 (0.003)	-0.010** (0.004)	-0.007** (0.002)
Medium, >5% - 20%	-0.018** (0.006)	-0.002 (0.006)	0.007 (0.004)	0.008** (0.003)	0.005* (0.002)	0.004*** (0.001)
High, >20%	0.004 (0.006)	0.006* (0.003)	0.010*** (0.002)	0.006*** (0.001)	0.003* (0.001)	0.001 (0.001)
Young household	-0.032** (0.012)	-0.007 (0.009)	0.012** (0.004)	0.007 (0.005)	0.001 (0.003)	-0.001 (0.002)
Single-mother household	0.022* (0.010)	0.015** (0.005)	0.006 (0.003)	0.004 (0.003)	0.003 (0.002)	0.004** (0.001)
Couple without children	0.004 (0.006)	-0.003 (0.004)	-0.008*** (0.002)	-0.006** (0.002)	-0.007*** (0.002)	-0.010*** (0.002)
Large household (3+ children)	0.017 (0.009)	0.017*** (0.005)	0.018*** (0.004)	0.013*** (0.003)	0.010*** (0.002)	0.003* (0.001)
Household with self-employed member	0.015* (0.007)	0.017** (0.006)	0.016*** (0.004)	0.017*** (0.004)	0.015*** (0.003)	0.010*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.020 (0.014)	0.015 (0.009)	0.010 (0.006)	0.009 (0.005)	0.005 (0.003)	-0.002 (0.001)
Household with Black (non-Hispanic) members	0.013* (0.006)	0.011 (0.006)	0.016*** (0.005)	0.013*** (0.004)	0.006 (0.003)	-0.003 (0.002)
Household with members from other ethnicity	0.002 (0.002)	0.001 (0.002)	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)	0.000 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.020 (0.011)	0.017 (0.010)	0.015 (0.008)	0.016* (0.008)	0.015* (0.006)	0.005 (0.005)
Southern	0.036* (0.016)	0.037* (0.016)	0.051** (0.017)	0.046** (0.016)	0.038** (0.013)	0.017* (0.007)
Pacific and Mountain states	0.014 (0.013)	0.022 (0.013)	0.030 (0.015)	0.025 (0.013)	0.021 (0.012)	0.014 (0.010)
Constant	-0.045 (0.052)	-0.016 (0.040)	-0.106*** (0.025)	-0.098*** (0.029)	-0.139*** (0.028)	-0.115*** (0.024)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 12: Labor income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of disposable household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.259*** (0.025)	9.473*** (0.020)	9.741*** (0.017)	9.911*** (0.017)	10.155*** (0.018)	10.606*** (0.017)
1989	9.062*** (0.035)	9.276*** (0.027)	9.563*** (0.026)	9.745*** (0.024)	10.000*** (0.023)	10.418*** (0.019)
Difference	0.197*** (0.020)	0.197*** (0.020)	0.178*** (0.018)	0.167*** (0.016)	0.155*** (0.015)	0.189*** (0.011)
Composition	0.341*** (0.044)	0.361*** (0.031)	0.366*** (0.021)	0.350*** (0.020)	0.338*** (0.017)	0.260*** (0.011)
Income Structure	-0.143** (0.051)	-0.164*** (0.040)	-0.189*** (0.025)	-0.183*** (0.021)	-0.183*** (0.015)	-0.071*** (0.011)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.002)	0.003 (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.003 (0.003)
Household: inactive / jobless	0.003** (0.001)	0.003** (0.001)	0.002** (0.001)	0.001** (0.001)	0.001** (0.000)	0.000* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.219*** (0.034)	0.179*** (0.019)	0.138*** (0.015)	0.118*** (0.011)	0.095*** (0.008)	0.040*** (0.005)
Single, medium education	-0.045*** (0.011)	-0.036*** (0.007)	-0.023*** (0.005)	-0.021*** (0.004)	-0.018*** (0.003)	-0.010*** (0.002)
Single, high education	-0.046*** (0.014)	-0.030*** (0.008)	-0.009 (0.006)	-0.001 (0.005)	0.012** (0.004)	0.029*** (0.004)
Couple, low/low education	0.127*** (0.025)	0.172*** (0.018)	0.177*** (0.012)	0.158*** (0.012)	0.131*** (0.009)	0.064*** (0.005)
Couple, medium/low education	0.035*** (0.008)	0.036*** (0.006)	0.037*** (0.004)	0.038*** (0.004)	0.036*** (0.003)	0.024*** (0.002)
Couple, high/medium education	0.006** (0.002)	0.005** (0.002)	0.008*** (0.001)	0.010*** (0.001)	0.016*** (0.001)	0.022*** (0.002)
Couple, high/high education	0.015** (0.005)	0.016*** (0.003)	0.025*** (0.003)	0.033*** (0.003)	0.052*** (0.003)	0.081*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Jobless household	-0.004* (0.002)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.000)
Double-earner household	0.001 (0.001)	0.001* (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.008*** (0.001)	0.010*** (0.001)
Trad. breadwinner	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.002** (0.001)	0.003*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.017*** (0.004)	0.012*** (0.003)	0.008*** (0.002)	0.006*** (0.002)	0.004*** (0.001)	0.002*** (0.001)
Single working fulltime	0.006 (0.004)	0.004 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.004 (0.002)	0.003 (0.002)	0.003 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)
Young household	0.018*** (0.003)	0.012*** (0.003)	0.010*** (0.001)	0.012*** (0.002)	0.015*** (0.001)	0.013*** (0.001)
Single-mother household	0.003** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004** (0.001)	0.004** (0.001)	0.004** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.008 (0.004)	-0.011*** (0.003)	-0.015*** (0.003)	-0.015*** (0.002)	-0.018*** (0.003)	-0.014*** (0.002)
Household with Black (non-Hispanic) members	-0.007*** (0.002)	-0.007*** (0.002)	-0.005*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.004 (0.002)	-0.006** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2. Income concept used for dependent variable: Gross household income

2.1. Full analysis sample, using different model specifications

Table 13: Full analysis sample, models incl. transfers and tax refunds, excl. tax liabilities: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.741*** (0.049)	9.140*** (0.023)	9.499*** (0.018)	9.722*** (0.018)	10.037*** (0.020)	10.617*** (0.020)
1989	8.847*** (0.030)	9.085*** (0.024)	9.373*** (0.022)	9.588*** (0.023)	9.916*** (0.022)	10.493*** (0.020)
Difference	-0.106** (0.037)	0.055** (0.018)	0.126*** (0.017)	0.134*** (0.017)	0.121*** (0.017)	0.124*** (0.013)
Composition	-0.061 (0.081)	0.064* (0.029)	0.179*** (0.025)	0.213*** (0.024)	0.183*** (0.020)	0.189*** (0.017)
Income Structure	-0.045 (0.090)	-0.009 (0.029)	-0.053* (0.024)	-0.080*** (0.020)	-0.063*** (0.014)	-0.066*** (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.002)	0.003 (0.002)
Household: inactive / jobless	-0.060*** (0.012)	-0.026*** (0.005)	-0.018*** (0.004)	-0.016*** (0.003)	-0.014*** (0.003)	-0.009*** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.104 (0.056)	0.098*** (0.019)	0.218*** (0.014)	0.221*** (0.012)	0.184*** (0.011)	0.077*** (0.005)
Single, medium education	-0.048* (0.019)	-0.029*** (0.007)	-0.053*** (0.005)	-0.061*** (0.006)	-0.060*** (0.006)	-0.029*** (0.003)
Single, high education	-0.023 (0.016)	-0.013* (0.006)	-0.033*** (0.003)	-0.034*** (0.003)	-0.021*** (0.003)	0.022*** (0.002)
Couple, low/low education	0.017 (0.036)	0.062*** (0.015)	0.105*** (0.011)	0.138*** (0.011)	0.122*** (0.009)	0.069*** (0.007)
Couple, medium/low education	0.015 (0.013)	0.012** (0.005)	0.014*** (0.003)	0.020*** (0.003)	0.024*** (0.002)	0.023*** (0.002)
Couple, high/medium education	-0.007 (0.004)	-0.001 (0.002)	-0.001 (0.001)	0.001 (0.001)	0.008*** (0.001)	0.022*** (0.001)
Couple, high/high education	-0.016** (0.006)	-0.008* (0.003)	-0.005** (0.002)	0.002 (0.002)	0.020*** (0.002)	0.070*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.041*** (0.007)	0.013*** (0.002)	0.006*** (0.001)	0.002*** (0.001)	-0.001 (0.001)	-0.003*** (0.001)
Jobless household	-0.034 (0.019)	-0.013 (0.007)	-0.005 (0.003)	-0.003 (0.002)	-0.002 (0.001)	-0.002 (0.001)

Double-earner household	0.002 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.002*** (0.000)	0.006*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)
Both in part-time	0.000 (0.001)	0.000 (0.000)	0.001 (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Precarious	0.014*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.001*** (0.000)
Single working fulltime	0.001 (0.003)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
Single working part-time	0.000 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001* (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.068*** (0.017)	-0.046*** (0.007)	-0.048*** (0.005)	-0.055*** (0.005)	-0.077*** (0.007)	-0.056*** (0.005)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.008** (0.003)	-0.003** (0.001)	0.000 (0.001)	0.002* (0.001)	0.003** (0.001)	0.002** (0.001)
Medium, >5% - 20%	-0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20%	0.013* (0.005)	0.015*** (0.004)	0.017*** (0.004)	0.012*** (0.003)	0.007*** (0.002)	0.001** (0.000)
Young household	0.035*** (0.007)	0.013*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.006*** (0.001)	0.011*** (0.001)
Single-mother household	0.002 (0.004)	0.002 (0.002)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	0.000 (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004 (0.002)	0.002 (0.001)	0.001 (0.001)	0.001** (0.000)	0.002*** (0.001)	0.003*** (0.001)
Household with self-employed member	-0.027*** (0.004)	-0.012*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.004 (0.007)	-0.001 (0.003)	-0.006* (0.003)	-0.008** (0.002)	-0.008*** (0.002)	-0.011*** (0.002)
Household with Black (non-Hispanic) members	-0.013*** (0.003)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.002 (0.004)	-0.001 (0.002)	-0.003* (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	-0.000 (0.002)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)
Southern	-0.007 (0.004)	-0.005* (0.002)	-0.004* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.000 (0.001)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.012 (0.011)	0.019** (0.006)	0.004 (0.004)	-0.000 (0.003)	0.002 (0.003)	-0.001 (0.002)
Household: inactive / jobless	-0.596*** (0.052)	-0.204*** (0.020)	-0.103*** (0.014)	-0.059*** (0.012)	-0.043*** (0.009)	-0.055*** (0.006)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.036 (0.070)	-0.034 (0.027)	-0.146*** (0.020)	-0.104*** (0.014)	-0.042** (0.014)	0.039*** (0.008)
Single, medium education	-0.028 (0.026)	-0.010 (0.010)	-0.029*** (0.006)	-0.022*** (0.005)	-0.019*** (0.005)	-0.006 (0.004)
Single, high education	-0.001 (0.007)	0.002 (0.003)	-0.005** (0.002)	-0.002 (0.001)	0.001 (0.002)	0.006*** (0.001)
Couple, low/low education	0.005 (0.039)	-0.052** (0.016)	-0.091*** (0.011)	-0.113*** (0.009)	-0.064*** (0.008)	0.033*** (0.008)
Couple, medium/low education	-0.017 (0.019)	-0.016* (0.007)	-0.021*** (0.004)	-0.029*** (0.004)	-0.028*** (0.004)	-0.008** (0.003)
Couple, high/medium education	-0.005 (0.004)	-0.002 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.002 (0.001)	0.008*** (0.001)
Couple, high/high education	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.000)	0.000 (0.000)	0.002*** (0.000)	0.006*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.337*** (0.033)	0.095*** (0.015)	0.063*** (0.009)	0.047*** (0.008)	0.071*** (0.008)	0.053*** (0.008)
Jobless household	-0.220*** (0.030)	-0.065*** (0.011)	-0.021*** (0.006)	-0.010* (0.004)	-0.001 (0.003)	-0.005** (0.001)
Double-earner household	0.012 (0.006)	0.001 (0.003)	-0.001 (0.002)	-0.003 (0.002)	-0.009** (0.003)	-0.004 (0.003)
Trad. breadwinner	0.049*** (0.007)	0.021*** (0.004)	0.007** (0.002)	-0.003 (0.003)	-0.009** (0.003)	-0.007* (0.004)

Both in part-time	0.001 (0.003)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Precarious	-0.033*** (0.008)	-0.012*** (0.004)	-0.008*** (0.002)	-0.010*** (0.002)	-0.005*** (0.001)	0.001 (0.001)
Single working fulltime	0.078* (0.034)	0.012 (0.012)	0.023* (0.010)	0.002 (0.009)	0.003 (0.008)	0.001 (0.006)
Single working part-time	0.026* (0.013)	0.002 (0.006)	0.001 (0.004)	-0.003 (0.004)	0.003 (0.003)	0.004 (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.002 (0.015)	0.015* (0.006)	0.032*** (0.005)	0.059*** (0.005)	0.038*** (0.005)	-0.018*** (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.039*** (0.009)	0.011* (0.005)	0.009* (0.004)	0.002 (0.004)	-0.003 (0.003)	-0.006** (0.002)
Medium, >5% - 20%	0.018 (0.010)	-0.009* (0.004)	-0.004 (0.007)	0.002 (0.004)	0.009** (0.003)	0.006*** (0.001)
High, >20%	-0.012 (0.018)	0.009 (0.009)	0.007 (0.006)	0.017*** (0.004)	0.011*** (0.002)	0.002 (0.001)
Young household	-0.087*** (0.020)	-0.030*** (0.009)	-0.010* (0.004)	-0.004 (0.004)	-0.001 (0.003)	0.001 (0.003)
Single-mother household	0.011 (0.018)	0.008 (0.007)	0.005 (0.004)	-0.009* (0.004)	0.001 (0.003)	0.015*** (0.003)
Couple without children	0.010 (0.007)	0.002 (0.003)	-0.002 (0.002)	-0.004* (0.002)	-0.004 (0.002)	-0.009*** (0.002)
Large household (3+ children)	0.002 (0.010)	0.009 (0.007)	0.013*** (0.003)	0.013*** (0.002)	0.014*** (0.002)	0.013*** (0.002)
Household with self-employed member	0.144*** (0.013)	0.059*** (0.005)	0.034*** (0.004)	0.024*** (0.004)	0.023*** (0.003)	0.022*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.014 (0.008)	0.011* (0.005)	0.009* (0.005)	0.007 (0.004)	0.009** (0.003)	0.002 (0.002)
Household with Black (non-Hispanic) members	-0.009 (0.013)	0.009 (0.006)	0.012* (0.005)	0.012** (0.004)	0.013*** (0.003)	-0.000 (0.002)
Household with members from other ethnicity	-0.002 (0.003)	-0.000 (0.002)	-0.000 (0.002)	-0.001 (0.001)	0.002 (0.001)	0.002* (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.019 (0.023)	0.014 (0.010)	0.011 (0.008)	0.008 (0.007)	0.012 (0.009)	0.011 (0.007)
Southern	0.019 (0.026)	0.025* (0.012)	0.021* (0.011)	0.024* (0.010)	0.018* (0.009)	0.015 (0.008)
Pacific and Mountain states	0.015 (0.014)	0.000 (0.006)	0.000 (0.007)	0.004 (0.007)	0.007 (0.006)	0.013 (0.009)
Constant	0.192*** (0.055)	0.102** (0.037)	0.136*** (0.029)	0.074** (0.023)	-0.076*** (0.019)	-0.200*** (0.027)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 14: Full analysis sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.741*** (0.048)	9.140*** (0.022)	9.499*** (0.017)	9.722*** (0.016)	10.037*** (0.017)	10.617*** (0.018)
1989	8.847*** (0.030)	9.085*** (0.024)	9.373*** (0.022)	9.588*** (0.023)	9.916*** (0.022)	10.493*** (0.020)
Difference	-0.106** (0.035)	0.055** (0.017)	0.126*** (0.017)	0.134*** (0.017)	0.121*** (0.015)	0.124*** (0.012)
Composition	0.080 (0.084)	0.160*** (0.030)	0.280*** (0.022)	0.328*** (0.023)	0.345*** (0.020)	0.306*** (0.015)
Income Structure	-0.186* (0.089)	-0.105*** (0.029)	-0.153*** (0.020)	-0.195*** (0.019)	-0.224*** (0.017)	-0.183*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.000 (0.001)	0.002 (0.001)	0.002 (0.002)	0.004 (0.003)	0.004 (0.003)
Household: inactive / jobless	-0.058*** (0.012)	-0.024*** (0.005)	-0.017*** (0.003)	-0.014*** (0.003)	-0.012*** (0.002)	-0.007*** (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.102 (0.057)	0.097*** (0.020)	0.216*** (0.013)	0.219*** (0.012)	0.181*** (0.010)	0.075*** (0.005)
Single, medium education	-0.045* (0.019)	-0.027*** (0.007)	-0.051*** (0.005)	-0.058*** (0.005)	-0.056*** (0.006)	-0.026*** (0.003)
Single, high education	-0.016 (0.016)	-0.007 (0.006)	-0.027*** (0.003)	-0.027*** (0.003)	-0.012*** (0.003)	0.029*** (0.003)
Couple, low/low education	0.047 (0.035)	0.082*** (0.015)	0.126*** (0.011)	0.163*** (0.011)	0.157*** (0.011)	0.094*** (0.008)
Couple, medium/low education	0.022 (0.013)	0.016*** (0.005)	0.019*** (0.003)	0.025*** (0.003)	0.032*** (0.003)	0.028*** (0.002)
Couple, high/medium education	-0.004 (0.004)	0.001 (0.002)	0.001 (0.001)	0.003** (0.001)	0.012*** (0.001)	0.025*** (0.001)
Couple, high/high education	-0.005 (0.006)	-0.001 (0.003)	0.002 (0.002)	0.011*** (0.002)	0.032*** (0.002)	0.079*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.039*** (0.007)	0.011*** (0.002)	0.004*** (0.001)	0.000 (0.000)	-0.003*** (0.001)	-0.005*** (0.001)
Jobless household	-0.034 (0.019)	-0.013 (0.007)	-0.005 (0.003)	-0.003 (0.002)	-0.002 (0.001)	-0.002 (0.001)
Double-earner household	0.003* (0.001)	0.001 (0.000)	0.000 (0.000)	0.001** (0.000)	0.003*** (0.001)	0.007*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Both in part-time	0.001 (0.001)	0.001 (0.000)	0.001** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.016*** (0.004)	0.009*** (0.002)	0.006*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Single working fulltime	0.001 (0.003)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
Single working part-time	0.001 (0.001)	0.002* (0.001)	0.001 (0.000)	0.001* (0.000)	0.001* (0.000)	0.001** (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007** (0.002)	-0.002* (0.001)	0.001 (0.001)	0.003** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Medium, >5% - 20%	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20%	0.014** (0.005)	0.015*** (0.004)	0.017*** (0.004)	0.012*** (0.003)	0.007*** (0.002)	0.002** (0.000)
Young household	0.037*** (0.007)	0.014*** (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.009*** (0.001)	0.012*** (0.001)
Single-mother household	0.010** (0.004)	0.007*** (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.006*** (0.001)	0.007*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)

Large household (3+ children)	0.008*** (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.006*** (0.001)	0.006*** (0.001)
Household with self-employed member	-0.025*** (0.004)	-0.010*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.001 (0.007)	-0.004 (0.003)	-0.009*** (0.003)	-0.012*** (0.003)	-0.013*** (0.002)	-0.015*** (0.003)
Household with Black (non-Hispanic) members	-0.014*** (0.003)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.004 (0.004)	-0.002 (0.002)	-0.005** (0.001)	-0.007*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002* (0.001)
Southern	-0.008 (0.004)	-0.005* (0.002)	-0.005* (0.002)	-0.004* (0.002)	-0.004* (0.002)	-0.005* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.007 (0.010)	0.017** (0.006)	0.004 (0.004)	0.004 (0.003)	0.001 (0.003)	-0.008*** (0.002)
Household: inactive / jobless	-0.583*** (0.052)	-0.200*** (0.019)	-0.102*** (0.014)	-0.064*** (0.012)	-0.038*** (0.008)	-0.040*** (0.005)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.033 (0.070)	-0.033 (0.028)	-0.144*** (0.020)	-0.102*** (0.014)	-0.039** (0.013)	0.041*** (0.008)
Single, medium education	-0.028 (0.026)	-0.011 (0.010)	-0.031*** (0.006)	-0.026*** (0.005)	-0.022*** (0.005)	-0.005 (0.004)
Single, high education	0.000 (0.007)	0.003 (0.003)	-0.004* (0.002)	-0.001 (0.001)	0.002 (0.002)	0.008*** (0.002)
Couple, low/low education	-0.018 (0.039)	-0.065*** (0.017)	-0.101*** (0.011)	-0.121*** (0.010)	-0.084*** (0.010)	0.011 (0.008)
Couple, medium/low education	-0.025 (0.019)	-0.021** (0.007)	-0.026*** (0.004)	-0.034*** (0.004)	-0.037*** (0.004)	-0.015*** (0.003)
Couple, high/medium education	-0.002 (0.004)	0.000 (0.002)	0.001 (0.001)	0.001 (0.001)	0.005*** (0.001)	0.011*** (0.001)
Couple, high/high education	-0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.326*** (0.034)	0.091*** (0.014)	0.063*** (0.009)	0.052*** (0.009)	0.068*** (0.009)	0.041*** (0.008)
Jobless household	-0.223*** (0.031)	-0.067*** (0.011)	-0.025*** (0.006)	-0.015** (0.005)	-0.006* (0.003)	-0.006*** (0.002)
Double-earner household	0.015* (0.006)	0.003 (0.003)	0.001 (0.003)	-0.002 (0.003)	-0.006 (0.004)	-0.001 (0.003)
Trad. breadwinner	0.041*** (0.005)	0.017*** (0.003)	0.005 (0.003)	-0.003 (0.003)	-0.014*** (0.003)	-0.016*** (0.004)
Both in part-time	0.001 (0.003)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Precarious	-0.034*** (0.009)	-0.011** (0.004)	-0.005 (0.003)	-0.004 (0.002)	-0.002 (0.002)	-0.002 (0.001)
Single working fulltime	0.081* (0.034)	0.014 (0.012)	0.026** (0.010)	0.007 (0.009)	0.007 (0.007)	0.002 (0.006)
Single working part-time	0.025 (0.013)	0.003 (0.006)	0.004 (0.005)	0.002 (0.004)	0.005 (0.003)	0.002 (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.035*** (0.009)	0.009* (0.004)	0.007 (0.004)	0.001 (0.004)	-0.006* (0.003)	-0.010*** (0.002)
Medium, >5% - 20%	0.018 (0.009)	-0.007 (0.004)	-0.000 (0.007)	0.009 (0.005)	0.013*** (0.003)	0.004*** (0.001)
High, >20%	-0.012 (0.018)	0.009 (0.009)	0.008 (0.006)	0.018*** (0.004)	0.012*** (0.002)	0.001 (0.001)
Young household	-0.087*** (0.019)	-0.029*** (0.009)	-0.007 (0.005)	0.002 (0.004)	0.003 (0.003)	-0.002 (0.003)
Single-mother household	-0.000 (0.014)	0.006 (0.008)	0.010** (0.003)	0.005 (0.003)	0.004 (0.002)	-0.001 (0.001)
Couple without children	0.013* (0.006)	0.003 (0.003)	-0.002 (0.002)	-0.006*** (0.002)	-0.003 (0.002)	-0.006*** (0.002)
Large household (3+ children)	-0.011 (0.009)	0.002 (0.006)	0.008** (0.003)	0.011*** (0.003)	0.005* (0.003)	0.000 (0.002)
Household with self-employed member	0.139*** (0.013)	0.057*** (0.005)	0.033*** (0.004)	0.024*** (0.004)	0.020*** (0.003)	0.016*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.012 (0.008)	0.011* (0.005)	0.009 (0.005)	0.009 (0.005)	0.008* (0.004)	-0.001 (0.002)

Household with Black (non-Hispanic) members	-0.010 (0.013)	0.008 (0.006)	0.012* (0.005)	0.013** (0.004)	0.012*** (0.004)	-0.002 (0.002)
Household with members from other ethnicity	-0.003 (0.003)	-0.000 (0.002)	-0.001 (0.002)	-0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.014 (0.021)	0.011 (0.008)	0.008 (0.006)	0.005 (0.004)	0.007 (0.006)	0.006 (0.005)
Southern	0.023 (0.025)	0.029* (0.012)	0.028* (0.012)	0.035** (0.012)	0.027** (0.010)	0.015 (0.008)
Pacific and Mountain states	0.015 (0.014)	0.001 (0.006)	0.001 (0.007)	0.006 (0.008)	0.009 (0.007)	0.013 (0.009)
Constant	0.121* (0.055)	0.043 (0.034)	0.064* (0.028)	-0.022 (0.023)	-0.183*** (0.021)	-0.249*** (0.026)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 15: Full analysis sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.741*** (0.048)	9.140*** (0.023)	9.499*** (0.018)	9.722*** (0.016)	10.037*** (0.017)	10.617*** (0.019)
1989	8.847*** (0.030)	9.085*** (0.024)	9.373*** (0.023)	9.588*** (0.024)	9.916*** (0.023)	10.493*** (0.020)
Difference	-0.106** (0.035)	0.055** (0.017)	0.126*** (0.017)	0.134*** (0.017)	0.121*** (0.015)	0.124*** (0.013)
Composition	0.084 (0.084)	0.181*** (0.030)	0.312*** (0.023)	0.357*** (0.022)	0.368*** (0.020)	0.316*** (0.014)
Income Structure	-0.190* (0.089)	-0.126*** (0.029)	-0.186*** (0.024)	-0.224*** (0.021)	-0.247*** (0.018)	-0.193*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.000 (0.001)	0.002 (0.001)	0.003 (0.002)	0.004 (0.003)	0.005 (0.003)
Household: inactive / jobless	-0.062*** (0.013)	-0.028*** (0.006)	-0.021*** (0.004)	-0.017*** (0.003)	-0.013*** (0.003)	-0.007*** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.115 (0.059)	0.122*** (0.020)	0.251*** (0.014)	0.248*** (0.012)	0.202*** (0.010)	0.083*** (0.005)
Single, medium education	-0.044* (0.019)	-0.029*** (0.007)	-0.056*** (0.005)	-0.063*** (0.006)	-0.060*** (0.006)	-0.028*** (0.003)
Single, high education	-0.015 (0.016)	-0.007 (0.006)	-0.028*** (0.004)	-0.028*** (0.003)	-0.012*** (0.003)	0.029*** (0.003)
Couple, low/low education	0.048 (0.035)	0.089*** (0.016)	0.137*** (0.011)	0.173*** (0.012)	0.165*** (0.011)	0.098*** (0.008)
Couple, medium/low education	0.023 (0.013)	0.020*** (0.005)	0.024*** (0.003)	0.029*** (0.003)	0.035*** (0.003)	0.029*** (0.002)
Couple, high/medium education	-0.004 (0.004)	0.001 (0.002)	0.003* (0.001)	0.005*** (0.001)	0.013*** (0.001)	0.026*** (0.002)

Couple, high/high education	-0.007 (0.006)	0.000 (0.003)	0.006** (0.002)	0.015*** (0.002)	0.035*** (0.002)	0.081*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.041*** (0.007)	0.014*** (0.003)	0.007*** (0.002)	0.002*** (0.001)	-0.002* (0.001)	-0.005*** (0.001)
Jobless household	-0.036 (0.020)	-0.015 (0.008)	-0.008 (0.004)	-0.005 (0.003)	-0.003 (0.002)	-0.002 (0.001)
Double-earner household	0.002* (0.001)	0.001** (0.000)	0.001** (0.000)	0.002*** (0.000)	0.003*** (0.001)	0.007*** (0.001)
Trad. breadwinner	-0.002 (0.001)	-0.001 (0.000)	0.000 (0.000)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Both in part-time	0.001 (0.001)	0.001* (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.016*** (0.004)	0.010*** (0.002)	0.007*** (0.002)	0.006*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Single working fulltime	0.001 (0.003)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
Single working part-time	0.001 (0.001)	0.002* (0.001)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001** (0.000)
Young household	0.038*** (0.007)	0.016*** (0.003)	0.009*** (0.002)	0.008*** (0.001)	0.011*** (0.001)	0.013*** (0.001)
Single-mother household	0.010** (0.004)	0.008*** (0.002)	0.004*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.008*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.008*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.006*** (0.001)
Household with self-employed member	-0.026*** (0.004)	-0.012*** (0.002)	-0.008*** (0.001)	-0.007*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.000 (0.007)	-0.004 (0.003)	-0.010*** (0.003)	-0.013*** (0.003)	-0.014*** (0.003)	-0.016*** (0.003)
Household with Black (non-Hispanic) members	-0.014*** (0.004)	-0.008*** (0.002)	-0.008*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.004 (0.004)	-0.002 (0.002)	-0.005*** (0.001)	-0.008*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.001)	0.002* (0.001)
Southern	-0.008 (0.004)	-0.004* (0.002)	-0.003* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.011 (0.010)	0.019** (0.007)	0.006 (0.004)	0.005 (0.004)	0.002 (0.004)	-0.008*** (0.002)
Household: inactive / jobless	-0.596*** (0.047)	-0.193*** (0.018)	-0.101*** (0.016)	-0.055*** (0.013)	-0.034*** (0.008)	-0.041*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.041 (0.073)	-0.050 (0.029)	-0.165*** (0.023)	-0.115*** (0.015)	-0.047*** (0.012)	0.037*** (0.008)
Single, medium education	-0.023 (0.026)	-0.007 (0.010)	-0.027*** (0.007)	-0.022*** (0.006)	-0.020*** (0.005)	-0.005 (0.004)
Single, high education	0.002 (0.007)	0.005 (0.003)	-0.001 (0.002)	0.001 (0.002)	0.003* (0.002)	0.008*** (0.002)
Couple, low/low education	-0.018 (0.039)	-0.071*** (0.017)	-0.109*** (0.011)	-0.127*** (0.010)	-0.088*** (0.009)	0.009 (0.008)
Couple, medium/low education	-0.026 (0.019)	-0.025*** (0.007)	-0.032*** (0.005)	-0.039*** (0.004)	-0.040*** (0.004)	-0.017*** (0.003)
Couple, high/medium education	-0.003 (0.004)	0.001 (0.002)	0.002 (0.001)	0.003 (0.001)	0.006*** (0.001)	0.011*** (0.001)
Couple, high/high education	-0.000 (0.001)	0.001 (0.001)	0.001** (0.000)	0.002*** (0.000)	0.004*** (0.000)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.338*** (0.034)	0.092*** (0.015)	0.067*** (0.012)	0.051*** (0.009)	0.068*** (0.009)	0.043*** (0.007)
Jobless household	-0.222*** (0.028)	-0.055*** (0.009)	-0.012* (0.005)	-0.000 (0.004)	0.004 (0.003)	-0.004* (0.002)
Double-earner household	0.013* (0.006)	0.004 (0.003)	0.001 (0.003)	-0.002 (0.003)	-0.007 (0.004)	-0.001 (0.003)
Trad. breadwinner	0.042*** (0.005)	0.016*** (0.003)	0.003 (0.003)	-0.006 (0.003)	-0.016*** (0.003)	-0.016*** (0.004)
Both in part-time	0.001 (0.003)	0.001 (0.001)	0.002* (0.001)	0.002* (0.001)	0.003* (0.001)	0.002* (0.001)
Precarious	-0.031*** (0.009)	-0.008* (0.004)	-0.002 (0.002)	-0.000 (0.002)	0.001 (0.002)	-0.001 (0.001)

Single working fulltime	0.067* (0.034)	0.004 (0.014)	0.015 (0.014)	-0.004 (0.011)	0.001 (0.008)	0.003 (0.006)
Single working part-time	0.025 (0.013)	0.001 (0.006)	0.003 (0.005)	0.002 (0.004)	0.007* (0.003)	0.003 (0.002)
Young household	-0.083*** (0.019)	-0.024** (0.009)	-0.002 (0.005)	0.007 (0.004)	0.006 (0.003)	-0.002 (0.003)
Single-mother household	0.012 (0.014)	0.020* (0.009)	0.024*** (0.003)	0.017*** (0.003)	0.010*** (0.002)	-0.000 (0.001)
Couple without children	0.013* (0.006)	0.003 (0.003)	-0.001 (0.002)	-0.005** (0.002)	-0.002 (0.002)	-0.006*** (0.002)
Large household (3+ children)	-0.006 (0.010)	0.007 (0.007)	0.014*** (0.003)	0.016*** (0.003)	0.008** (0.003)	0.000 (0.002)
Household with self-employed member	0.142*** (0.012)	0.057*** (0.005)	0.033*** (0.004)	0.022*** (0.004)	0.018*** (0.003)	0.016*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.014 (0.008)	0.013* (0.006)	0.012* (0.006)	0.012* (0.005)	0.010* (0.004)	-0.000 (0.002)
Household with Black (non-Hispanic) members	-0.004 (0.012)	0.014** (0.005)	0.020*** (0.006)	0.021*** (0.005)	0.018*** (0.004)	-0.001 (0.002)
Household with members from other ethnicity	-0.001 (0.003)	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)	0.003* (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.016 (0.020)	0.015 (0.009)	0.014 (0.007)	0.010 (0.005)	0.010 (0.006)	0.007 (0.006)
Southern	0.022 (0.026)	0.032* (0.013)	0.034* (0.013)	0.039** (0.014)	0.031** (0.012)	0.017* (0.009)
Pacific and Mountain states	0.015 (0.014)	0.003 (0.006)	0.004 (0.008)	0.009 (0.009)	0.010 (0.008)	0.013 (0.010)
Constant	0.131* (0.052)	-0.004 (0.034)	0.011 (0.028)	-0.068*** (0.020)	-0.219*** (0.019)	-0.269*** (0.025)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2.2. Market income sample, using different model specifications

Table 16: Market income sample, models incl. transfers and tax refunds, excl. tax liabilities: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.050*** (0.034)	9.356*** (0.023)	9.696*** (0.017)	9.898*** (0.016)	10.171*** (0.018)	10.702*** (0.018)
1989	9.025*** (0.030)	9.253*** (0.024)	9.556*** (0.022)	9.742*** (0.020)	10.038*** (0.020)	10.550*** (0.019)
Difference	0.025 (0.026)	0.103*** (0.016)	0.140*** (0.015)	0.157*** (0.016)	0.133*** (0.014)	0.152*** (0.012)
Composition	-0.035 (0.064)	0.065 (0.042)	0.168*** (0.026)	0.147*** (0.021)	0.146*** (0.019)	0.190*** (0.015)

Income Structure	0.060 (0.066)	0.038 (0.042)	-0.028 (0.025)	0.009 (0.020)	-0.014 (0.014)	-0.039** (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.000 (0.001)	0.000 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Household: inactive / jobless	0.009 (0.006)	0.005 (0.003)	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.150*** (0.044)	0.188*** (0.026)	0.177*** (0.015)	0.156*** (0.011)	0.133*** (0.011)	0.055*** (0.005)
Single, medium education	-0.040** (0.012)	-0.036*** (0.007)	-0.039*** (0.005)	-0.040*** (0.004)	-0.036*** (0.004)	-0.016*** (0.003)
Single, high education	-0.024 (0.014)	-0.032*** (0.009)	-0.028*** (0.004)	-0.024*** (0.003)	-0.008** (0.003)	0.028*** (0.003)
Couple, low/low education	0.033 (0.030)	0.050* (0.022)	0.126*** (0.013)	0.111*** (0.010)	0.092*** (0.008)	0.052*** (0.007)
Couple, medium/low education	0.002 (0.008)	0.009 (0.006)	0.018*** (0.004)	0.020*** (0.003)	0.025*** (0.003)	0.020*** (0.002)
Couple, high/medium education	-0.005 (0.003)	-0.001 (0.002)	0.000 (0.001)	0.003** (0.001)	0.010*** (0.001)	0.023*** (0.001)
Couple, high/high education	-0.017** (0.005)	-0.012** (0.004)	-0.000 (0.003)	0.008*** (0.002)	0.027*** (0.002)	0.075*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.005)	-0.002 (0.002)	-0.000 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.001)
Jobless household	-0.044*** (0.010)	-0.022*** (0.005)	-0.009*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
Double-earner household	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	0.001* (0.000)	0.004*** (0.001)	0.008*** (0.001)
Trad. breadwinner	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
Both in part-time	0.001 (0.001)	0.001 (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)
Precarious	0.013*** (0.004)	0.008*** (0.002)	0.005*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.001*** (0.000)
Single working fulltime	0.003 (0.002)	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.106*** (0.012)	-0.094*** (0.009)	-0.079*** (0.006)	-0.083*** (0.006)	-0.096*** (0.007)	-0.051*** (0.004)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.009*** (0.003)	-0.003* (0.001)	0.000 (0.001)	0.001 (0.001)	0.002** (0.001)	0.002*** (0.001)
Medium, >5% - 20%	-0.000 (0.000)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)
High, >20%	0.017*** (0.005)	0.014*** (0.004)	0.007*** (0.002)	0.004*** (0.001)	0.002*** (0.001)	0.000* (0.000)
Young household	0.018*** (0.004)	0.009*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.008*** (0.001)	0.010*** (0.001)
Single-mother household	-0.005* (0.002)	-0.004*** (0.001)	-0.003*** (0.001)	-0.002*** (0.000)	-0.002*** (0.000)	0.000 (0.000)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.000 (0.001)	-0.000 (0.001)	0.001* (0.000)	0.001** (0.000)	0.001** (0.000)	0.002*** (0.001)
Household with self-employed member	-0.017*** (0.003)	-0.009*** (0.002)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.003 (0.004)	0.001 (0.003)	-0.005* (0.002)	-0.006*** (0.002)	-0.008*** (0.002)	-0.011*** (0.002)
Household with Black (non-Hispanic) members	-0.007** (0.002)	-0.005** (0.002)	-0.004*** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.002 (0.003)	-0.001 (0.002)	-0.004** (0.002)	-0.004** (0.002)	-0.004*** (0.001)	-0.004*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	-0.001 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.006* (0.002)	-0.003* (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.001)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)

unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.030** (0.011)	0.017* (0.007)	-0.002 (0.004)	-0.000 (0.003)	0.001 (0.002)	-0.003 (0.002)
Household: inactive / jobless	-0.335*** (0.028)	-0.169*** (0.017)	-0.080*** (0.012)	-0.044*** (0.008)	-0.036*** (0.008)	-0.032*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.063 (0.054)	-0.106** (0.032)	-0.084*** (0.018)	-0.050*** (0.013)	-0.019 (0.012)	0.042*** (0.008)
Single, medium education	-0.019 (0.021)	-0.017 (0.012)	-0.016* (0.007)	-0.015** (0.005)	-0.016*** (0.005)	-0.002 (0.005)
Single, high education	0.001 (0.006)	-0.003 (0.004)	-0.001 (0.002)	-0.001 (0.001)	0.002 (0.001)	0.007*** (0.002)
Couple, low/low education	-0.009 (0.033)	-0.031 (0.024)	-0.101*** (0.013)	-0.070*** (0.009)	-0.024** (0.008)	0.050*** (0.008)
Couple, medium/low education	0.002 (0.012)	-0.014 (0.008)	-0.025*** (0.005)	-0.024*** (0.003)	-0.024*** (0.004)	-0.003 (0.003)
Couple, high/medium education	-0.003 (0.003)	-0.000 (0.002)	-0.000 (0.002)	0.000 (0.001)	0.003* (0.001)	0.009*** (0.001)
Couple, high/high education	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.000)	0.001* (0.000)	0.002*** (0.000)	0.006*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.199*** (0.023)	0.092*** (0.014)	0.054*** (0.009)	0.051*** (0.007)	0.064*** (0.007)	0.044*** (0.007)
Jobless household	-0.093*** (0.013)	-0.041*** (0.007)	-0.011** (0.003)	-0.006** (0.002)	-0.003 (0.002)	-0.004*** (0.001)
Double-earner household	0.006 (0.005)	0.000 (0.003)	-0.003 (0.003)	-0.006 (0.003)	-0.009* (0.004)	-0.003 (0.004)
Trad. breadwinner	0.039*** (0.007)	0.016** (0.005)	-0.004 (0.004)	-0.010*** (0.003)	-0.010** (0.003)	-0.005 (0.004)
Both in part-time	0.001 (0.003)	0.002 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.002* (0.001)
Precarious	-0.023** (0.007)	-0.015*** (0.004)	-0.011*** (0.002)	-0.008*** (0.001)	-0.002 (0.001)	0.001 (0.001)
Single working fulltime	0.034 (0.026)	0.016 (0.018)	-0.002 (0.011)	-0.001 (0.008)	-0.004 (0.007)	-0.005 (0.007)
Single working part-time	0.013 (0.012)	-0.005 (0.009)	-0.007 (0.005)	-0.003 (0.003)	0.002 (0.003)	0.004 (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	0.021 (0.012)	0.024*** (0.007)	0.068*** (0.006)	0.056*** (0.005)	0.011** (0.003)	-0.019*** (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.029*** (0.007)	0.013* (0.006)	0.007 (0.004)	0.004 (0.004)	-0.003 (0.002)	-0.005* (0.002)
Medium, >5% - 20%	-0.004 (0.008)	-0.012* (0.006)	-0.007* (0.004)	-0.002 (0.002)	0.006** (0.002)	0.006*** (0.001)
High, >20%	-0.011 (0.012)	-0.006 (0.005)	0.004 (0.002)	0.005*** (0.001)	0.003* (0.001)	0.001 (0.001)
Young household	-0.061*** (0.016)	-0.025** (0.009)	-0.011* (0.005)	-0.001 (0.003)	-0.003 (0.003)	0.001 (0.003)
Single-mother household	0.032** (0.011)	0.022*** (0.006)	-0.004 (0.004)	-0.005 (0.003)	0.012*** (0.002)	0.016*** (0.002)
Couple without children	0.006 (0.007)	-0.002 (0.004)	-0.004 (0.002)	-0.005* (0.002)	-0.006*** (0.002)	-0.009*** (0.002)
Large household (3+ children)	0.022* (0.010)	0.021*** (0.006)	0.015*** (0.003)	0.014*** (0.002)	0.019*** (0.002)	0.012*** (0.001)
Household with self-employed member	0.106*** (0.010)	0.059*** (0.006)	0.030*** (0.004)	0.024*** (0.004)	0.022*** (0.003)	0.016*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.021* (0.010)	0.015* (0.007)	0.007 (0.004)	0.005* (0.003)	0.006** (0.002)	0.002 (0.002)
Household with Black (non-Hispanic) members	0.006 (0.009)	0.009 (0.006)	0.010* (0.005)	0.011** (0.004)	0.007** (0.003)	-0.001 (0.002)
Household with members from other ethnicity	0.000 (0.003)	0.002 (0.002)	-0.001 (0.001)	0.000 (0.001)	0.002 (0.001)	0.002 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.031 (0.019)	0.010 (0.009)	0.010 (0.007)	0.015 (0.010)	0.013 (0.007)	0.007 (0.005)
Southern	0.028 (0.017)	0.014 (0.009)	0.023* (0.009)	0.029** (0.011)	0.023* (0.009)	0.014* (0.007)
Pacific and Mountain states	0.014 (0.012)	0.008 (0.007)	0.010 (0.007)	0.017 (0.009)	0.012 (0.007)	0.012 (0.009)
Constant	0.041 (0.053)	0.148*** (0.036)	0.108*** (0.026)	0.027 (0.019)	-0.065** (0.023)	-0.202*** (0.026)

Observations	116963	116963	116963	116963	116963	116963
Standard errors in parentheses						
Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income tax liability						
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$						
IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.						

Table 17: Market income sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.050*** (0.031)	9.356*** (0.021)	9.696*** (0.015)	9.898*** (0.014)	10.171*** (0.016)	10.702*** (0.017)
1989	9.025*** (0.031)	9.253*** (0.024)	9.556*** (0.022)	9.742*** (0.020)	10.038*** (0.020)	10.550*** (0.019)
Difference	0.025 (0.024)	0.103*** (0.014)	0.140*** (0.015)	0.157*** (0.015)	0.133*** (0.014)	0.152*** (0.011)
Composition	0.191*** (0.056)	0.264*** (0.034)	0.336*** (0.026)	0.324*** (0.020)	0.351*** (0.018)	0.298*** (0.014)
Income Structure	-0.166** (0.057)	-0.161*** (0.034)	-0.196*** (0.025)	-0.167*** (0.020)	-0.218*** (0.014)	-0.147*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.001 (0.002)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Household: inactive / jobless	0.008 (0.006)	0.004 (0.003)	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.152*** (0.044)	0.190*** (0.026)	0.178*** (0.014)	0.157*** (0.010)	0.134*** (0.010)	0.056*** (0.005)
Single, medium education	-0.036** (0.013)	-0.033*** (0.007)	-0.036*** (0.005)	-0.037*** (0.004)	-0.033*** (0.004)	-0.014*** (0.002)
Single, high education	-0.011 (0.014)	-0.021* (0.009)	-0.019*** (0.004)	-0.014*** (0.003)	0.003 (0.003)	0.035*** (0.003)
Couple, low/low education	0.088** (0.030)	0.099*** (0.022)	0.167*** (0.014)	0.153*** (0.011)	0.142*** (0.010)	0.078*** (0.007)
Couple, medium/low education	0.014 (0.009)	0.020*** (0.006)	0.027*** (0.004)	0.029*** (0.003)	0.035*** (0.003)	0.025*** (0.002)
Couple, high/medium education	0.000 (0.003)	0.003 (0.002)	0.004** (0.001)	0.007*** (0.001)	0.015*** (0.001)	0.026*** (0.001)
Couple, high/high education	0.000 (0.005)	0.003 (0.004)	0.012*** (0.003)	0.022*** (0.002)	0.043*** (0.002)	0.083*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.004)	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)
Jobless household	-0.044*** (0.010)	-0.021*** (0.005)	-0.009*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
Double-earner household	0.002* (0.001)	0.001 (0.001)	0.001* (0.000)	0.002*** (0.001)	0.005*** (0.001)	0.009*** (0.001)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Both in part-time	0.002 (0.001)	0.001* (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)

Low, >0% - 5%	0.023*** (0.006)	0.008 (0.006)	0.004 (0.005)	0.000 (0.004)	-0.009*** (0.002)	-0.009*** (0.002)
Medium, >5% - 20%	-0.001 (0.008)	-0.009 (0.007)	0.000 (0.004)	0.004 (0.003)	0.007** (0.002)	0.004*** (0.001)
High, >20%	-0.009 (0.012)	-0.005 (0.005)	0.007** (0.002)	0.007*** (0.002)	0.004** (0.001)	0.001 (0.001)
Young household	-0.059*** (0.016)	-0.022** (0.008)	-0.003 (0.005)	0.006* (0.003)	-0.001 (0.003)	-0.001 (0.003)
Single-mother household	0.025* (0.011)	0.018** (0.006)	0.010** (0.003)	0.004 (0.002)	0.003 (0.002)	0.002 (0.001)
Couple without children	0.009 (0.007)	-0.000 (0.004)	-0.004* (0.002)	-0.005** (0.002)	-0.003 (0.002)	-0.006** (0.002)
Large household (3+ children)	0.008 (0.010)	0.009 (0.006)	0.011*** (0.003)	0.008** (0.003)	0.004* (0.002)	0.001 (0.001)
Household with self-employed member	0.099*** (0.009)	0.053*** (0.006)	0.029*** (0.004)	0.021*** (0.003)	0.015*** (0.003)	0.011*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.019 (0.010)	0.014 (0.008)	0.009 (0.006)	0.007 (0.004)	0.004 (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	0.005 (0.009)	0.008 (0.006)	0.011* (0.005)	0.012** (0.004)	0.006* (0.003)	-0.003 (0.002)
Household with members from other ethnicity	-0.001 (0.003)	0.001 (0.002)	-0.001 (0.001)	0.000 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.027 (0.016)	0.006 (0.006)	0.007 (0.006)	0.012 (0.008)	0.008 (0.005)	0.005 (0.005)
Southern	0.035* (0.017)	0.021* (0.010)	0.035** (0.012)	0.039** (0.014)	0.028** (0.011)	0.013* (0.006)
Pacific and Mountain states	0.016 (0.012)	0.009 (0.008)	0.013 (0.009)	0.019 (0.010)	0.013 (0.008)	0.012 (0.009)
Constant	-0.082 (0.052)	0.036 (0.036)	-0.019 (0.028)	-0.095*** (0.023)	-0.171*** (0.024)	-0.242*** (0.025)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 18: Market income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.050*** (0.032)	9.356*** (0.022)	9.696*** (0.015)	9.898*** (0.014)	10.171*** (0.016)	10.702*** (0.017)
1989	9.025*** (0.031)	9.253*** (0.024)	9.556*** (0.022)	9.742*** (0.021)	10.038*** (0.020)	10.550*** (0.019)
Difference	0.025 (0.023)	0.103*** (0.014)	0.140*** (0.015)	0.157*** (0.015)	0.133*** (0.014)	0.152*** (0.012)
Composition	0.204*** (0.058)	0.288*** (0.035)	0.359*** (0.026)	0.343*** (0.020)	0.365*** (0.018)	0.304*** (0.013)
Income Structure	-0.180** (0.059)	-0.185*** (0.035)	-0.219*** (0.026)	-0.186*** (0.021)	-0.232*** (0.015)	-0.153*** (0.012)
explained						

MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.001)	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Household: inactive / jobless	0.009 (0.006)	0.005 (0.003)	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.174*** (0.044)	0.216*** (0.026)	0.196*** (0.015)	0.172*** (0.010)	0.144*** (0.010)	0.060*** (0.005)
Single, medium education	-0.040** (0.013)	-0.037*** (0.008)	-0.039*** (0.005)	-0.040*** (0.004)	-0.035*** (0.004)	-0.015*** (0.002)
Single, high education	-0.015 (0.015)	-0.024** (0.009)	-0.020*** (0.004)	-0.015*** (0.003)	0.003 (0.003)	0.035*** (0.003)
Couple, low/low education	0.092** (0.031)	0.106*** (0.022)	0.173*** (0.015)	0.159*** (0.011)	0.146*** (0.010)	0.080*** (0.007)
Couple, medium/low education	0.017 (0.009)	0.024*** (0.006)	0.030*** (0.004)	0.032*** (0.003)	0.037*** (0.003)	0.026*** (0.002)
Couple, high/medium education	0.000 (0.003)	0.004* (0.002)	0.005*** (0.002)	0.008*** (0.001)	0.016*** (0.001)	0.026*** (0.002)
Couple, high/high education	0.000 (0.005)	0.006 (0.004)	0.016*** (0.003)	0.025*** (0.002)	0.046*** (0.002)	0.085*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.004)	-0.001 (0.002)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)
Jobless household	-0.048*** (0.010)	-0.025*** (0.005)	-0.011*** (0.002)	-0.007*** (0.002)	-0.005*** (0.001)	-0.003*** (0.001)
Double-earner household	0.002* (0.001)	0.002* (0.001)	0.002*** (0.000)	0.003*** (0.001)	0.006*** (0.001)	0.010*** (0.001)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Both in part-time	0.002* (0.001)	0.002** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.017*** (0.004)	0.011*** (0.003)	0.007*** (0.002)	0.006*** (0.001)	0.005*** (0.001)	0.002*** (0.001)
Single working fulltime	0.004 (0.003)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.002 (0.001)
Single working part-time	0.003 (0.002)	0.003 (0.001)	0.002* (0.001)	0.001* (0.001)	0.001 (0.001)	0.001* (0.000)
Young household	0.025*** (0.004)	0.015*** (0.002)	0.010*** (0.001)	0.009*** (0.001)	0.012*** (0.001)	0.012*** (0.001)
Single-mother household	0.003 (0.002)	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.004*** (0.001)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Household with self-employed member	-0.016*** (0.003)	-0.008*** (0.002)	-0.004*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.004 (0.004)	-0.006* (0.003)	-0.012*** (0.003)	-0.013*** (0.002)	-0.016*** (0.003)	-0.015*** (0.002)
Household with Black (non-Hispanic) members	-0.009*** (0.003)	-0.008*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.006 (0.004)	-0.004* (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	-0.000 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.006* (0.002)	-0.003* (0.001)	-0.002* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.028* (0.011)	0.015 (0.007)	0.002 (0.005)	0.002 (0.004)	-0.004 (0.002)	-0.009*** (0.002)
Household: inactive / jobless	-0.334*** (0.028)	-0.168*** (0.015)	-0.081*** (0.011)	-0.042*** (0.007)	-0.026*** (0.007)	-0.023*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.075 (0.054)	-0.121*** (0.034)	-0.092*** (0.019)	-0.056*** (0.012)	-0.024* (0.011)	0.039*** (0.007)
Single, medium education	-0.014 (0.022)	-0.013 (0.014)	-0.016* (0.008)	-0.015*** (0.005)	-0.015*** (0.005)	0.000 (0.005)
Single, high education	0.006 (0.006)	0.002 (0.004)	0.002 (0.002)	0.003 (0.001)	0.005*** (0.002)	0.009*** (0.002)
Couple, low/low education	-0.052 (0.033)	-0.071** (0.023)	-0.126*** (0.014)	-0.097*** (0.010)	-0.065*** (0.009)	0.024** (0.008)

Couple, medium/low education	-0.015 (0.013)	-0.031*** (0.009)	-0.037*** (0.006)	-0.037*** (0.004)	-0.039*** (0.004)	-0.011*** (0.003)
Couple, high/medium education	0.001 (0.003)	0.005* (0.002)	0.004* (0.002)	0.004*** (0.001)	0.007*** (0.001)	0.011*** (0.001)
Couple, high/high education	0.001 (0.001)	0.002* (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.194*** (0.023)	0.088*** (0.015)	0.056*** (0.009)	0.049*** (0.008)	0.053*** (0.007)	0.035*** (0.007)
Jobless household	-0.091*** (0.013)	-0.038*** (0.008)	-0.008* (0.004)	-0.003 (0.002)	-0.001 (0.002)	-0.003*** (0.001)
Double-earner household	0.011* (0.004)	0.006 (0.004)	-0.001 (0.003)	-0.003 (0.003)	-0.004 (0.004)	0.001 (0.003)
Trad. breadwinner	0.030*** (0.006)	0.007 (0.005)	-0.007 (0.004)	-0.015*** (0.004)	-0.020*** (0.003)	-0.013*** (0.004)
Both in part-time	0.002 (0.003)	0.004* (0.002)	0.003 (0.001)	0.003* (0.001)	0.003* (0.001)	0.002* (0.001)
Precarious	-0.019* (0.008)	-0.011* (0.005)	-0.001 (0.003)	0.000 (0.002)	-0.000 (0.002)	-0.001 (0.001)
Single working fulltime	0.026 (0.027)	0.012 (0.022)	-0.006 (0.014)	-0.004 (0.009)	-0.002 (0.007)	-0.002 (0.006)
Single working part-time	0.011 (0.012)	-0.007 (0.009)	-0.003 (0.005)	0.001 (0.003)	0.003 (0.003)	0.002 (0.002)
Young household	-0.058*** (0.017)	-0.023* (0.009)	-0.001 (0.005)	0.007* (0.003)	-0.001 (0.003)	-0.001 (0.003)
Single-mother household	0.039** (0.013)	0.028*** (0.007)	0.018*** (0.003)	0.010*** (0.002)	0.006*** (0.002)	0.002 (0.001)
Couple without children	0.009 (0.007)	-0.000 (0.004)	-0.004 (0.002)	-0.004* (0.002)	-0.003 (0.002)	-0.006** (0.002)
Large household (3+ children)	0.013 (0.011)	0.013* (0.006)	0.015*** (0.003)	0.010*** (0.003)	0.006** (0.002)	0.001 (0.001)
Household with self-employed member	0.103*** (0.009)	0.056*** (0.006)	0.029*** (0.004)	0.021*** (0.003)	0.015*** (0.003)	0.011*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.021* (0.010)	0.015 (0.008)	0.011 (0.006)	0.008 (0.004)	0.005 (0.003)	-0.000 (0.002)
Household with Black (non-Hispanic) members	0.010 (0.009)	0.012* (0.006)	0.015** (0.005)	0.015*** (0.004)	0.008** (0.003)	-0.002 (0.002)
Household with members from other ethnicity	0.001 (0.003)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.031* (0.016)	0.011 (0.007)	0.011 (0.007)	0.015 (0.008)	0.010 (0.005)	0.005 (0.005)
Southern	0.036* (0.018)	0.024* (0.011)	0.036** (0.013)	0.040** (0.014)	0.029** (0.011)	0.013* (0.007)
Pacific and Mountain states	0.018 (0.013)	0.012 (0.008)	0.014 (0.009)	0.019 (0.011)	0.013 (0.008)	0.012 (0.009)
Constant	-0.114* (0.049)	-0.016 (0.037)	-0.055* (0.027)	-0.123*** (0.021)	-0.198*** (0.023)	-0.257*** (0.024)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2.3. Labor income sample, using different model specifications

Table 19: Labor income sample, models incl. transfers and tax refunds, excl. tax liabilities: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.324*** (0.027)	9.548*** (0.021)	9.823*** (0.019)	9.999*** (0.020)	10.271*** (0.022)	10.775*** (0.020)
1989	9.119*** (0.036)	9.338*** (0.028)	9.655*** (0.028)	9.864*** (0.028)	10.156*** (0.025)	10.628*** (0.021)
Difference	0.205*** (0.021)	0.210*** (0.019)	0.167*** (0.019)	0.135*** (0.018)	0.114*** (0.016)	0.147*** (0.012)
Composition	0.045 (0.048)	0.095** (0.031)	0.109*** (0.021)	0.115*** (0.021)	0.110*** (0.020)	0.177*** (0.013)
Income Structure	0.160** (0.052)	0.115** (0.036)	0.059** (0.023)	0.020 (0.022)	0.004 (0.018)	-0.031* (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.000 (0.001)	0.002 (0.002)	0.003 (0.003)	0.002 (0.003)	0.003 (0.003)	0.003 (0.003)
Household: inactive / jobless	0.002* (0.001)	0.002* (0.001)	0.001** (0.001)	0.001** (0.000)	0.001* (0.000)	0.000 (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.215*** (0.032)	0.160*** (0.019)	0.126*** (0.016)	0.115*** (0.011)	0.091*** (0.009)	0.034*** (0.006)
Single, medium education	-0.048*** (0.010)	-0.037*** (0.007)	-0.027*** (0.005)	-0.023*** (0.004)	-0.022*** (0.004)	-0.009*** (0.002)
Single, high education	-0.061*** (0.013)	-0.045*** (0.007)	-0.026*** (0.006)	-0.015*** (0.004)	-0.002 (0.005)	0.030*** (0.004)
Couple, low/low education	0.055* (0.024)	0.109*** (0.015)	0.114*** (0.010)	0.105*** (0.010)	0.080*** (0.009)	0.042*** (0.005)
Couple, medium/low education	0.012 (0.008)	0.021*** (0.005)	0.023*** (0.003)	0.023*** (0.003)	0.024*** (0.002)	0.018*** (0.003)
Couple, high/medium education	-0.002 (0.002)	-0.002 (0.001)	0.002 (0.001)	0.005*** (0.001)	0.013*** (0.001)	0.021*** (0.001)
Couple, high/high education	-0.011** (0.004)	-0.008* (0.003)	0.004 (0.003)	0.014*** (0.002)	0.037*** (0.002)	0.080*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Jobless household	-0.004* (0.002)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.000)
Double-earner household	-0.002* (0.001)	-0.002* (0.001)	0.000 (0.001)	0.002** (0.001)	0.006*** (0.001)	0.010*** (0.001)
Trad. breadwinner	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Both in part-time	0.001 (0.001)	0.002** (0.001)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001* (0.000)
Precarious	0.013*** (0.004)	0.009*** (0.002)	0.006*** (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.001*** (0.000)
Single working fulltime	0.005 (0.003)	0.003 (0.002)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)	0.000 (0.000)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	-0.145*** (0.013)	-0.120*** (0.009)	-0.114*** (0.008)	-0.117*** (0.008)	-0.121*** (0.008)	-0.050*** (0.003)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007*** (0.002)	-0.004** (0.001)	-0.002* (0.001)	0.000 (0.001)	0.002** (0.001)	0.002*** (0.001)
Medium, >5% - 20%	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
High, >20%	0.022*** (0.004)	0.015*** (0.002)	0.007*** (0.001)	0.004*** (0.001)	0.001* (0.001)	-0.000 (0.000)

Young household	0.010** (0.003)	0.005* (0.002)	0.005*** (0.001)	0.007*** (0.002)	0.010*** (0.001)	0.013*** (0.001)
Single-mother household	-0.008*** (0.002)	-0.006*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.002*** (0.000)	0.001* (0.000)
Couple without children	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	-0.001 (0.001)	-0.000 (0.000)	0.001* (0.000)	0.001** (0.000)	0.001** (0.000)	0.002** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.001 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.004 (0.004)	-0.001 (0.003)	-0.007*** (0.002)	-0.007*** (0.002)	-0.010*** (0.002)	-0.012*** (0.002)
Household with Black (non-Hispanic) members	-0.004* (0.002)	-0.004** (0.001)	-0.004** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.000 (0.002)	-0.001 (0.001)	-0.004** (0.001)	-0.003* (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.003* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.029** (0.010)	0.001 (0.006)	-0.003 (0.005)	0.005 (0.003)	-0.000 (0.003)	-0.005* (0.003)
Household: inactive / jobless	-0.003 (0.006)	-0.001 (0.004)	-0.000 (0.003)	-0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.036 (0.045)	-0.031 (0.028)	-0.011 (0.019)	-0.013 (0.015)	-0.011 (0.012)	0.027*** (0.007)
Single, medium education	0.011 (0.026)	0.001 (0.015)	0.016 (0.010)	0.008 (0.008)	-0.015* (0.006)	-0.007 (0.004)
Single, high education	0.006 (0.007)	0.003 (0.004)	0.006* (0.003)	0.006* (0.003)	0.003 (0.002)	0.006*** (0.002)
Couple, low/low education	-0.041 (0.026)	-0.092*** (0.016)	-0.083*** (0.009)	-0.055*** (0.011)	-0.007 (0.011)	0.052*** (0.007)
Couple, medium/low education	-0.015 (0.011)	-0.030*** (0.007)	-0.029*** (0.004)	-0.025*** (0.004)	-0.016*** (0.003)	0.002 (0.003)
Couple, high/medium education	-0.001 (0.003)	-0.001 (0.002)	0.000 (0.002)	0.001 (0.001)	0.004** (0.001)	0.008*** (0.002)
Couple, high/high education	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.000)	0.001** (0.000)	0.003*** (0.001)	0.007*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.005 (0.007)	0.014*** (0.004)	0.015*** (0.003)	0.022*** (0.003)	0.027*** (0.003)	0.012*** (0.002)
Jobless household	-0.013* (0.006)	-0.009* (0.004)	-0.006* (0.003)	-0.004 (0.002)	-0.002 (0.002)	-0.003** (0.001)
Double-earner household	-0.009 (0.005)	-0.007 (0.004)	-0.006 (0.004)	-0.017*** (0.005)	-0.013** (0.005)	-0.001 (0.005)
Trad. breadwinner	0.006 (0.009)	-0.011 (0.006)	-0.014*** (0.004)	-0.020*** (0.004)	-0.010* (0.004)	-0.007 (0.004)
Both in part-time	0.001 (0.003)	0.002 (0.002)	0.000 (0.001)	0.002 (0.001)	0.003** (0.001)	0.002** (0.001)
Precarious	-0.014 (0.008)	-0.012** (0.004)	-0.013*** (0.002)	-0.007*** (0.002)	0.000 (0.002)	0.000 (0.001)
Single working fulltime	-0.064 (0.039)	-0.044 (0.026)	-0.055*** (0.016)	-0.047** (0.016)	-0.004 (0.010)	-0.000 (0.009)
Single working part-time	-0.022 (0.015)	-0.016 (0.008)	-0.015* (0.006)	-0.007 (0.005)	0.005 (0.004)	0.005* (0.002)
PAYABLE INCOME TAX (Ref.: Moderate, >10 - 15 percent)						
Tax refunds	0.040*** (0.010)	0.064*** (0.008)	0.106*** (0.008)	0.068*** (0.006)	-0.014*** (0.003)	-0.027*** (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.010 (0.006)	0.012* (0.006)	0.010* (0.004)	0.002 (0.004)	-0.004 (0.003)	-0.003 (0.002)
Medium, >5% - 20%	-0.025*** (0.006)	-0.008 (0.006)	-0.004 (0.003)	0.007* (0.003)	0.009*** (0.002)	0.007*** (0.001)
High, >20%	0.003 (0.006)	0.005 (0.003)	0.006*** (0.002)	0.004*** (0.001)	0.003 (0.001)	0.002* (0.001)
Young household	-0.036** (0.013)	-0.016* (0.008)	-0.002 (0.005)	0.000 (0.005)	0.000 (0.003)	0.001 (0.003)
Single-mother household	0.030*** (0.008)	0.006 (0.005)	-0.015*** (0.004)	0.002 (0.002)	0.021*** (0.002)	0.019*** (0.002)

Couple without children	0.001 (0.007)	-0.003 (0.004)	-0.005* (0.003)	-0.006* (0.003)	-0.010*** (0.002)	-0.012*** (0.002)
Large household (3+ children)	0.036** (0.011)	0.025*** (0.006)	0.021*** (0.003)	0.025*** (0.003)	0.028*** (0.002)	0.014*** (0.002)
Household with self-employed member	0.014 (0.007)	0.014** (0.005)	0.013*** (0.003)	0.015*** (0.003)	0.015*** (0.003)	0.008* (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.023 (0.014)	0.014 (0.008)	0.007 (0.005)	0.008* (0.004)	0.009** (0.003)	0.001 (0.002)
Household with Black (non-Hispanic) members	0.017* (0.007)	0.011 (0.006)	0.014** (0.005)	0.014*** (0.004)	0.008* (0.003)	-0.002 (0.002)
Household with members from other ethnicity	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)	0.002 (0.002)	0.004** (0.001)	0.002 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.021* (0.010)	0.016* (0.008)	0.017* (0.007)	0.019* (0.008)	0.013* (0.007)	0.004 (0.005)
Southern	0.031* (0.013)	0.030* (0.012)	0.040** (0.012)	0.045** (0.014)	0.040** (0.013)	0.017* (0.008)
Pacific and Mountain states	0.013 (0.012)	0.022 (0.012)	0.027* (0.013)	0.028* (0.014)	0.024 (0.012)	0.014 (0.010)
Constant	0.143** (0.055)	0.155*** (0.035)	0.020 (0.019)	-0.064** (0.021)	-0.107*** (0.025)	-0.172*** (0.025)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt, income tax liability

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 20: Labor income sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.324*** (0.026)	9.548*** (0.019)	9.823*** (0.017)	9.999*** (0.018)	10.271*** (0.020)	10.775*** (0.020)
1989	9.119*** (0.037)	9.338*** (0.028)	9.655*** (0.027)	9.864*** (0.027)	10.156*** (0.025)	10.628*** (0.021)
Difference	0.205*** (0.022)	0.210*** (0.020)	0.167*** (0.020)	0.135*** (0.019)	0.114*** (0.015)	0.147*** (0.012)
Composition	0.357*** (0.040)	0.353*** (0.030)	0.354*** (0.022)	0.367*** (0.021)	0.371*** (0.019)	0.286*** (0.013)
Income Structure	-0.152** (0.047)	-0.143*** (0.039)	-0.187*** (0.025)	-0.232*** (0.025)	-0.257*** (0.017)	-0.139*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.002)	0.003 (0.003)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.003 (0.003)
Household: inactive / jobless	0.003** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.001)	0.001** (0.000)	0.000* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.222*** (0.034)	0.166*** (0.020)	0.131*** (0.017)	0.121*** (0.012)	0.097*** (0.009)	0.036*** (0.006)

Single, medium education	-0.045*** (0.011)	-0.035*** (0.007)	-0.025*** (0.005)	-0.021*** (0.004)	-0.019*** (0.004)	-0.008*** (0.002)
Single, high education	-0.044** (0.014)	-0.031*** (0.008)	-0.012 (0.006)	-0.001 (0.005)	0.012* (0.005)	0.036*** (0.004)
Couple, low/low education	0.128*** (0.024)	0.169*** (0.018)	0.171*** (0.012)	0.164*** (0.013)	0.141*** (0.011)	0.067*** (0.006)
Couple, medium/low education	0.030*** (0.009)	0.037*** (0.006)	0.038*** (0.004)	0.038*** (0.004)	0.039*** (0.003)	0.025*** (0.003)
Couple, high/medium education	0.005* (0.002)	0.004* (0.002)	0.007*** (0.001)	0.011*** (0.001)	0.019*** (0.002)	0.024*** (0.002)
Couple, high/high education	0.014*** (0.004)	0.012*** (0.003)	0.024*** (0.003)	0.034*** (0.003)	0.058*** (0.003)	0.089*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Jobless household	-0.003 (0.002)	-0.002 (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.000)
Double-earner household	-0.000 (0.001)	0.000 (0.001)	0.002*** (0.001)	0.004*** (0.001)	0.008*** (0.001)	0.011*** (0.001)
Trad. breadwinner	0.000 (0.001)	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.002* (0.001)	0.002*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001** (0.000)
Precarious	0.015*** (0.004)	0.011*** (0.003)	0.008*** (0.002)	0.006*** (0.002)	0.004*** (0.001)	0.002*** (0.001)
Single working fulltime	0.005 (0.004)	0.004 (0.002)	0.002 (0.002)	0.002 (0.001)	0.002 (0.002)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.003 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.004** (0.001)	-0.002 (0.001)	0.001 (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Medium, >5% - 20%	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
High, >20%	0.025*** (0.004)	0.017*** (0.003)	0.009*** (0.001)	0.006*** (0.001)	0.004*** (0.001)	0.001* (0.000)
Young household	0.015*** (0.003)	0.009*** (0.002)	0.009*** (0.001)	0.011*** (0.002)	0.015*** (0.001)	0.014*** (0.001)
Single-mother household	0.003** (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.004*** (0.001)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004** (0.001)	0.004** (0.001)	0.005** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.000 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.007 (0.004)	-0.011** (0.004)	-0.016*** (0.003)	-0.017*** (0.003)	-0.020*** (0.003)	-0.016*** (0.002)
Household with Black (non-Hispanic) members	-0.006** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.004* (0.002)	-0.005** (0.002)	-0.007*** (0.002)	-0.006*** (0.001)	-0.007*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.003 (0.001)
Southern	-0.008* (0.003)	-0.005* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)	-0.005* (0.002)
Pacific and Mountain states	-0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.023* (0.010)	-0.000 (0.007)	0.001 (0.005)	0.005 (0.004)	-0.010** (0.003)	-0.012*** (0.003)
Household: inactive / jobless	-0.008 (0.006)	-0.005 (0.005)	-0.004 (0.003)	-0.005 (0.003)	-0.006* (0.002)	-0.004* (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.064 (0.046)	-0.057* (0.028)	-0.041* (0.020)	-0.040* (0.017)	-0.029* (0.012)	0.022** (0.007)
Single, medium education	-0.009 (0.026)	-0.021 (0.015)	-0.012 (0.011)	-0.014 (0.009)	-0.025*** (0.006)	-0.007 (0.004)
Single, high education	0.006 (0.007)	0.001 (0.004)	0.003 (0.003)	0.004 (0.003)	0.004 (0.002)	0.008*** (0.002)
Couple, low/low education	-0.094*** (0.024)	-0.131*** (0.018)	-0.113*** (0.011)	-0.092*** (0.013)	-0.060*** (0.011)	0.027*** (0.006)
Couple, medium/low education	-0.037** (0.012)	-0.047*** (0.008)	-0.045*** (0.006)	-0.042*** (0.005)	-0.035*** (0.004)	-0.007 (0.003)

Couple, high/medium education	0.005 (0.003)	0.004 (0.002)	0.005** (0.002)	0.006*** (0.002)	0.010*** (0.002)	0.011*** (0.002)
Couple, high/high education	0.003** (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.006*** (0.001)	0.009*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.003 (0.006)	0.010** (0.004)	0.014*** (0.003)	0.019*** (0.003)	0.018*** (0.003)	0.007** (0.002)
Jobless household	-0.011 (0.007)	-0.007 (0.004)	-0.005 (0.004)	-0.002 (0.003)	-0.000 (0.002)	-0.002 (0.001)
Double-earner household	-0.001 (0.006)	-0.001 (0.004)	-0.001 (0.005)	-0.012* (0.005)	-0.005 (0.006)	0.003 (0.004)
Trad. breadwinner	-0.004 (0.008)	-0.016* (0.007)	-0.015** (0.005)	-0.024*** (0.005)	-0.022*** (0.005)	-0.014** (0.004)
Both in part-time	0.002 (0.003)	0.004 (0.002)	0.003 (0.001)	0.004** (0.001)	0.003* (0.001)	0.002* (0.001)
Precarious	-0.012 (0.009)	-0.007 (0.005)	-0.003 (0.003)	-0.002 (0.003)	-0.002 (0.002)	-0.003 (0.001)
Single working fulltime	-0.025 (0.041)	-0.007 (0.027)	-0.013 (0.018)	-0.010 (0.018)	0.022 (0.012)	0.008 (0.008)
Single working part-time	-0.013 (0.015)	-0.005 (0.008)	-0.001 (0.006)	0.004 (0.005)	0.008* (0.004)	0.004 (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.002 (0.005)	0.006 (0.006)	0.006 (0.005)	-0.003 (0.004)	-0.013*** (0.004)	-0.008*** (0.002)
Medium, >5% - 20%	-0.021*** (0.006)	-0.001 (0.006)	0.008 (0.005)	0.014*** (0.003)	0.006** (0.002)	0.003** (0.001)
High, >20%	0.005 (0.006)	0.009* (0.004)	0.012*** (0.002)	0.008*** (0.002)	0.002 (0.002)	0.001 (0.001)
Young household	-0.031* (0.013)	-0.008 (0.009)	0.012* (0.005)	0.009 (0.005)	-0.001 (0.003)	-0.002 (0.003)
Single-mother household	0.023* (0.009)	0.012* (0.005)	0.008* (0.003)	0.010*** (0.003)	-0.003 (0.002)	0.001 (0.001)
Couple without children	0.005 (0.007)	-0.001 (0.004)	-0.006** (0.002)	-0.005* (0.003)	-0.004* (0.002)	-0.009*** (0.002)
Large household (3+ children)	0.016 (0.010)	0.013** (0.005)	0.016*** (0.004)	0.014*** (0.003)	0.005* (0.002)	0.002 (0.001)
Household with self-employed member	0.017* (0.008)	0.017** (0.006)	0.017*** (0.004)	0.019*** (0.004)	0.017*** (0.004)	0.008* (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.022 (0.015)	0.015 (0.010)	0.011 (0.007)	0.010 (0.006)	0.006 (0.003)	-0.002 (0.002)
Household with Black (non-Hispanic) members	0.016* (0.007)	0.011 (0.006)	0.017*** (0.005)	0.015*** (0.004)	0.006 (0.003)	-0.003 (0.002)
Household with members from other ethnicity	0.001 (0.002)	0.002 (0.002)	0.001 (0.001)	0.002 (0.002)	0.002* (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.021 (0.011)	0.017 (0.009)	0.018* (0.008)	0.020* (0.009)	0.013* (0.006)	0.004 (0.005)
Southern	0.040* (0.017)	0.042* (0.017)	0.058** (0.018)	0.058** (0.019)	0.041** (0.014)	0.015* (0.007)
Pacific and Mountain states	0.015 (0.014)	0.025 (0.014)	0.031* (0.016)	0.031 (0.017)	0.024 (0.013)	0.013 (0.010)
Constant	-0.044 (0.058)	-0.018 (0.043)	-0.171*** (0.026)	-0.236*** (0.033)	-0.236*** (0.033)	-0.213*** (0.025)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 21: Labor income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.324*** (0.026)	9.548*** (0.020)	9.823*** (0.017)	9.999*** (0.018)	10.271*** (0.020)	10.775*** (0.020)
1989	9.119*** (0.038)	9.338*** (0.029)	9.655*** (0.028)	9.864*** (0.028)	10.156*** (0.026)	10.628*** (0.021)
Difference	0.205*** (0.022)	0.210*** (0.021)	0.167*** (0.020)	0.135*** (0.019)	0.114*** (0.016)	0.147*** (0.012)
Composition	0.374*** (0.041)	0.369*** (0.032)	0.369*** (0.022)	0.379*** (0.021)	0.380*** (0.019)	0.289*** (0.013)
Income Structure	-0.169*** (0.049)	-0.159*** (0.042)	-0.202*** (0.027)	-0.244*** (0.026)	-0.266*** (0.018)	-0.142*** (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.003)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.005)	0.003 (0.003)
Household: inactive / jobless	0.003** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.001)	0.001** (0.000)	0.000* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.248*** (0.035)	0.185*** (0.021)	0.143*** (0.018)	0.129*** (0.012)	0.103*** (0.009)	0.038*** (0.006)
Single, medium education	-0.051*** (0.011)	-0.039*** (0.008)	-0.027*** (0.006)	-0.023*** (0.004)	-0.020*** (0.004)	-0.008*** (0.002)
Single, high education	-0.052*** (0.014)	-0.036*** (0.008)	-0.015* (0.007)	-0.003 (0.005)	0.012* (0.005)	0.036*** (0.004)
Couple, low/low education	0.138*** (0.024)	0.177*** (0.019)	0.177*** (0.013)	0.169*** (0.013)	0.146*** (0.011)	0.069*** (0.005)
Couple, medium/low education	0.034*** (0.009)	0.040*** (0.006)	0.040*** (0.005)	0.040*** (0.004)	0.041*** (0.003)	0.025*** (0.003)
Couple, high/medium education	0.006* (0.002)	0.005** (0.002)	0.008*** (0.001)	0.012*** (0.001)	0.020*** (0.002)	0.024*** (0.002)
Couple, high/high education	0.017*** (0.004)	0.015*** (0.004)	0.026*** (0.003)	0.037*** (0.003)	0.061*** (0.003)	0.091*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Jobless household	-0.004* (0.002)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.000)
Double-earner household	0.001 (0.001)	0.001 (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.009*** (0.001)	0.011*** (0.001)
Trad. breadwinner	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.002** (0.001)	0.003*** (0.001)	0.003*** (0.000)	0.003*** (0.001)	0.002*** (0.001)	0.001*** (0.000)
Precarious	0.017*** (0.005)	0.012*** (0.003)	0.009*** (0.002)	0.007*** (0.002)	0.005*** (0.001)	0.002*** (0.001)
Single working fulltime	0.007 (0.004)	0.004 (0.003)	0.003 (0.002)	0.002 (0.002)	0.003 (0.002)	0.002 (0.001)
Single working part-time	0.004 (0.002)	0.003 (0.002)	0.003 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)
Young household	0.020*** (0.004)	0.013*** (0.002)	0.012*** (0.002)	0.013*** (0.002)	0.016*** (0.002)	0.015*** (0.001)
Single-mother household	0.004*** (0.001)	0.004*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.007*** (0.001)	0.005*** (0.001)
Couple without children	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.004** (0.002)	0.004** (0.001)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.004*** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.001 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.006 (0.004)	-0.011** (0.004)	-0.016*** (0.003)	-0.017*** (0.003)	-0.020*** (0.003)	-0.016*** (0.002)
Household with Black (non-Hispanic) members	-0.007** (0.002)	-0.007*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.005* (0.002)	-0.005*** (0.002)	-0.008*** (0.002)	-0.007*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)

REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)
Southern	-0.007* (0.003)	-0.004* (0.002)	-0.002* (0.001)	-0.002 (0.001)	-0.003* (0.002)	-0.005* (0.002)
Pacific and Mountain states	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.026* (0.011)	0.003 (0.007)	0.004 (0.005)	0.007 (0.004)	-0.010** (0.003)	-0.012*** (0.003)
Household: inactive / jobless	-0.007 (0.007)	-0.005 (0.005)	-0.005 (0.003)	-0.005 (0.003)	-0.006* (0.002)	-0.004* (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.049 (0.052)	-0.041 (0.032)	-0.027 (0.023)	-0.029 (0.018)	-0.024* (0.012)	0.023** (0.007)
Single, medium education	0.017 (0.030)	0.002 (0.017)	0.005 (0.013)	-0.001 (0.010)	-0.018** (0.006)	-0.005 (0.004)
Single, high education	0.013 (0.008)	0.008 (0.005)	0.008* (0.003)	0.008** (0.003)	0.006** (0.002)	0.009*** (0.002)
Couple, low/low education	-0.103*** (0.025)	-0.137*** (0.019)	-0.117*** (0.011)	-0.095*** (0.013)	-0.062*** (0.010)	0.026*** (0.006)
Couple, medium/low education	-0.041*** (0.012)	-0.050*** (0.009)	-0.048*** (0.006)	-0.044*** (0.006)	-0.037*** (0.004)	-0.007* (0.003)
Couple, high/medium education	0.007* (0.003)	0.005* (0.002)	0.006** (0.002)	0.007*** (0.002)	0.011*** (0.002)	0.011*** (0.002)
Couple, high/high education	0.004*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.009*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.006)	0.009* (0.004)	0.014*** (0.003)	0.019*** (0.003)	0.019*** (0.003)	0.007*** (0.002)
Jobless household	-0.007 (0.008)	-0.003 (0.005)	-0.001 (0.004)	0.001 (0.003)	0.001 (0.002)	-0.002 (0.001)
Double-earner household	0.003 (0.006)	-0.000 (0.004)	-0.002 (0.005)	-0.012* (0.005)	-0.004 (0.006)	0.003 (0.004)
Trad. breadwinner	-0.004 (0.008)	-0.017** (0.006)	-0.016*** (0.005)	-0.026*** (0.004)	-0.023*** (0.005)	-0.014*** (0.004)
Both in part-time	0.003 (0.003)	0.005* (0.002)	0.004** (0.002)	0.006*** (0.002)	0.004** (0.001)	0.002** (0.001)
Precarious	-0.005 (0.009)	0.000 (0.005)	0.003 (0.003)	0.003 (0.003)	0.000 (0.002)	-0.002 (0.001)
Single working fulltime	-0.067 (0.049)	-0.045 (0.033)	-0.042 (0.022)	-0.029 (0.020)	0.014 (0.012)	0.006 (0.008)
Single working part-time	-0.023 (0.015)	-0.010 (0.009)	-0.002 (0.007)	0.004 (0.005)	0.008* (0.004)	0.005* (0.002)
Young household	-0.034** (0.013)	-0.008 (0.009)	0.013* (0.005)	0.010* (0.005)	-0.002 (0.003)	-0.003 (0.003)
Single-mother household	0.035*** (0.010)	0.022*** (0.006)	0.015*** (0.003)	0.015*** (0.003)	-0.001 (0.002)	0.001 (0.001)
Couple without children	0.006 (0.007)	-0.000 (0.004)	-0.005* (0.002)	-0.004 (0.003)	-0.004 (0.002)	-0.008*** (0.002)
Large household (3+ children)	0.022* (0.011)	0.018*** (0.005)	0.020*** (0.004)	0.017*** (0.004)	0.006** (0.002)	0.002 (0.001)
Household with self-employed member	0.017* (0.008)	0.016** (0.006)	0.017*** (0.004)	0.018*** (0.004)	0.016*** (0.004)	0.008* (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.025 (0.015)	0.017 (0.011)	0.013 (0.007)	0.011 (0.006)	0.006 (0.003)	-0.002 (0.002)
Household with Black (non-Hispanic) members	0.021** (0.008)	0.017** (0.006)	0.022*** (0.005)	0.019*** (0.004)	0.007* (0.003)	-0.003 (0.002)
Household with members from other ethnicity	0.003 (0.003)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003* (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.027* (0.012)	0.022* (0.010)	0.022* (0.009)	0.022* (0.010)	0.014* (0.006)	0.004 (0.005)
Southern	0.037* (0.017)	0.039* (0.017)	0.055** (0.018)	0.056** (0.018)	0.041** (0.014)	0.015* (0.007)
Pacific and Mountain states	0.014 (0.014)	0.024 (0.014)	0.030 (0.015)	0.030 (0.016)	0.023 (0.013)	0.013 (0.010)
Constant	-0.105 (0.057)	-0.057 (0.041)	-0.195*** (0.023)	-0.260*** (0.030)	-0.263*** (0.032)	-0.225*** (0.024)
Observations	99126	99126	99126	99126	99126	99126
Standard errors in parentheses						

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3. Income concept used for dependent variable: Gross household income (excl. tax refunds)

3.1. Full analysis sample, using different model specifications

Table 22: Full analysis sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.678*** (0.047)	9.072*** (0.024)	9.428*** (0.018)	9.661*** (0.017)	10.007*** (0.019)	10.616*** (0.019)
1989	8.823*** (0.030)	9.068*** (0.024)	9.356*** (0.023)	9.578*** (0.024)	9.921*** (0.023)	10.493*** (0.020)
Difference	-0.145*** (0.034)	0.003 (0.019)	0.072*** (0.016)	0.083*** (0.018)	0.086*** (0.017)	0.122*** (0.013)
Composition	0.143 (0.080)	0.227*** (0.032)	0.313*** (0.023)	0.366*** (0.025)	0.392*** (0.023)	0.309*** (0.015)
Income Structure	-0.288*** (0.083)	-0.224*** (0.032)	-0.241*** (0.019)	-0.282*** (0.021)	-0.306*** (0.019)	-0.187*** (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.002)	0.002 (0.001)	0.002 (0.002)	0.003 (0.002)	0.004 (0.003)	0.004 (0.003)
Household: inactive / jobless	-0.054*** (0.011)	-0.025*** (0.005)	-0.017*** (0.003)	-0.015*** (0.003)	-0.013*** (0.003)	-0.007*** (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.095 (0.057)	0.090*** (0.022)	0.186*** (0.013)	0.219*** (0.012)	0.197*** (0.011)	0.075*** (0.005)
Single, medium education	-0.032 (0.019)	-0.018** (0.007)	-0.037*** (0.004)	-0.053*** (0.005)	-0.059*** (0.006)	-0.026*** (0.003)
Single, high education	-0.006 (0.016)	0.001 (0.007)	-0.016*** (0.004)	-0.021*** (0.003)	-0.009*** (0.003)	0.029*** (0.003)
Couple, low/low education	0.076* (0.034)	0.125*** (0.021)	0.142*** (0.012)	0.174*** (0.013)	0.178*** (0.011)	0.095*** (0.008)
Couple, medium/low education	0.023 (0.015)	0.022*** (0.005)	0.024*** (0.004)	0.026*** (0.003)	0.034*** (0.003)	0.028*** (0.002)
Couple, high/medium education	-0.001 (0.004)	0.001 (0.002)	0.002* (0.001)	0.004*** (0.001)	0.013*** (0.001)	0.025*** (0.002)
Couple, high/high education	-0.003 (0.005)	0.001 (0.003)	0.006** (0.002)	0.013*** (0.002)	0.035*** (0.002)	0.079*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.035*** (0.006)	0.012*** (0.002)	0.005*** (0.001)	0.002* (0.001)	-0.003*** (0.001)	-0.005*** (0.001)
Jobless household	-0.032 (0.018)	-0.013 (0.007)	-0.005 (0.003)	-0.003 (0.002)	-0.002 (0.001)	-0.002 (0.001)

Double-earner household	0.002 (0.001)	0.000 (0.001)	0.000 (0.000)	0.001** (0.000)	0.003*** (0.001)	0.007*** (0.001)
Trad. breadwinner	-0.001 (0.001)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Both in part-time	0.001 (0.001)	0.001* (0.001)	0.001** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.019*** (0.004)	0.011*** (0.003)	0.006*** (0.001)	0.006*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Single working fulltime	0.001 (0.003)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
Single working part-time	0.002 (0.001)	0.003* (0.001)	0.002* (0.001)	0.001* (0.000)	0.001* (0.000)	0.001** (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007** (0.002)	-0.003** (0.001)	0.001 (0.001)	0.003** (0.001)	0.005*** (0.002)	0.003*** (0.001)
Medium, >5% - 20%	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
High, >20%	0.011* (0.005)	0.011*** (0.003)	0.016*** (0.004)	0.013*** (0.003)	0.008*** (0.002)	0.002*** (0.001)
Young household	0.039*** (0.006)	0.015*** (0.003)	0.008*** (0.001)	0.008*** (0.001)	0.010*** (0.001)	0.012*** (0.001)
Single-mother household	0.012*** (0.003)	0.013*** (0.002)	0.009*** (0.001)	0.009*** (0.001)	0.010*** (0.001)	0.007*** (0.001)
Couple without children	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.010*** (0.003)	0.008*** (0.002)	0.007*** (0.001)	0.007*** (0.001)	0.008*** (0.002)	0.006*** (0.001)
Household with self-employed member	-0.022*** (0.004)	-0.010*** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.003 (0.007)	-0.007** (0.003)	-0.012*** (0.003)	-0.015*** (0.003)	-0.016*** (0.003)	-0.015*** (0.003)
Household with Black (non-Hispanic) members	-0.013*** (0.003)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.003 (0.004)	-0.003 (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.000 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002* (0.001)
Southern	-0.007 (0.004)	-0.005* (0.002)	-0.005* (0.002)	-0.004** (0.002)	-0.004* (0.002)	-0.005* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.001 (0.001)	0.000 (0.001)	0.001 (0.000)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.007 (0.012)	0.009 (0.007)	-0.001 (0.004)	-0.001 (0.003)	-0.002 (0.003)	-0.008*** (0.002)
Household: inactive / jobless	-0.518*** (0.049)	-0.209*** (0.019)	-0.098*** (0.014)	-0.070*** (0.012)	-0.051*** (0.008)	-0.040*** (0.005)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.037 (0.069)	-0.033 (0.029)	-0.108*** (0.020)	-0.102*** (0.015)	-0.061*** (0.014)	0.041*** (0.008)
Single, medium education	-0.018 (0.025)	-0.006 (0.010)	-0.016* (0.007)	-0.021*** (0.006)	-0.026*** (0.005)	-0.005 (0.004)
Single, high education	0.002 (0.006)	0.004 (0.003)	-0.000 (0.002)	0.000 (0.002)	0.002 (0.002)	0.008*** (0.002)
Couple, low/low education	-0.047 (0.036)	-0.111*** (0.022)	-0.117*** (0.012)	-0.131*** (0.011)	-0.107*** (0.010)	0.010 (0.008)
Couple, medium/low education	-0.028 (0.021)	-0.029*** (0.007)	-0.033*** (0.005)	-0.035*** (0.004)	-0.040*** (0.004)	-0.015*** (0.003)
Couple, high/medium education	-0.000 (0.004)	0.000 (0.002)	0.002 (0.001)	0.002 (0.001)	0.006*** (0.001)	0.011*** (0.001)
Couple, high/high education	0.000 (0.001)	0.001 (0.001)	0.001** (0.000)	0.002*** (0.000)	0.004*** (0.000)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.281*** (0.032)	0.097*** (0.014)	0.068*** (0.009)	0.065*** (0.008)	0.072*** (0.009)	0.039*** (0.008)
Jobless household	-0.205*** (0.029)	-0.070*** (0.011)	-0.027*** (0.007)	-0.017** (0.005)	-0.007* (0.004)	-0.006*** (0.002)
Double-earner household	0.009 (0.005)	0.000 (0.003)	0.002 (0.003)	-0.001 (0.003)	-0.004 (0.004)	-0.001 (0.003)
Trad. breadwinner	0.032*** (0.005)	0.009* (0.004)	-0.004 (0.003)	-0.011** (0.004)	-0.018*** (0.004)	-0.016*** (0.004)
Both in part-time	0.002 (0.003)	0.000 (0.002)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Precarious	-0.047*** (0.009)	-0.018*** (0.004)	-0.008*** (0.002)	-0.005 (0.003)	-0.004* (0.002)	-0.002 (0.002)

Single working fulltime	0.059 (0.033)	0.003 (0.014)	0.008 (0.012)	-0.001 (0.009)	0.008 (0.008)	0.002 (0.006)
Single working part-time	0.017 (0.014)	-0.006 (0.007)	-0.004 (0.005)	-0.000 (0.004)	0.003 (0.003)	0.002 (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.031*** (0.009)	0.012* (0.005)	0.006 (0.004)	-0.000 (0.004)	-0.010** (0.003)	-0.011*** (0.002)
Medium, >5% - 20%	0.012 (0.010)	-0.007 (0.005)	0.003 (0.006)	0.003 (0.004)	0.010** (0.003)	0.004*** (0.001)
High, >20%	-0.008 (0.019)	0.023* (0.010)	0.013* (0.006)	0.017*** (0.004)	0.011*** (0.002)	0.001 (0.001)
Young household	-0.093*** (0.019)	-0.029** (0.009)	-0.008 (0.005)	-0.001 (0.004)	-0.002 (0.004)	-0.002 (0.003)
Single-mother household	-0.001 (0.013)	-0.010 (0.008)	-0.013*** (0.003)	-0.012*** (0.003)	-0.010*** (0.002)	-0.001 (0.002)
Couple without children	0.015* (0.006)	0.005 (0.003)	0.000 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.006*** (0.002)
Large household (3+ children)	-0.023* (0.011)	-0.014 (0.008)	-0.009** (0.003)	-0.003 (0.003)	-0.001 (0.003)	0.000 (0.002)
Household with self-employed member	0.122*** (0.013)	0.055*** (0.006)	0.031*** (0.003)	0.025*** (0.004)	0.022*** (0.003)	0.016*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.011 (0.008)	0.010 (0.006)	0.007 (0.005)	0.006 (0.005)	0.005 (0.004)	-0.001 (0.002)
Household with Black (non-Hispanic) members	-0.009 (0.011)	0.011 (0.006)	0.011* (0.005)	0.014** (0.005)	0.011** (0.004)	-0.002 (0.002)
Household with members from other ethnicity	-0.003 (0.003)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.011 (0.021)	0.017 (0.010)	0.003 (0.004)	0.002 (0.005)	0.008 (0.006)	0.006 (0.005)
Southern	0.024 (0.022)	0.029* (0.012)	0.028* (0.011)	0.035** (0.012)	0.026* (0.011)	0.014 (0.008)
Pacific and Mountain states	0.013 (0.013)	0.005 (0.007)	0.005 (0.006)	0.007 (0.009)	0.010 (0.008)	0.012 (0.009)
Constant	0.099* (0.045)	0.030 (0.040)	0.015 (0.028)	-0.046 (0.026)	-0.160*** (0.026)	-0.245*** (0.026)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 23: Full analysis sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.678*** (0.047)	9.072*** (0.024)	9.428*** (0.019)	9.661*** (0.018)	10.007*** (0.019)	10.616*** (0.019)
1989	8.823*** (0.030)	9.068*** (0.024)	9.356*** (0.023)	9.578*** (0.025)	9.921*** (0.023)	10.493*** (0.020)
Difference	-0.145*** (0.034)	0.003 (0.018)	0.072*** (0.016)	0.083*** (0.018)	0.086*** (0.017)	0.122*** (0.013)

Composition	0.150 (0.080)	0.246*** (0.032)	0.344*** (0.023)	0.399*** (0.025)	0.418*** (0.023)	0.319*** (0.014)
Income Structure	-0.295*** (0.082)	-0.243*** (0.032)	-0.273*** (0.021)	-0.315*** (0.023)	-0.332*** (0.020)	-0.197*** (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.002)	0.002 (0.001)	0.003 (0.002)	0.003 (0.002)	0.005 (0.003)	0.005 (0.003)
Household: inactive / jobless	-0.056*** (0.012)	-0.027*** (0.005)	-0.020*** (0.004)	-0.018*** (0.004)	-0.014*** (0.003)	-0.007*** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.107 (0.059)	0.110*** (0.023)	0.219*** (0.013)	0.251*** (0.012)	0.220*** (0.011)	0.083*** (0.005)
Single, medium education	-0.031 (0.019)	-0.021** (0.007)	-0.041*** (0.004)	-0.058*** (0.006)	-0.064*** (0.006)	-0.028*** (0.003)
Single, high education	-0.006 (0.015)	0.000 (0.007)	-0.016*** (0.004)	-0.021*** (0.003)	-0.010** (0.004)	0.029*** (0.003)
Couple, low/low education	0.077* (0.034)	0.131*** (0.021)	0.153*** (0.012)	0.185*** (0.013)	0.187*** (0.012)	0.099*** (0.007)
Couple, medium/low education	0.024 (0.015)	0.025*** (0.005)	0.028*** (0.004)	0.031*** (0.003)	0.037*** (0.003)	0.029*** (0.002)
Couple, high/medium education	-0.001 (0.004)	0.002 (0.002)	0.004*** (0.001)	0.006*** (0.001)	0.014*** (0.001)	0.026*** (0.002)
Couple, high/high education	-0.004 (0.005)	0.002 (0.003)	0.009*** (0.002)	0.017*** (0.002)	0.039*** (0.002)	0.081*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.037*** (0.007)	0.014*** (0.003)	0.008*** (0.002)	0.004*** (0.001)	-0.002* (0.001)	-0.005*** (0.001)
Jobless household	-0.034 (0.019)	-0.015 (0.008)	-0.008 (0.004)	-0.005 (0.003)	-0.003 (0.002)	-0.002 (0.001)
Double-earner household	0.001 (0.001)	0.000 (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.004*** (0.001)	0.007*** (0.001)
Trad. breadwinner	-0.001 (0.001)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Both in part-time	0.001 (0.001)	0.002* (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Precarious	0.019*** (0.004)	0.012*** (0.003)	0.008*** (0.002)	0.007*** (0.002)	0.006*** (0.001)	0.003*** (0.001)
Single working fulltime	0.001 (0.002)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
Single working part-time	0.002 (0.001)	0.003* (0.001)	0.002* (0.001)	0.001* (0.001)	0.001* (0.000)	0.001** (0.000)
Young household	0.040*** (0.006)	0.017*** (0.003)	0.011*** (0.001)	0.010*** (0.001)	0.012*** (0.001)	0.013*** (0.001)
Single-mother household	0.012*** (0.003)	0.013*** (0.002)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.008*** (0.001)
Couple without children	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.010*** (0.003)	0.009*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.006*** (0.001)
Household with self-employed member	-0.024*** (0.004)	-0.011*** (0.002)	-0.008*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)	-0.004*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.002 (0.007)	-0.007** (0.002)	-0.012*** (0.003)	-0.016*** (0.003)	-0.017*** (0.003)	-0.016*** (0.003)
Household with Black (non-Hispanic) members	-0.013*** (0.003)	-0.007*** (0.002)	-0.008*** (0.002)	-0.008*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.003 (0.004)	-0.003 (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.008*** (0.002)	-0.006*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.002* (0.001)
Southern	-0.007 (0.004)	-0.004* (0.002)	-0.004* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.010 (0.012)	0.011 (0.007)	0.001 (0.005)	0.000 (0.004)	-0.002 (0.003)	-0.009*** (0.002)
Household: inactive / jobless	-0.527*** (0.044)	-0.192*** (0.018)	-0.092*** (0.015)	-0.063*** (0.014)	-0.048*** (0.009)	-0.041*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						

Single, low education	-0.043 (0.072)	-0.044 (0.031)	-0.126*** (0.022)	-0.118*** (0.016)	-0.071*** (0.013)	0.038*** (0.008)
Single, medium education	-0.014 (0.026)	-0.003 (0.011)	-0.011 (0.008)	-0.018** (0.007)	-0.024*** (0.005)	-0.005 (0.004)
Single, high education	0.003 (0.006)	0.006 (0.003)	0.002 (0.002)	0.003 (0.002)	0.004* (0.002)	0.008*** (0.002)
Couple, low/low education	-0.047 (0.037)	-0.116*** (0.022)	-0.125*** (0.012)	-0.139*** (0.012)	-0.112*** (0.010)	0.007 (0.008)
Couple, medium/low education	-0.029 (0.022)	-0.032*** (0.008)	-0.039*** (0.005)	-0.041*** (0.004)	-0.044*** (0.005)	-0.017*** (0.003)
Couple, high/medium education	-0.000 (0.004)	0.001 (0.002)	0.004** (0.001)	0.004* (0.001)	0.007*** (0.001)	0.012*** (0.001)
Couple, high/high education	0.000 (0.001)	0.001 (0.001)	0.002*** (0.000)	0.003*** (0.001)	0.005*** (0.001)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.290*** (0.032)	0.090*** (0.014)	0.070*** (0.012)	0.064*** (0.009)	0.073*** (0.009)	0.042*** (0.007)
Jobless household	-0.204*** (0.026)	-0.053*** (0.009)	-0.012* (0.006)	-0.002 (0.005)	0.002 (0.004)	-0.004* (0.002)
Double-earner household	0.007 (0.005)	0.001 (0.003)	0.002 (0.003)	-0.001 (0.003)	-0.004 (0.004)	-0.000 (0.003)
Trad. breadwinner	0.033*** (0.005)	0.008* (0.004)	-0.006* (0.003)	-0.014*** (0.003)	-0.020*** (0.004)	-0.017*** (0.004)
Both in part-time	0.002 (0.002)	0.001 (0.002)	0.002* (0.001)	0.002 (0.001)	0.003* (0.001)	0.001 (0.001)
Precarious	-0.045*** (0.009)	-0.015*** (0.004)	-0.004* (0.002)	-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.001)
Single working fulltime	0.049 (0.033)	-0.008 (0.015)	-0.004 (0.015)	-0.011 (0.012)	0.003 (0.009)	0.003 (0.006)
Single working part-time	0.017 (0.014)	-0.007 (0.007)	-0.004 (0.005)	0.000 (0.004)	0.005 (0.003)	0.002 (0.002)
Young household	-0.090*** (0.019)	-0.024* (0.009)	-0.003 (0.005)	0.003 (0.005)	0.000 (0.004)	-0.002 (0.003)
Single-mother household	0.008 (0.013)	0.003 (0.009)	0.001 (0.003)	-0.001 (0.003)	-0.004 (0.002)	-0.001 (0.001)
Couple without children	0.015* (0.006)	0.005 (0.003)	0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.006*** (0.002)
Large household (3+ children)	-0.019 (0.012)	-0.009 (0.008)	-0.004 (0.003)	0.001 (0.003)	0.002 (0.003)	0.000 (0.002)
Household with self-employed member	0.125*** (0.012)	0.053*** (0.005)	0.031*** (0.004)	0.024*** (0.004)	0.020*** (0.003)	0.016*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.013 (0.008)	0.012 (0.007)	0.010 (0.006)	0.009 (0.005)	0.007 (0.004)	-0.001 (0.002)
Household with Black (non-Hispanic) members	-0.004 (0.011)	0.018*** (0.005)	0.020*** (0.005)	0.021*** (0.005)	0.016*** (0.004)	-0.001 (0.002)
Household with members from other ethnicity	-0.002 (0.003)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.012 (0.020)	0.020 (0.011)	0.008 (0.005)	0.007 (0.005)	0.011 (0.007)	0.007 (0.006)
Southern	0.024 (0.023)	0.031* (0.013)	0.033** (0.013)	0.040** (0.014)	0.030* (0.012)	0.016 (0.009)
Pacific and Mountain states	0.014 (0.014)	0.007 (0.007)	0.008 (0.007)	0.010 (0.010)	0.012 (0.009)	0.013 (0.010)
Constant	0.107* (0.044)	-0.010 (0.039)	-0.038 (0.027)	-0.099*** (0.024)	-0.203*** (0.025)	-0.266*** (0.025)
Observations	125826	125826	125826	125826	125826	125826

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3.2. Market income sample, using different model specifications

Table 24: Market income sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.949*** (0.031)	9.247*** (0.021)	9.615*** (0.017)	9.846*** (0.017)	10.153*** (0.017)	10.701*** (0.017)
1989	8.993*** (0.033)	9.227*** (0.025)	9.540*** (0.023)	9.735*** (0.021)	10.036*** (0.020)	10.550*** (0.019)
Difference	-0.044 (0.025)	0.020 (0.015)	0.075*** (0.018)	0.112*** (0.016)	0.116*** (0.014)	0.151*** (0.011)
Composition	0.232*** (0.062)	0.294*** (0.040)	0.394*** (0.029)	0.371*** (0.024)	0.387*** (0.020)	0.299*** (0.014)
Income Structure	-0.276*** (0.065)	-0.274*** (0.040)	-0.319*** (0.029)	-0.259*** (0.023)	-0.271*** (0.015)	-0.148*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.002)	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.004 (0.004)	0.003 (0.003)
Household: inactive / jobless	0.007 (0.005)	0.004 (0.003)	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.132** (0.044)	0.130*** (0.024)	0.180*** (0.013)	0.161*** (0.012)	0.144*** (0.011)	0.056*** (0.005)
Single, medium education	-0.026* (0.012)	-0.020*** (0.006)	-0.031*** (0.004)	-0.037*** (0.004)	-0.035*** (0.005)	-0.014*** (0.002)
Single, high education	-0.002 (0.013)	0.000 (0.007)	-0.012** (0.004)	-0.010** (0.003)	0.004 (0.004)	0.035*** (0.003)
Couple, low/low education	0.114*** (0.032)	0.143*** (0.024)	0.194*** (0.017)	0.179*** (0.013)	0.158*** (0.011)	0.078*** (0.007)
Couple, medium/low education	0.019 (0.010)	0.027*** (0.007)	0.032*** (0.004)	0.034*** (0.004)	0.039*** (0.003)	0.025*** (0.002)
Couple, high/medium education	0.001 (0.003)	0.003 (0.002)	0.005*** (0.002)	0.008*** (0.001)	0.016*** (0.001)	0.026*** (0.002)
Couple, high/high education	0.004 (0.005)	0.007* (0.003)	0.014*** (0.003)	0.025*** (0.003)	0.046*** (0.002)	0.084*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.003 (0.004)	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)
Jobless household	-0.040*** (0.009)	-0.022*** (0.005)	-0.010*** (0.002)	-0.007*** (0.002)	-0.004*** (0.001)	-0.003*** (0.001)
Double-earner household	0.002 (0.001)	-0.001 (0.001)	0.001* (0.000)	0.003*** (0.001)	0.006*** (0.001)	0.009*** (0.001)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Both in part-time	0.002 (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.016*** (0.004)	0.010*** (0.003)	0.007*** (0.002)	0.006*** (0.001)	0.004*** (0.001)	0.002*** (0.001)
Single working fulltime	0.003 (0.002)	0.001 (0.001)	0.002 (0.001)	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.003* (0.002)	0.002* (0.001)	0.001 (0.001)	0.001* (0.001)	0.001* (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.007** (0.002)	-0.002* (0.001)	0.002* (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Medium, >5% - 20%	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.000)
High, >20%	0.014*** (0.004)	0.012*** (0.003)	0.008*** (0.002)	0.006*** (0.001)	0.003*** (0.001)	0.001** (0.000)
Young household	0.021*** (0.004)	0.012*** (0.002)	0.010*** (0.001)	0.010*** (0.001)	0.012*** (0.001)	0.011*** (0.001)
Single-mother household	0.006*** (0.002)	0.007*** (0.001)	0.008*** (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.004*** (0.001)

Couple without children	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.006** (0.002)	0.006** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.005*** (0.001)	0.004*** (0.001)
Household with self-employed member	-0.014*** (0.003)	-0.006*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.007 (0.004)	-0.009** (0.003)	-0.015*** (0.003)	-0.016*** (0.003)	-0.017*** (0.003)	-0.015*** (0.002)
Household with Black (non-Hispanic) members	-0.009*** (0.002)	-0.006*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.005 (0.004)	-0.004* (0.002)	-0.006** (0.002)	-0.008*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.005* (0.002)	-0.003* (0.001)	-0.003* (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.000 (0.001)	0.001 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.017 (0.012)	0.005 (0.006)	-0.007 (0.005)	-0.007 (0.004)	-0.010*** (0.003)	-0.009*** (0.002)
Household: inactive / jobless	-0.281*** (0.027)	-0.150*** (0.015)	-0.093*** (0.012)	-0.050*** (0.008)	-0.031*** (0.007)	-0.021*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.050 (0.053)	-0.050 (0.029)	-0.084*** (0.017)	-0.054*** (0.014)	-0.031** (0.012)	0.042*** (0.007)
Single, medium education	-0.015 (0.022)	-0.002 (0.012)	-0.014* (0.007)	-0.021*** (0.005)	-0.020*** (0.006)	0.000 (0.005)
Single, high education	0.005 (0.006)	0.006 (0.003)	0.002 (0.002)	0.002 (0.001)	0.005** (0.002)	0.009*** (0.002)
Couple, low/low education	-0.074* (0.034)	-0.112*** (0.026)	-0.148*** (0.017)	-0.122*** (0.013)	-0.079*** (0.010)	0.025** (0.008)
Couple, medium/low education	-0.019 (0.015)	-0.036*** (0.009)	-0.040*** (0.005)	-0.040*** (0.005)	-0.042*** (0.005)	-0.010** (0.003)
Couple, high/medium education	0.002 (0.004)	0.002 (0.002)	0.003* (0.002)	0.004** (0.001)	0.007*** (0.001)	0.011*** (0.001)
Couple, high/high education	0.001 (0.001)	0.001** (0.001)	0.002*** (0.001)	0.003*** (0.000)	0.004*** (0.001)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.172*** (0.019)	0.076*** (0.012)	0.070*** (0.010)	0.056*** (0.009)	0.052*** (0.007)	0.031*** (0.007)
Jobless household	-0.081*** (0.013)	-0.044*** (0.007)	-0.017*** (0.004)	-0.011*** (0.003)	-0.005* (0.002)	-0.005*** (0.001)
Double-earner household	0.009 (0.006)	-0.005 (0.004)	-0.001 (0.004)	0.001 (0.004)	-0.002 (0.004)	0.001 (0.004)
Trad. breadwinner	0.021*** (0.006)	-0.005 (0.005)	-0.017** (0.005)	-0.020*** (0.004)	-0.022*** (0.004)	-0.013** (0.004)
Both in part-time	0.002 (0.003)	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Precarious	-0.025** (0.008)	-0.014** (0.005)	-0.009** (0.004)	-0.006** (0.002)	-0.004* (0.002)	-0.002 (0.001)
Single working fulltime	0.031 (0.026)	-0.018 (0.014)	-0.007 (0.012)	0.005 (0.007)	0.005 (0.007)	-0.004 (0.007)
Single working part-time	0.009 (0.012)	-0.013 (0.007)	-0.006 (0.005)	-0.001 (0.004)	0.001 (0.003)	0.001 (0.002)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	0.020** (0.007)	0.009 (0.005)	0.003 (0.005)	-0.004 (0.004)	-0.012*** (0.002)	-0.009*** (0.002)
Medium, >5% - 20%	0.001 (0.008)	-0.006 (0.006)	-0.003 (0.005)	-0.001 (0.003)	0.005* (0.002)	0.004*** (0.001)
High, >20%	0.000 (0.012)	0.004 (0.006)	0.007* (0.003)	0.005** (0.002)	0.003** (0.001)	0.001 (0.001)
Young household	-0.049** (0.015)	-0.020* (0.008)	-0.009 (0.005)	-0.003 (0.003)	-0.005 (0.003)	-0.001 (0.003)
Single-mother household	0.013 (0.011)	-0.009 (0.006)	-0.013*** (0.004)	-0.013*** (0.003)	-0.008*** (0.002)	0.002 (0.001)
Couple without children	0.012 (0.006)	0.004 (0.003)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.006** (0.002)
Large household (3+ children)	-0.008 (0.011)	-0.012 (0.007)	-0.008* (0.004)	-0.006 (0.003)	-0.001 (0.002)	0.001 (0.001)
Household with self-employed member	0.091*** (0.010)	0.049*** (0.005)	0.030*** (0.004)	0.022*** (0.003)	0.016*** (0.003)	0.011*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						

Household with Hispanic members	0.017 (0.011)	0.010 (0.008)	0.006 (0.005)	0.004 (0.004)	0.003 (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	0.005 (0.007)	0.008 (0.005)	0.011* (0.005)	0.009* (0.004)	0.005 (0.003)	-0.003 (0.002)
Household with members from other ethnicity	0.000 (0.003)	0.001 (0.002)	-0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.020 (0.013)	0.010 (0.007)	0.006 (0.006)	0.012 (0.009)	0.009 (0.006)	0.005 (0.005)
Southern	0.044* (0.017)	0.034** (0.011)	0.042** (0.015)	0.040** (0.015)	0.028* (0.011)	0.013 (0.006)
Pacific and Mountain states	0.015 (0.014)	0.017 (0.011)	0.017 (0.011)	0.021 (0.012)	0.014 (0.008)	0.012 (0.009)
Constant	-0.183*** (0.054)	-0.014 (0.034)	-0.039 (0.032)	-0.084** (0.030)	-0.156*** (0.028)	-0.240*** (0.025)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics, transfer receipt

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 25: Market income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.949*** (0.032)	9.247*** (0.022)	9.615*** (0.018)	9.846*** (0.017)	10.153*** (0.017)	10.701*** (0.017)
1989	8.993*** (0.034)	9.227*** (0.025)	9.540*** (0.024)	9.735*** (0.022)	10.036*** (0.020)	10.550*** (0.020)
Difference	-0.044 (0.024)	0.020 (0.015)	0.075*** (0.018)	0.112*** (0.016)	0.116*** (0.014)	0.151*** (0.012)
Composition	0.245*** (0.063)	0.317*** (0.041)	0.420*** (0.029)	0.393*** (0.024)	0.403*** (0.019)	0.306*** (0.013)
Income Structure	-0.289*** (0.067)	-0.297*** (0.041)	-0.345*** (0.030)	-0.281*** (0.024)	-0.286*** (0.016)	-0.155*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.002)	0.002 (0.003)	0.003 (0.003)	0.004 (0.004)	0.004 (0.004)	0.003 (0.003)
Household: inactive / jobless	0.008 (0.006)	0.005 (0.003)	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.150*** (0.043)	0.152*** (0.024)	0.201*** (0.014)	0.177*** (0.012)	0.156*** (0.010)	0.060*** (0.005)
Single, medium education	-0.029* (0.012)	-0.024*** (0.006)	-0.035*** (0.005)	-0.041*** (0.005)	-0.037*** (0.005)	-0.015*** (0.002)
Single, high education	-0.006 (0.013)	-0.002 (0.007)	-0.014** (0.005)	-0.011** (0.004)	0.004 (0.004)	0.035*** (0.003)
Couple, low/low education	0.118*** (0.033)	0.149*** (0.025)	0.201*** (0.018)	0.185*** (0.014)	0.162*** (0.011)	0.080*** (0.007)
Couple, medium/low education	0.021* (0.011)	0.030*** (0.007)	0.035*** (0.004)	0.037*** (0.004)	0.041*** (0.003)	0.026*** (0.002)

Couple, high/medium education	0.001 (0.003)	0.004 (0.002)	0.006*** (0.002)	0.010*** (0.001)	0.017*** (0.001)	0.026*** (0.002)
Couple, high/high education	0.004 (0.005)	0.009** (0.003)	0.018*** (0.004)	0.029*** (0.003)	0.049*** (0.003)	0.085*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.004 (0.004)	-0.001 (0.002)	-0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)
Jobless household	-0.043*** (0.009)	-0.024*** (0.005)	-0.012*** (0.003)	-0.008*** (0.002)	-0.005*** (0.001)	-0.003*** (0.001)
Double-earner household	0.002 (0.001)	-0.000 (0.001)	0.002*** (0.000)	0.004*** (0.001)	0.006*** (0.001)	0.010*** (0.001)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.002 (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Precarious	0.017*** (0.005)	0.012*** (0.003)	0.009*** (0.002)	0.006*** (0.002)	0.005*** (0.001)	0.002*** (0.001)
Single working fulltime	0.003 (0.002)	0.002 (0.001)	0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.002 (0.001)
Single working part-time	0.003 (0.002)	0.003* (0.002)	0.002* (0.001)	0.002* (0.001)	0.001* (0.001)	0.001* (0.000)
Young household	0.024*** (0.004)	0.015*** (0.002)	0.013*** (0.002)	0.012*** (0.001)	0.013*** (0.001)	0.012*** (0.001)
Single-mother household	0.006*** (0.002)	0.008*** (0.001)	0.009*** (0.001)	0.008*** (0.001)	0.007*** (0.001)	0.005*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.007** (0.002)	0.006** (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.005*** (0.001)	0.004*** (0.001)
Household with self-employed member	-0.015*** (0.003)	-0.007*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.007 (0.004)	-0.010** (0.003)	-0.016*** (0.003)	-0.017*** (0.003)	-0.018*** (0.003)	-0.015*** (0.002)
Household with Black (non-Hispanic) members	-0.009*** (0.002)	-0.008*** (0.002)	-0.007*** (0.002)	-0.007*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.005 (0.004)	-0.005* (0.002)	-0.007** (0.002)	-0.009*** (0.002)	-0.008*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.000 (0.001)	0.001 (0.001)	0.001 (0.000)	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)
Southern	-0.006* (0.003)	-0.005* (0.002)	-0.002* (0.001)	-0.002 (0.001)	-0.003* (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.021 (0.012)	0.007 (0.006)	-0.006 (0.005)	-0.006 (0.004)	-0.010*** (0.003)	-0.009*** (0.002)
Household: inactive / jobless	-0.288*** (0.027)	-0.155*** (0.015)	-0.097*** (0.012)	-0.053*** (0.008)	-0.034*** (0.007)	-0.023*** (0.004)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.056 (0.053)	-0.059* (0.030)	-0.092*** (0.018)	-0.062*** (0.014)	-0.036** (0.011)	0.039*** (0.007)
Single, medium education	-0.008 (0.022)	0.004 (0.012)	-0.009 (0.008)	-0.018*** (0.005)	-0.019*** (0.005)	0.000 (0.004)
Single, high education	0.008 (0.005)	0.008* (0.003)	0.004 (0.002)	0.004* (0.001)	0.006*** (0.002)	0.009*** (0.002)
Couple, low/low education	-0.075* (0.035)	-0.116*** (0.027)	-0.152*** (0.018)	-0.126*** (0.013)	-0.082*** (0.009)	0.024** (0.007)
Couple, medium/low education	-0.021 (0.016)	-0.039*** (0.010)	-0.044*** (0.006)	-0.043*** (0.005)	-0.044*** (0.005)	-0.011*** (0.003)
Couple, high/medium education	0.002 (0.004)	0.004 (0.002)	0.005** (0.002)	0.006*** (0.001)	0.008*** (0.001)	0.011*** (0.001)
Couple, high/high education	0.002 (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.008*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.178*** (0.021)	0.080*** (0.014)	0.073*** (0.010)	0.059*** (0.009)	0.055*** (0.007)	0.033*** (0.007)
Jobless household	-0.076*** (0.013)	-0.038*** (0.007)	-0.010* (0.004)	-0.006* (0.003)	-0.001 (0.002)	-0.004*** (0.001)
Double-earner household	0.010 (0.005)	-0.004 (0.004)	-0.000 (0.004)	0.001 (0.004)	-0.002 (0.004)	0.001 (0.003)
Trad. breadwinner	0.022*** (0.006)	-0.006 (0.005)	-0.019*** (0.005)	-0.022*** (0.004)	-0.024*** (0.004)	-0.013*** (0.004)
Both in part-time	0.003 (0.003)	0.001 (0.002)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002* (0.001)

Precarious	-0.020* (0.008)	-0.009* (0.004)	-0.005 (0.004)	-0.004 (0.002)	-0.002 (0.002)	-0.001 (0.001)
Single working fulltime	0.017 (0.027)	-0.029 (0.017)	-0.015 (0.014)	0.001 (0.009)	0.004 (0.007)	-0.003 (0.006)
Single working part-time	0.008 (0.012)	-0.014 (0.007)	-0.006 (0.005)	-0.000 (0.003)	0.002 (0.003)	0.002 (0.002)
Young household	-0.047** (0.016)	-0.019* (0.008)	-0.008 (0.006)	-0.002 (0.004)	-0.005 (0.003)	-0.001 (0.003)
Single-mother household	0.027* (0.013)	0.003 (0.007)	-0.005 (0.003)	-0.008** (0.003)	-0.006** (0.002)	0.002 (0.001)
Couple without children	0.012 (0.006)	0.004 (0.003)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.006** (0.002)
Large household (3+ children)	-0.002 (0.012)	-0.007 (0.007)	-0.005 (0.004)	-0.004 (0.003)	0.001 (0.002)	0.001 (0.001)
Household with self-employed member	0.093*** (0.009)	0.050*** (0.005)	0.030*** (0.004)	0.022*** (0.003)	0.016*** (0.003)	0.011*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.019 (0.011)	0.012 (0.008)	0.007 (0.006)	0.005 (0.004)	0.004 (0.003)	-0.001 (0.002)
Household with Black (non-Hispanic) members	0.011 (0.007)	0.013* (0.006)	0.015** (0.006)	0.012** (0.004)	0.007* (0.003)	-0.002 (0.002)
Household with members from other ethnicity	0.002 (0.003)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.024 (0.013)	0.014* (0.007)	0.010 (0.006)	0.015 (0.009)	0.011 (0.006)	0.005 (0.005)
Southern	0.044* (0.018)	0.036** (0.012)	0.043** (0.015)	0.042** (0.015)	0.029** (0.011)	0.013* (0.007)
Pacific and Mountain states	0.017 (0.014)	0.019 (0.011)	0.019 (0.011)	0.022 (0.012)	0.014 (0.008)	0.012 (0.009)
Constant	-0.214*** (0.052)	-0.062 (0.032)	-0.081** (0.029)	-0.121*** (0.028)	-0.189*** (0.027)	-0.255*** (0.024)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3.3. Labor income sample, using different model specifications

Table 26: Labor income sample, models incl. transfers, excl. tax liabilities and refunds: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.171*** (0.025)	9.393*** (0.024)	9.731*** (0.022)	9.950*** (0.021)	10.259*** (0.021)	10.774*** (0.020)
1989	9.070*** (0.039)	9.300*** (0.029)	9.641*** (0.029)	9.855*** (0.028)	10.156*** (0.025)	10.628*** (0.021)
Difference	0.102*** (0.027)	0.093*** (0.020)	0.090*** (0.021)	0.095*** (0.020)	0.103*** (0.016)	0.146*** (0.012)
Composition	0.410*** (0.043)	0.420*** (0.036)	0.459*** (0.027)	0.428*** (0.026)	0.399*** (0.021)	0.287*** (0.013)

Income Structure	-0.308*** (0.050)	-0.327*** (0.040)	-0.369*** (0.028)	-0.332*** (0.028)	-0.296*** (0.018)	-0.141*** (0.012)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.002 (0.003)	0.004 (0.004)	0.004 (0.004)	0.004 (0.005)	0.004 (0.005)	0.003 (0.003)
Household: inactive / jobless	0.003** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.000)	0.000* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.183*** (0.029)	0.162*** (0.026)	0.142*** (0.018)	0.120*** (0.014)	0.103*** (0.010)	0.037*** (0.006)
Single, medium education	-0.030*** (0.009)	-0.024*** (0.006)	-0.020*** (0.005)	-0.019*** (0.004)	-0.021*** (0.004)	-0.008*** (0.002)
Single, high education	-0.020 (0.012)	-0.014 (0.008)	0.000 (0.008)	0.008 (0.006)	0.013* (0.005)	0.036*** (0.004)
Couple, low/low education	0.176*** (0.026)	0.195*** (0.022)	0.219*** (0.017)	0.194*** (0.014)	0.155*** (0.012)	0.067*** (0.006)
Couple, medium/low education	0.036*** (0.010)	0.041*** (0.008)	0.045*** (0.005)	0.044*** (0.004)	0.043*** (0.004)	0.025*** (0.003)
Couple, high/medium education	0.004* (0.002)	0.005*** (0.001)	0.009*** (0.002)	0.013*** (0.002)	0.019*** (0.002)	0.024*** (0.002)
Couple, high/high education	0.014*** (0.003)	0.018*** (0.004)	0.030*** (0.003)	0.039*** (0.003)	0.060*** (0.003)	0.090*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Jobless household	-0.003 (0.002)	-0.002 (0.001)	-0.002 (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.000)
Double-earner household	-0.001 (0.001)	-0.000 (0.001)	0.002** (0.001)	0.004*** (0.001)	0.008*** (0.001)	0.011*** (0.001)
Trad. breadwinner	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.003*** (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.000)	0.001** (0.000)
Precarious	0.016*** (0.004)	0.012*** (0.003)	0.009*** (0.002)	0.007*** (0.002)	0.005*** (0.001)	0.002*** (0.001)
Single working fulltime	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.002)	0.001 (0.001)
Single working part-time	0.003 (0.002)	0.004 (0.002)	0.003 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.000)
PUBLIC TRANSFERS RECEIVED (Ref.: Low, up to 5 percent)						
Low, >0% - 5%	-0.004** (0.001)	-0.002 (0.001)	0.002* (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.003*** (0.001)
Medium, >5% - 20%	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)
High, >20%	0.021*** (0.004)	0.017*** (0.003)	0.010*** (0.002)	0.007*** (0.001)	0.004*** (0.001)	0.001* (0.000)
Young household	0.015*** (0.003)	0.013*** (0.003)	0.014*** (0.002)	0.015*** (0.002)	0.016*** (0.002)	0.014*** (0.001)
Single-mother household	0.008*** (0.001)	0.010*** (0.002)	0.011*** (0.002)	0.010*** (0.002)	0.008*** (0.001)	0.004*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.007** (0.002)	0.007** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.005*** (0.002)	0.004*** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.011** (0.004)	-0.017*** (0.004)	-0.019*** (0.004)	-0.022*** (0.004)	-0.022*** (0.003)	-0.016*** (0.002)
Household with Black (non-Hispanic) members	-0.007*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)
Household with members from other ethnicity	-0.005* (0.002)	-0.007*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.003 (0.001)
Southern	-0.007* (0.003)	-0.005* (0.002)	-0.003* (0.002)	-0.003 (0.002)	-0.004* (0.002)	-0.005* (0.002)
Pacific and Mountain states	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

Table 27: Labor income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	9.171*** (0.025)	9.393*** (0.024)	9.731*** (0.022)	9.950*** (0.022)	10.259*** (0.022)	10.774*** (0.020)
1989	9.070*** (0.039)	9.300*** (0.030)	9.641*** (0.029)	9.855*** (0.029)	10.156*** (0.026)	10.628*** (0.021)
Difference	0.102*** (0.027)	0.093*** (0.021)	0.090*** (0.021)	0.095*** (0.020)	0.103*** (0.016)	0.146*** (0.012)
Composition	0.429*** (0.043)	0.440*** (0.037)	0.478*** (0.027)	0.442*** (0.026)	0.409*** (0.020)	0.290*** (0.013)
Income Structure	-0.327*** (0.052)	-0.347*** (0.043)	-0.387*** (0.030)	-0.347*** (0.029)	-0.305*** (0.018)	-0.144*** (0.013)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.003 (0.003)	0.004 (0.004)	0.005 (0.005)	0.005 (0.005)	0.005 (0.005)	0.003 (0.003)
Household: inactive / jobless	0.003** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001** (0.000)	0.000* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.206*** (0.030)	0.182*** (0.027)	0.156*** (0.019)	0.130*** (0.014)	0.109*** (0.010)	0.038*** (0.006)
Single, medium education	-0.035*** (0.009)	-0.029*** (0.007)	-0.023*** (0.006)	-0.021*** (0.005)	-0.022*** (0.004)	-0.008*** (0.002)
Single, high education	-0.027* (0.012)	-0.019* (0.009)	-0.003 (0.008)	0.007 (0.006)	0.013* (0.006)	0.036*** (0.004)
Couple, low/low education	0.186*** (0.027)	0.204*** (0.022)	0.227*** (0.018)	0.200*** (0.014)	0.160*** (0.012)	0.069*** (0.005)
Couple, medium/low education	0.040*** (0.010)	0.044*** (0.008)	0.048*** (0.005)	0.047*** (0.005)	0.045*** (0.004)	0.025*** (0.003)
Couple, high/medium education	0.005* (0.002)	0.007*** (0.002)	0.010*** (0.002)	0.014*** (0.002)	0.020*** (0.002)	0.025*** (0.002)
Couple, high/high education	0.017*** (0.004)	0.021*** (0.004)	0.034*** (0.003)	0.043*** (0.003)	0.064*** (0.003)	0.091*** (0.003)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Jobless household	-0.004* (0.002)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.000)
Double-earner household	-0.001 (0.001)	0.000 (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.009*** (0.001)	0.011*** (0.001)
Trad. breadwinner	0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Both in part-time	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.001*** (0.000)
Precarious	0.018*** (0.005)	0.014*** (0.004)	0.011*** (0.003)	0.008*** (0.002)	0.005*** (0.001)	0.002*** (0.001)
Single working fulltime	0.004 (0.003)	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.003 (0.002)	0.002 (0.001)
Single working part-time	0.004 (0.002)	0.004 (0.002)	0.003 (0.002)	0.003 (0.001)	0.002 (0.001)	0.001 (0.000)
Young household	0.019*** (0.003)	0.017*** (0.003)	0.017*** (0.002)	0.017*** (0.002)	0.017*** (0.002)	0.015*** (0.001)

Single-mother household	0.009*** (0.002)	0.011*** (0.002)	0.012*** (0.002)	0.011*** (0.002)	0.009*** (0.001)	0.005*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.007** (0.002)	0.008** (0.002)	0.008*** (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.004*** (0.001)
Household with self-employed member	-0.001 (0.001)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.010* (0.004)	-0.016*** (0.004)	-0.019*** (0.004)	-0.023*** (0.004)	-0.022*** (0.003)	-0.016*** (0.002)
Household with Black (non-Hispanic) members	-0.008*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.008*** (0.002)	-0.007*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.005* (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)	-0.008*** (0.002)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.003 (0.001)
Southern	-0.006* (0.003)	-0.004* (0.002)	-0.003 (0.001)	-0.002 (0.001)	-0.003* (0.002)	-0.005* (0.002)
Pacific and Mountain states	0.000 (0.001)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.027** (0.010)	0.003 (0.008)	-0.001 (0.006)	-0.000 (0.005)	-0.015*** (0.003)	-0.012*** (0.003)
Household: inactive / jobless	-0.005 (0.006)	-0.009 (0.006)	-0.009* (0.004)	-0.008* (0.004)	-0.007** (0.003)	-0.004* (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-0.009 (0.047)	-0.051 (0.039)	-0.041 (0.026)	-0.030 (0.020)	-0.031* (0.012)	0.022** (0.007)
Single, medium education	0.039 (0.029)	0.010 (0.020)	0.013 (0.015)	0.002 (0.011)	-0.022*** (0.007)	-0.006 (0.004)
Single, high education	0.021** (0.007)	0.011* (0.005)	0.012** (0.005)	0.011*** (0.003)	0.007** (0.002)	0.009*** (0.002)
Couple, low/low education	-0.152*** (0.030)	-0.166*** (0.023)	-0.168*** (0.017)	-0.126*** (0.014)	-0.077*** (0.011)	0.026*** (0.006)
Couple, medium/low education	-0.048*** (0.013)	-0.056*** (0.010)	-0.057*** (0.006)	-0.053*** (0.007)	-0.042*** (0.005)	-0.008* (0.003)
Couple, high/medium education	0.006 (0.003)	0.007** (0.002)	0.008*** (0.002)	0.009*** (0.002)	0.011*** (0.002)	0.011*** (0.002)
Couple, high/high education	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.008*** (0.001)	0.009*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.001 (0.006)	0.009* (0.004)	0.015*** (0.004)	0.020*** (0.003)	0.018*** (0.003)	0.007** (0.002)
Jobless household	-0.005 (0.007)	-0.002 (0.006)	-0.002 (0.005)	0.001 (0.003)	0.002 (0.002)	-0.002 (0.001)
Double-earner household	-0.002 (0.005)	-0.002 (0.005)	-0.002 (0.006)	-0.008 (0.006)	-0.002 (0.006)	0.003 (0.004)
Trad. breadwinner	-0.007 (0.007)	-0.025*** (0.007)	-0.033*** (0.006)	-0.035*** (0.005)	-0.025*** (0.005)	-0.014*** (0.004)
Both in part-time	0.002 (0.003)	0.005* (0.002)	0.004 (0.002)	0.005** (0.002)	0.004* (0.001)	0.002** (0.001)
Precarious	-0.002 (0.008)	-0.006 (0.005)	-0.003 (0.004)	-0.002 (0.003)	-0.002 (0.002)	-0.002 (0.001)
Single working fulltime	-0.107* (0.048)	-0.062 (0.036)	-0.055 (0.028)	-0.032 (0.021)	0.017 (0.013)	0.006 (0.008)
Single working part-time	-0.020 (0.014)	-0.020 (0.011)	-0.009 (0.008)	-0.002 (0.005)	0.007 (0.004)	0.005 (0.002)
Young household	-0.032* (0.013)	-0.015 (0.010)	0.002 (0.007)	-0.001 (0.005)	-0.005 (0.004)	-0.003 (0.003)
Single-mother household	0.010 (0.009)	-0.009 (0.007)	-0.015*** (0.004)	-0.009** (0.004)	-0.010*** (0.002)	0.001 (0.001)
Couple without children	0.012* (0.006)	0.004 (0.004)	-0.003 (0.002)	-0.001 (0.003)	-0.003 (0.002)	-0.009*** (0.002)
Large household (3+ children)	-0.000 (0.011)	-0.012 (0.007)	-0.001 (0.005)	0.003 (0.004)	0.002 (0.002)	0.001 (0.001)
Household with self-employed member	0.017* (0.007)	0.018** (0.006)	0.020*** (0.004)	0.020*** (0.005)	0.017*** (0.004)	0.007* (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.026 (0.015)	0.012 (0.011)	0.011 (0.008)	0.006 (0.007)	0.004 (0.003)	-0.002 (0.002)
Household with Black (non-Hispanic) members	0.020** (0.008)	0.016* (0.007)	0.022*** (0.006)	0.016*** (0.004)	0.006 (0.004)	-0.003 (0.002)
Household with members from other ethnicity	0.003 (0.003)	0.002 (0.002)	0.003 (0.002)	0.002 (0.002)	0.002 (0.001)	0.001 (0.001)

REGION (Ref.: Atlantic)						
Midwest	0.028* (0.013)	0.023 (0.012)	0.024* (0.012)	0.022* (0.010)	0.015* (0.007)	0.004 (0.005)
Southern	0.055* (0.023)	0.042* (0.018)	0.058** (0.021)	0.058** (0.020)	0.040** (0.014)	0.015* (0.007)
Pacific and Mountain states	0.015 (0.015)	0.029 (0.016)	0.034 (0.018)	0.035 (0.019)	0.025 (0.014)	0.013 (0.010)
Constant	-0.223*** (0.058)	-0.106* (0.047)	-0.218*** (0.036)	-0.254*** (0.035)	-0.249*** (0.031)	-0.225*** (0.025)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

4. Income concept used for dependent variable: Household labor income

4.1. Labor income sample, using different model specifications

Table 28: Labor income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of household labor income, selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.353*** (0.041)	8.808*** (0.022)	9.338*** (0.016)	9.618*** (0.015)	10.026*** (0.018)	10.632*** (0.020)
1989	7.797*** (0.072)	8.425*** (0.063)	9.130*** (0.038)	9.489*** (0.034)	9.941*** (0.028)	10.510*** (0.022)
Difference	0.556*** (0.066)	0.382*** (0.059)	0.207*** (0.031)	0.129*** (0.028)	0.085*** (0.019)	0.122*** (0.012)
Composition	0.414*** (0.078)	0.415*** (0.048)	0.426*** (0.033)	0.427*** (0.027)	0.407*** (0.023)	0.300*** (0.015)
Income Structure	0.143 (0.077)	-0.032 (0.069)	-0.218*** (0.040)	-0.298*** (0.032)	-0.322*** (0.022)	-0.178*** (0.015)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.000 (0.001)	0.002 (0.003)	0.005 (0.005)	0.006 (0.006)	0.005 (0.005)	0.004 (0.004)
Household: inactive / jobless	0.005* (0.002)	0.003* (0.001)	0.003** (0.001)	0.003** (0.001)	0.002** (0.001)	0.001* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.637*** (0.085)	0.400*** (0.043)	0.213*** (0.024)	0.161*** (0.016)	0.085*** (0.011)	0.005 (0.004)
Single, medium education	-0.204*** (0.040)	-0.111*** (0.021)	-0.051*** (0.009)	-0.032*** (0.006)	-0.009** (0.003)	0.007*** (0.002)

Single, high education	-0.287*** (0.048)	-0.150*** (0.025)	-0.051*** (0.011)	-0.017* (0.007)	0.026*** (0.005)	0.058*** (0.004)
Couple, low/low education	0.104* (0.048)	0.129*** (0.028)	0.186*** (0.020)	0.187*** (0.016)	0.158*** (0.011)	0.069*** (0.006)
Couple, medium/low education	0.052** (0.017)	0.046*** (0.012)	0.047*** (0.007)	0.043*** (0.005)	0.045*** (0.003)	0.027*** (0.003)
Couple, high/medium education	0.004 (0.006)	0.007 (0.004)	0.008*** (0.002)	0.011*** (0.002)	0.018*** (0.002)	0.025*** (0.002)
Couple, high/high education	0.016 (0.009)	0.023*** (0.006)	0.031*** (0.004)	0.038*** (0.005)	0.059*** (0.003)	0.092*** (0.004)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.009 (0.020)	-0.007 (0.016)	-0.005 (0.011)	-0.004 (0.009)	-0.003 (0.006)	-0.001 (0.003)
Jobless household	0.001 (0.002)	-0.002 (0.002)	-0.003* (0.002)	-0.004* (0.002)	-0.005* (0.002)	-0.003* (0.001)
Double-earner household	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.002*** (0.001)	0.008*** (0.001)	0.015*** (0.002)
Trad. breadwinner	-0.000 (0.000)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.002 (0.003)	0.001 (0.002)
Both in part-time	0.001 (0.001)	0.002* (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.002*** (0.000)
Precarious	0.023*** (0.006)	0.019*** (0.005)	0.014*** (0.004)	0.012*** (0.003)	0.009*** (0.002)	0.004*** (0.001)
Single working fulltime	0.032 (0.020)	0.017 (0.011)	0.007 (0.004)	0.004 (0.002)	0.001 (0.001)	-0.000 (0.000)
Single working part-time	-0.007 (0.004)	-0.000 (0.001)	0.003 (0.002)	0.004 (0.002)	0.004* (0.002)	0.002* (0.001)
Young household	0.040*** (0.005)	0.026*** (0.004)	0.017*** (0.002)	0.016*** (0.002)	0.015*** (0.002)	0.014*** (0.001)
Single-mother household	0.015*** (0.003)	0.012*** (0.002)	0.012*** (0.002)	0.011*** (0.002)	0.010*** (0.002)	0.006*** (0.001)
Couple without children	-0.000 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.007** (0.002)	0.007** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.004*** (0.001)
Household with self-employed member	-0.004** (0.001)	-0.003*** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.000 (0.001)	-0.000 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.007 (0.007)	0.005 (0.004)	-0.007* (0.003)	-0.012*** (0.003)	-0.017*** (0.003)	-0.017*** (0.003)
Household with Black (non-Hispanic) members	-0.014*** (0.004)	-0.008** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)
Household with members from other ethnicity	-0.003 (0.006)	-0.003 (0.003)	-0.007** (0.002)	-0.005* (0.002)	-0.007*** (0.002)	-0.004*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.004 (0.003)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.003* (0.001)
Southern	-0.004 (0.004)	-0.001 (0.002)	-0.002 (0.001)	-0.002 (0.001)	-0.003* (0.001)	-0.005* (0.002)
Pacific and Mountain states	-0.000 (0.002)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.000 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.053* (0.024)	0.041** (0.016)	0.024** (0.009)	-0.002 (0.007)	-0.010* (0.004)	-0.015*** (0.002)
Household: inactive / jobless	0.033 (0.022)	0.025 (0.013)	-0.002 (0.007)	-0.014** (0.005)	-0.012*** (0.003)	-0.008*** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.020 (0.143)	0.114 (0.084)	-0.037 (0.043)	-0.075** (0.028)	-0.038* (0.017)	0.037*** (0.006)
Single, medium education	0.182 (0.094)	0.217*** (0.053)	0.024 (0.025)	-0.020 (0.017)	-0.014 (0.008)	0.007 (0.004)
Single, high education	0.054* (0.024)	0.062*** (0.014)	0.012 (0.007)	0.001 (0.005)	0.007* (0.003)	0.013*** (0.002)
Couple, low/low education	-0.046 (0.060)	-0.085** (0.032)	-0.137*** (0.020)	-0.121*** (0.016)	-0.075*** (0.010)	0.027*** (0.007)
Couple, medium/low education	-0.073** (0.025)	-0.058** (0.019)	-0.055*** (0.009)	-0.048*** (0.006)	-0.045*** (0.005)	-0.006 (0.004)
Couple, high/medium education	0.000 (0.009)	-0.001 (0.007)	0.004 (0.003)	0.008** (0.002)	0.010*** (0.002)	0.011*** (0.002)
Couple, high/high education	0.003 (0.003)	0.003 (0.002)	0.005*** (0.001)	0.006*** (0.001)	0.007*** (0.001)	0.009*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.171*** (0.040)	0.228*** (0.024)	0.130*** (0.009)	0.073*** (0.006)	0.025*** (0.004)	-0.009*** (0.002)
Jobless household	0.030 (0.021)	0.018 (0.015)	0.017* (0.008)	0.017** (0.005)	0.005* (0.003)	-0.001 (0.001)

Double-earner household	0.002 (0.008)	0.005 (0.005)	0.013** (0.005)	0.001 (0.005)	-0.006 (0.005)	0.006 (0.004)
Trad. breadwinner	-0.003 (0.008)	-0.005 (0.007)	-0.020*** (0.005)	-0.031*** (0.008)	-0.040*** (0.005)	-0.026*** (0.005)
Both in part-time	-0.003 (0.003)	-0.001 (0.003)	0.007** (0.003)	0.008** (0.003)	0.006*** (0.002)	0.002* (0.001)
Precarious	0.036* (0.016)	0.053*** (0.011)	0.032*** (0.006)	0.018*** (0.004)	0.005 (0.003)	-0.002 (0.001)
Single working fulltime	-0.303 (0.158)	-0.370*** (0.093)	-0.048 (0.045)	0.022 (0.032)	0.014 (0.015)	-0.010 (0.008)
Single working part-time	-0.093* (0.047)	-0.076** (0.026)	0.021 (0.012)	0.031*** (0.008)	0.016** (0.005)	-0.002 (0.003)
Young household	-0.030 (0.019)	-0.018 (0.015)	-0.014 (0.009)	-0.011 (0.007)	-0.008 (0.006)	-0.007* (0.003)
Single-mother household	0.078*** (0.022)	0.065*** (0.012)	0.017* (0.007)	0.006 (0.004)	-0.001 (0.003)	0.001 (0.002)
Couple without children	0.012 (0.014)	0.013 (0.007)	0.000 (0.004)	-0.001 (0.002)	-0.003 (0.003)	-0.006* (0.002)
Large household (3+ children)	0.010 (0.017)	0.014 (0.013)	0.004 (0.004)	0.002 (0.004)	0.004 (0.003)	0.003 (0.001)
Household with self-employed member	0.025 (0.015)	0.027** (0.010)	0.020** (0.007)	0.021*** (0.005)	0.017*** (0.005)	0.012*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.013 (0.013)	0.021 (0.012)	0.010 (0.010)	0.010 (0.007)	0.007 (0.006)	-0.003 (0.002)
Household with Black (non-Hispanic) members	0.054*** (0.015)	0.055*** (0.012)	0.013 (0.007)	0.013* (0.005)	0.007 (0.004)	-0.006** (0.002)
Household with members from other ethnicity	0.003 (0.006)	0.006 (0.006)	0.003 (0.003)	0.003 (0.002)	0.001 (0.002)	0.002 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.046 (0.029)	0.067* (0.032)	0.020 (0.012)	0.027* (0.012)	0.016* (0.008)	-0.000 (0.006)
Southern	0.100* (0.049)	0.094* (0.044)	0.053** (0.020)	0.060** (0.021)	0.043** (0.015)	0.013 (0.008)
Pacific and Mountain states	0.004 (0.019)	0.025 (0.026)	0.019 (0.013)	0.027 (0.015)	0.026 (0.015)	0.014 (0.010)
Constant	-0.233** (0.074)	-0.571*** (0.083)	-0.354*** (0.042)	-0.329*** (0.034)	-0.286*** (0.030)	-0.233*** (0.030)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

5. Income concept used for dependent variable: Household market income

5.1. Market income sample, using different model specifications

Table 29: Market income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	3.066*** (0.193)	5.572*** (0.196)	8.231*** (0.076)	9.039*** (0.038)	9.724*** (0.022)	10.532*** (0.019)
1989	6.922*** (0.061)	7.770*** (0.056)	8.778*** (0.040)	9.258*** (0.032)	9.792*** (0.027)	10.476*** (0.021)
Difference	-3.855*** (0.174)	-2.197*** (0.171)	-0.547*** (0.062)	-0.219*** (0.032)	-0.069** (0.022)	0.056*** (0.012)
Composition	2.093*** (0.391)	1.494*** (0.280)	0.686*** (0.110)	0.537*** (0.043)	0.474*** (0.027)	0.356*** (0.018)
Income Structure	-5.948*** (0.474)	-3.691*** (0.346)	-1.233*** (0.125)	-0.756*** (0.046)	-0.543*** (0.030)	-0.300*** (0.016)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	-0.009 (0.009)	-0.008 (0.008)	-0.003 (0.003)	0.002 (0.002)	0.005 (0.005)	0.004 (0.004)
Household: inactive / jobless	0.073 (0.052)	0.071 (0.050)	0.026 (0.018)	0.011 (0.008)	0.004 (0.003)	0.001 (0.001)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	2.433*** (0.414)	1.605*** (0.255)	0.581*** (0.073)	0.316*** (0.033)	0.154*** (0.015)	0.028*** (0.005)
Single, medium education	-0.716*** (0.134)	-0.499*** (0.093)	-0.169*** (0.029)	-0.079*** (0.012)	-0.031*** (0.005)	0.002 (0.002)
Single, high education	-0.496*** (0.128)	-0.342*** (0.075)	-0.083*** (0.021)	-0.026* (0.011)	0.011 (0.006)	0.055*** (0.003)
Couple, low/low education	0.499** (0.160)	0.400** (0.129)	0.157** (0.060)	0.166*** (0.026)	0.200*** (0.016)	0.104*** (0.009)
Couple, medium/low education	0.163 (0.097)	0.140 (0.078)	0.045* (0.019)	0.044*** (0.009)	0.043*** (0.005)	0.032*** (0.003)
Couple, high/medium education	0.107*** (0.030)	0.094*** (0.017)	0.049*** (0.007)	0.030*** (0.004)	0.019*** (0.002)	0.027*** (0.002)
Couple, high/high education	0.328*** (0.049)	0.288*** (0.035)	0.127*** (0.015)	0.076*** (0.008)	0.058*** (0.004)	0.091*** (0.004)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.002 (0.003)	0.009 (0.011)	0.011 (0.013)	0.010 (0.011)	0.008 (0.009)	0.004 (0.004)
Jobless household	0.026 (0.014)	0.006 (0.009)	-0.018*** (0.005)	-0.016*** (0.004)	-0.014*** (0.003)	-0.008*** (0.002)
Double-earner household	0.019*** (0.004)	0.018*** (0.004)	0.006*** (0.002)	0.002 (0.001)	0.003*** (0.001)	0.012*** (0.002)
Trad. breadwinner	-0.007 (0.011)	-0.006 (0.010)	-0.002 (0.004)	-0.000 (0.001)	0.001 (0.002)	0.001 (0.002)
Both in part-time	-0.002 (0.001)	-0.002 (0.001)	-0.000 (0.001)	0.002** (0.001)	0.003*** (0.001)	0.002*** (0.000)
Precarious	-0.024*** (0.006)	-0.019*** (0.005)	0.007*** (0.002)	0.011*** (0.003)	0.009*** (0.002)	0.004*** (0.001)
Single working fulltime	0.076 (0.049)	0.057 (0.037)	0.021 (0.013)	0.009 (0.006)	0.002 (0.002)	0.000 (0.000)
Single working part-time	-0.035* (0.018)	-0.027* (0.013)	-0.007* (0.004)	-0.000 (0.001)	0.003* (0.002)	0.002* (0.001)
Young household	0.009 (0.011)	0.006 (0.008)	0.017*** (0.004)	0.014*** (0.002)	0.012*** (0.002)	0.014*** (0.001)
Single-mother household	-0.025*** (0.006)	-0.024*** (0.006)	0.004* (0.002)	0.007*** (0.001)	0.010*** (0.001)	0.006*** (0.001)
Couple without children	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)

Large household (3+ children)	-0.002 (0.002)	-0.000 (0.001)	0.004** (0.001)	0.006*** (0.002)	0.007*** (0.002)	0.004*** (0.001)
Household with self-employed member	-0.181*** (0.032)	-0.176*** (0.031)	-0.064*** (0.011)	-0.024*** (0.004)	-0.008*** (0.002)	-0.002*** (0.001)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.026 (0.024)	-0.011 (0.014)	0.003 (0.007)	-0.003 (0.003)	-0.012*** (0.003)	-0.017*** (0.003)
Household with Black (non-Hispanic) members	-0.043*** (0.012)	-0.038** (0.012)	-0.017*** (0.004)	-0.010*** (0.002)	-0.007*** (0.002)	-0.006*** (0.001)
Household with members from other ethnicity	-0.080** (0.029)	-0.043* (0.019)	-0.013* (0.006)	-0.009*** (0.003)	-0.007*** (0.002)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.002 (0.010)	0.008 (0.009)	-0.000 (0.002)	0.000 (0.001)	0.000 (0.001)	0.002 (0.001)
Southern	-0.000 (0.017)	-0.015 (0.015)	0.001 (0.003)	-0.001 (0.002)	-0.002 (0.001)	-0.004* (0.002)
Pacific and Mountain states	0.004 (0.008)	0.002 (0.006)	0.004 (0.003)	0.002 (0.002)	0.003 (0.002)	0.001 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.128*** (0.017)	0.120*** (0.016)	0.073*** (0.009)	0.033*** (0.010)	-0.013* (0.006)	-0.018*** (0.002)
Household: inactive / jobless	-3.367*** (0.166)	-3.442*** (0.171)	-1.167*** (0.050)	-0.403*** (0.023)	-0.117*** (0.010)	-0.027*** (0.005)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	-2.062*** (0.471)	-1.177*** (0.274)	-0.238** (0.086)	-0.071 (0.040)	0.008 (0.017)	0.072*** (0.009)
Single, medium education	-0.792*** (0.180)	-0.457*** (0.122)	-0.079* (0.037)	-0.020 (0.016)	0.001 (0.008)	0.019*** (0.004)
Single, high education	-0.092 (0.049)	-0.046 (0.029)	0.006 (0.009)	0.007 (0.004)	0.007* (0.003)	0.015*** (0.002)
Couple, low/low education	-0.428* (0.170)	-0.308* (0.140)	-0.043 (0.066)	-0.060* (0.029)	-0.087*** (0.015)	0.009 (0.010)
Couple, medium/low education	-0.224 (0.133)	-0.187 (0.107)	-0.053 (0.028)	-0.052*** (0.013)	-0.047*** (0.007)	-0.016*** (0.004)
Couple, high/medium education	0.087** (0.028)	0.076*** (0.016)	0.039*** (0.006)	0.020*** (0.003)	0.009*** (0.002)	0.011*** (0.002)
Couple, high/high education	0.046*** (0.007)	0.041*** (0.006)	0.018*** (0.003)	0.010*** (0.002)	0.007*** (0.001)	0.009*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	0.088 (0.179)	-0.256* (0.110)	-0.292*** (0.034)	-0.191*** (0.024)	-0.146*** (0.012)	-0.080*** (0.008)
Jobless household	0.216*** (0.050)	0.115*** (0.033)	-0.008 (0.013)	-0.011 (0.010)	-0.010** (0.004)	-0.013*** (0.002)
Double-earner household	0.089*** (0.020)	0.089*** (0.021)	0.034*** (0.007)	0.008 (0.005)	-0.009 (0.005)	0.007 (0.004)
Trad. breadwinner	0.300*** (0.019)	0.289*** (0.019)	0.108*** (0.008)	0.032*** (0.005)	-0.025*** (0.005)	-0.029*** (0.005)
Both in part-time	0.002 (0.004)	0.004 (0.004)	0.005 (0.003)	0.005* (0.002)	0.005* (0.002)	0.000 (0.001)
Precarious	0.156*** (0.011)	0.170*** (0.015)	0.025*** (0.006)	-0.000 (0.004)	-0.008** (0.003)	-0.008*** (0.002)
Single working fulltime	1.351*** (0.241)	0.908*** (0.148)	0.246*** (0.045)	0.059* (0.027)	-0.012 (0.015)	-0.024*** (0.007)
Single working part-time	0.388*** (0.063)	0.294*** (0.041)	0.097*** (0.016)	0.031*** (0.009)	-0.005 (0.005)	-0.011*** (0.002)
Young household	0.056 (0.039)	0.063* (0.027)	-0.009 (0.014)	-0.005 (0.008)	0.003 (0.006)	-0.006 (0.004)
Single-mother household	0.241*** (0.037)	0.274*** (0.035)	0.049*** (0.009)	0.019*** (0.006)	-0.007* (0.003)	-0.003* (0.002)
Couple without children	0.005 (0.027)	-0.015 (0.019)	0.013 (0.010)	0.001 (0.004)	-0.002 (0.002)	-0.004 (0.002)
Large household (3+ children)	0.067*** (0.016)	0.052*** (0.012)	0.024** (0.008)	0.005 (0.003)	-0.000 (0.003)	-0.000 (0.002)
Household with self-employed member	1.049*** (0.059)	1.042*** (0.060)	0.371*** (0.022)	0.135*** (0.009)	0.045*** (0.004)	0.013*** (0.003)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.011 (0.030)	0.007 (0.018)	0.022* (0.010)	0.017* (0.008)	0.013* (0.005)	-0.001 (0.002)
Household with Black (non-Hispanic) members	-0.022 (0.040)	-0.037 (0.039)	-0.000 (0.009)	0.007 (0.006)	0.015** (0.005)	-0.002 (0.002)
Household with members from other ethnicity	-0.022 (0.017)	-0.006 (0.011)	0.004 (0.004)	0.004 (0.002)	0.003 (0.002)	0.003* (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.003 (0.074)	-0.032 (0.071)	0.029 (0.023)	0.019 (0.014)	0.023* (0.010)	0.012 (0.006)

Southern	0.020 (0.144)	-0.091 (0.131)	0.058 (0.039)	0.047* (0.021)	0.048** (0.017)	0.017 (0.009)
Pacific and Mountain states	-0.013 (0.070)	-0.016 (0.057)	0.021 (0.020)	0.015 (0.014)	0.029 (0.016)	0.020 (0.011)
Constant	-3.229*** (0.391)	-1.167*** (0.274)	-0.586*** (0.103)	-0.416*** (0.057)	-0.269*** (0.033)	-0.264*** (0.031)
Observations	116963	116963	116963	116963	116963	116963

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

5.2. Labor income sample, using different model specifications

Table 30: Labor income sample, models without controls for redistribution: Results of multivariate OB-decompositions of unconditional quantile regressions estimating the contribution of households with minimum wage earners, of households with varying income tax and social security tax liability and other covariates on changes of percentiles of the distribution of gross household income (excl. tax refunds), selected percentiles

	P3	P5	P10	P15	P25	P50
overall						
2018	8.619*** (0.030)	8.988*** (0.025)	9.457*** (0.018)	9.728*** (0.018)	10.102*** (0.020)	10.693*** (0.021)
1989	8.467*** (0.065)	8.872*** (0.050)	9.416*** (0.036)	9.705*** (0.033)	10.074*** (0.027)	10.597*** (0.022)
Difference	0.152** (0.057)	0.116** (0.040)	0.041 (0.028)	0.024 (0.024)	0.027 (0.017)	0.096*** (0.012)
Composition	0.538*** (0.064)	0.573*** (0.050)	0.471*** (0.034)	0.477*** (0.026)	0.422*** (0.024)	0.312*** (0.015)
Income Structure	-0.386*** (0.080)	-0.457*** (0.065)	-0.430*** (0.042)	-0.453*** (0.031)	-0.395*** (0.020)	-0.216*** (0.015)
explained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.001 (0.002)	0.003 (0.004)	0.005 (0.006)	0.006 (0.006)	0.005 (0.005)	0.004 (0.004)
Household: inactive / jobless	0.003* (0.001)	0.003* (0.001)	0.002** (0.001)	0.002** (0.001)	0.001* (0.001)	0.001* (0.000)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.578*** (0.061)	0.412*** (0.047)	0.212*** (0.024)	0.163*** (0.017)	0.087*** (0.012)	0.016** (0.005)
Single, medium education	-0.166*** (0.031)	-0.102*** (0.019)	-0.049*** (0.008)	-0.032*** (0.006)	-0.013** (0.004)	0.003 (0.002)
Single, high education	-0.210*** (0.034)	-0.115*** (0.020)	-0.040*** (0.009)	-0.011 (0.009)	0.025*** (0.007)	0.056*** (0.004)
Couple, low/low education	0.150*** (0.037)	0.212*** (0.032)	0.205*** (0.020)	0.211*** (0.016)	0.166*** (0.013)	0.069*** (0.007)
Couple, medium/low education	0.060*** (0.016)	0.061*** (0.011)	0.054*** (0.006)	0.053*** (0.005)	0.049*** (0.004)	0.027*** (0.003)
Couple, high/medium education	0.018*** (0.005)	0.014*** (0.004)	0.012*** (0.002)	0.014*** (0.002)	0.020*** (0.002)	0.027*** (0.002)
Couple, high/high education	0.045*** (0.010)	0.041*** (0.006)	0.041*** (0.005)	0.049*** (0.004)	0.065*** (0.003)	0.100*** (0.004)

HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.006 (0.012)	-0.005 (0.010)	-0.003 (0.007)	-0.003 (0.006)	-0.002 (0.005)	-0.001 (0.002)
Jobless household	0.001 (0.002)	-0.002 (0.002)	-0.003* (0.001)	-0.004* (0.002)	-0.004* (0.002)	-0.003* (0.001)
Double-earner household	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.003*** (0.001)	0.008*** (0.001)	0.014*** (0.002)
Trad. breadwinner	0.000 (0.000)	0.001 (0.001)	0.001 (0.002)	0.002 (0.003)	0.002 (0.003)	0.001 (0.001)
Both in part-time	0.001 (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.000)
Precarious	0.021*** (0.006)	0.019*** (0.005)	0.013*** (0.003)	0.011*** (0.003)	0.008*** (0.002)	0.003*** (0.001)
Single working fulltime	0.026 (0.016)	0.015 (0.009)	0.007 (0.004)	0.004 (0.002)	0.001 (0.001)	0.000 (0.000)
Single working part-time	-0.004 (0.003)	-0.000 (0.001)	0.003 (0.001)	0.003 (0.002)	0.003 (0.002)	0.002* (0.001)
Young household	0.034*** (0.005)	0.022*** (0.003)	0.015*** (0.002)	0.015*** (0.002)	0.016*** (0.002)	0.016*** (0.001)
Single-mother household	0.009*** (0.002)	0.010*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.009*** (0.001)	0.005*** (0.001)
Couple without children	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Large household (3+ children)	0.007** (0.002)	0.008** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.004*** (0.001)
Household with self-employed member	-0.003** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.001* (0.001)	-0.001 (0.000)	-0.001 (0.000)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	-0.001 (0.006)	-0.002 (0.004)	-0.010** (0.003)	-0.015*** (0.003)	-0.019*** (0.003)	-0.018*** (0.003)
Household with Black (non-Hispanic) members	-0.015*** (0.004)	-0.012*** (0.003)	-0.008*** (0.002)	-0.008*** (0.002)	-0.007*** (0.001)	-0.007*** (0.001)
Household with members from other ethnicity	-0.008 (0.004)	-0.007* (0.003)	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.005*** (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.001 (0.002)	0.002 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.003* (0.001)
Southern	-0.003 (0.003)	-0.004 (0.002)	-0.003* (0.001)	-0.003 (0.001)	-0.003* (0.002)	-0.005* (0.002)
Pacific and Mountain states	0.001 (0.002)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)
unexplained						
MINIMUM WAGE HH (Ref.: Higher-wage hh)						
Household with MW earner(s)	0.061*** (0.018)	0.035* (0.017)	0.005 (0.008)	-0.005 (0.006)	-0.014*** (0.004)	-0.015*** (0.002)
Household: inactive / jobless	0.019 (0.012)	0.001 (0.008)	-0.004 (0.005)	-0.006 (0.004)	-0.008* (0.004)	-0.006** (0.002)
HH's EDUC. COMP. (Ref.: Couple (medium/medium))						
Single, low education	0.124 (0.110)	-0.024 (0.095)	-0.004 (0.036)	-0.016 (0.023)	0.000 (0.015)	0.039*** (0.007)
Single, medium education	0.201** (0.064)	0.084 (0.060)	0.029 (0.021)	0.011 (0.014)	-0.002 (0.009)	0.010** (0.004)
Single, high education	0.060*** (0.016)	0.031* (0.015)	0.015* (0.006)	0.011* (0.004)	0.011*** (0.003)	0.014*** (0.002)
Couple, low/low education	-0.055 (0.038)	-0.126*** (0.034)	-0.124*** (0.020)	-0.121*** (0.015)	-0.071*** (0.012)	0.030*** (0.007)
Couple, medium/low education	-0.074** (0.024)	-0.073*** (0.015)	-0.064*** (0.009)	-0.059*** (0.007)	-0.048*** (0.005)	-0.007 (0.004)
Couple, high/medium education	0.015* (0.006)	0.014** (0.004)	0.008*** (0.002)	0.008*** (0.002)	0.011*** (0.002)	0.013*** (0.002)
Couple, high/high education	0.009*** (0.002)	0.008*** (0.002)	0.006*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	0.010*** (0.001)
HH's LABOR MARKET INT. (Ref.: Modif. breadwinner)						
Pensioner household	-0.023 (0.027)	-0.018 (0.018)	-0.016* (0.007)	-0.027*** (0.005)	-0.028*** (0.004)	-0.019*** (0.002)
Jobless household	0.021 (0.019)	0.015 (0.017)	0.007 (0.007)	0.001 (0.004)	-0.004 (0.002)	-0.006*** (0.001)
Double-earner household	-0.001 (0.007)	0.003 (0.005)	-0.001 (0.005)	-0.010 (0.006)	-0.008 (0.006)	0.009* (0.005)
Trad. breadwinner	0.008 (0.007)	-0.003 (0.007)	-0.017* (0.007)	-0.036*** (0.006)	-0.041*** (0.006)	-0.028*** (0.004)
Both in part-time	0.002 (0.004)	0.004 (0.003)	0.008** (0.002)	0.005* (0.002)	0.003* (0.002)	0.001 (0.001)
Precarious	0.041** (0.014)	0.012 (0.009)	0.012* (0.005)	0.001 (0.004)	-0.006* (0.002)	-0.006*** (0.002)
Single working fulltime	-0.365*** (0.108)	-0.155 (0.109)	-0.063 (0.040)	-0.039 (0.027)	-0.015 (0.015)	-0.017* (0.008)

Single working part-time	-0.047 (0.031)	-0.007 (0.027)	0.003 (0.011)	0.002 (0.008)	-0.002 (0.005)	-0.007** (0.003)
Young household	-0.031 (0.022)	-0.010 (0.013)	0.001 (0.007)	0.008 (0.006)	0.001 (0.004)	-0.005 (0.003)
Single-mother household	0.094*** (0.016)	0.044*** (0.011)	0.000 (0.005)	-0.006 (0.004)	-0.004 (0.003)	0.000 (0.002)
Couple without children	0.032* (0.012)	0.009 (0.007)	-0.000 (0.004)	-0.002 (0.002)	-0.005 (0.003)	-0.007** (0.003)
Large household (3+ children)	0.035* (0.014)	0.019* (0.009)	0.011** (0.004)	0.007 (0.005)	0.004 (0.003)	0.001 (0.001)
Household with self-employed member	0.032** (0.012)	0.031*** (0.009)	0.024*** (0.005)	0.023*** (0.004)	0.019*** (0.004)	0.009** (0.004)
HH's ETHNIC COMP. (Ref.: White members only)						
Household with Hispanic members	0.030 (0.018)	0.026* (0.013)	0.020* (0.010)	0.017* (0.007)	0.010* (0.005)	-0.003 (0.002)
Household with Black (non-Hispanic) members	0.074*** (0.015)	0.040*** (0.010)	0.025*** (0.008)	0.023*** (0.006)	0.011** (0.003)	-0.006** (0.002)
Household with members from other ethnicity	0.011 (0.007)	0.008 (0.005)	0.005* (0.003)	0.004 (0.002)	0.004** (0.002)	0.001 (0.001)
REGION (Ref.: Atlantic)						
Midwest	0.066* (0.033)	0.037 (0.022)	0.023* (0.010)	0.027* (0.011)	0.017** (0.006)	0.004 (0.005)
Southern	0.104* (0.052)	0.072* (0.034)	0.065** (0.022)	0.065** (0.021)	0.043** (0.014)	0.012 (0.006)
Pacific and Mountain states	0.013 (0.022)	0.017 (0.018)	0.038* (0.019)	0.035* (0.018)	0.025 (0.013)	0.017 (0.010)
Constant	-0.841*** (0.090)	-0.551*** (0.059)	-0.442*** (0.033)	-0.379*** (0.027)	-0.307*** (0.027)	-0.255*** (0.026)
Observations	99126	99126	99126	99126	99126	99126

Standard errors in parentheses

Model includes households' educational composition, labor force composition, family formation, demographics

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

I. Robustness checks: Normalized coefficients

1. Robustness checks for Chapter 10.2: Multivariate results for different income concepts: Normalized coefficients

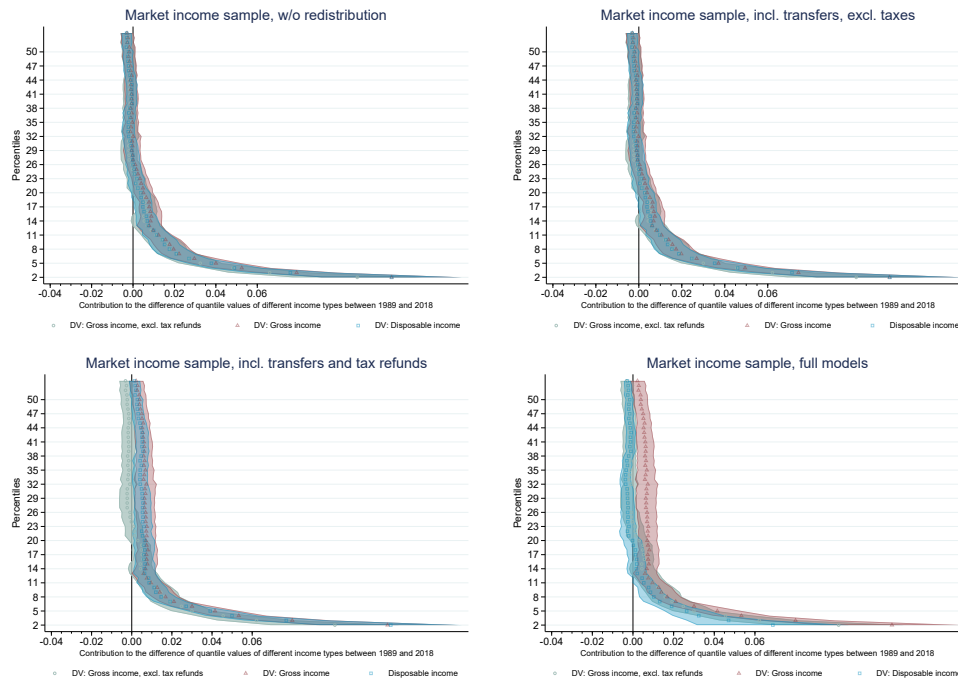


Figure 44: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications (from base model to full specification), market income sample

Note: “DV” indicates the income concept of which changes in percentile values are estimated. Results in different colors show results based on different model specifications, where “Without transfers and tax liab.” refers to the base model, which excludes covariates on household tax liability and transfer receipt. The base model includes the main covariate of households with minimum wage earners and control variables for households’ demographics, family status, ethnicity, self-employment status, educational composition, labor market activity. Normalized coefficients. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

2. Robustness checks for Chapter 10.3: Multivariate results for different model specifications: Normalized coefficients

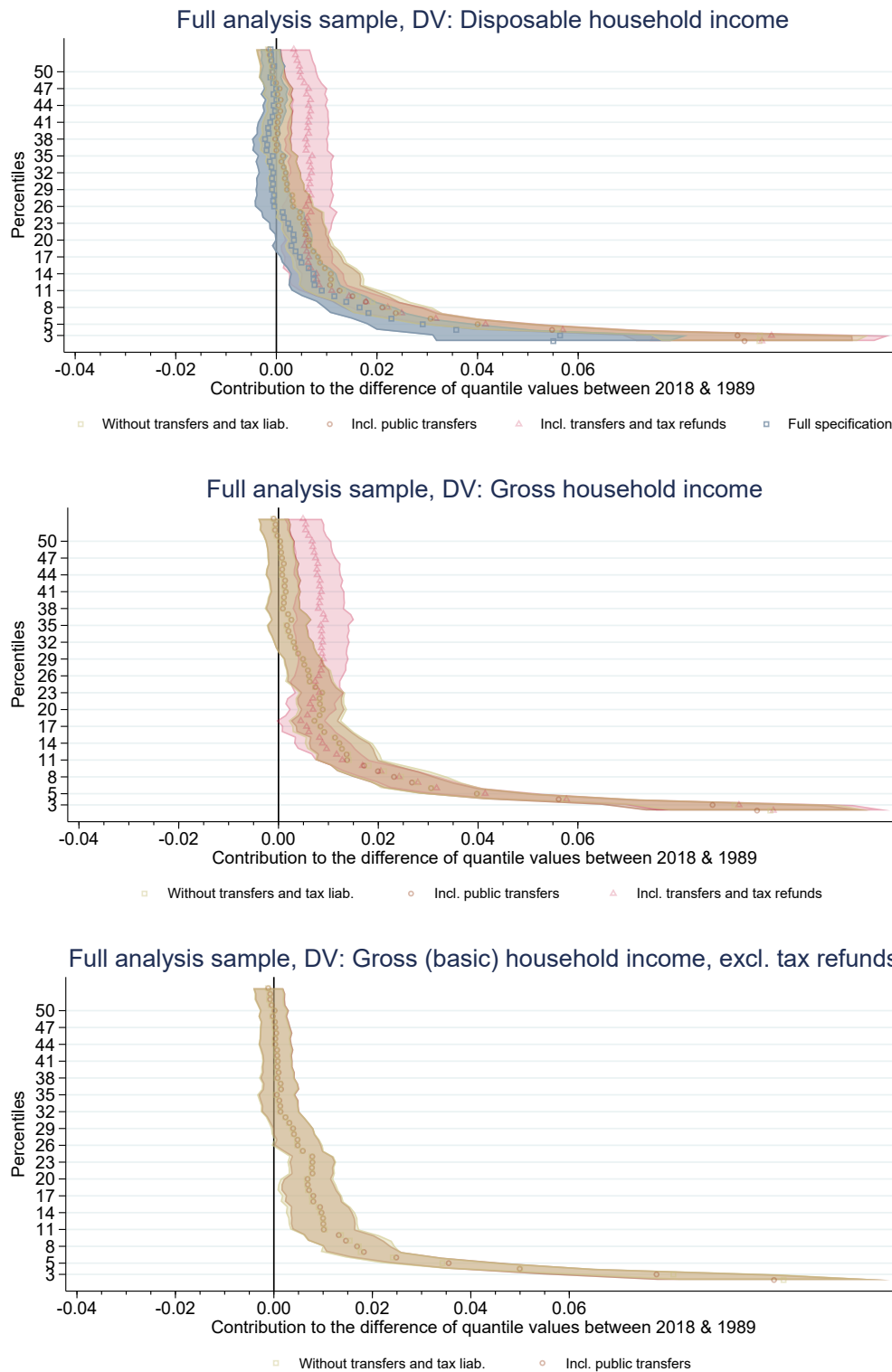


Figure 45: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications, full analysis sample

Note: See footnote below figure 45. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

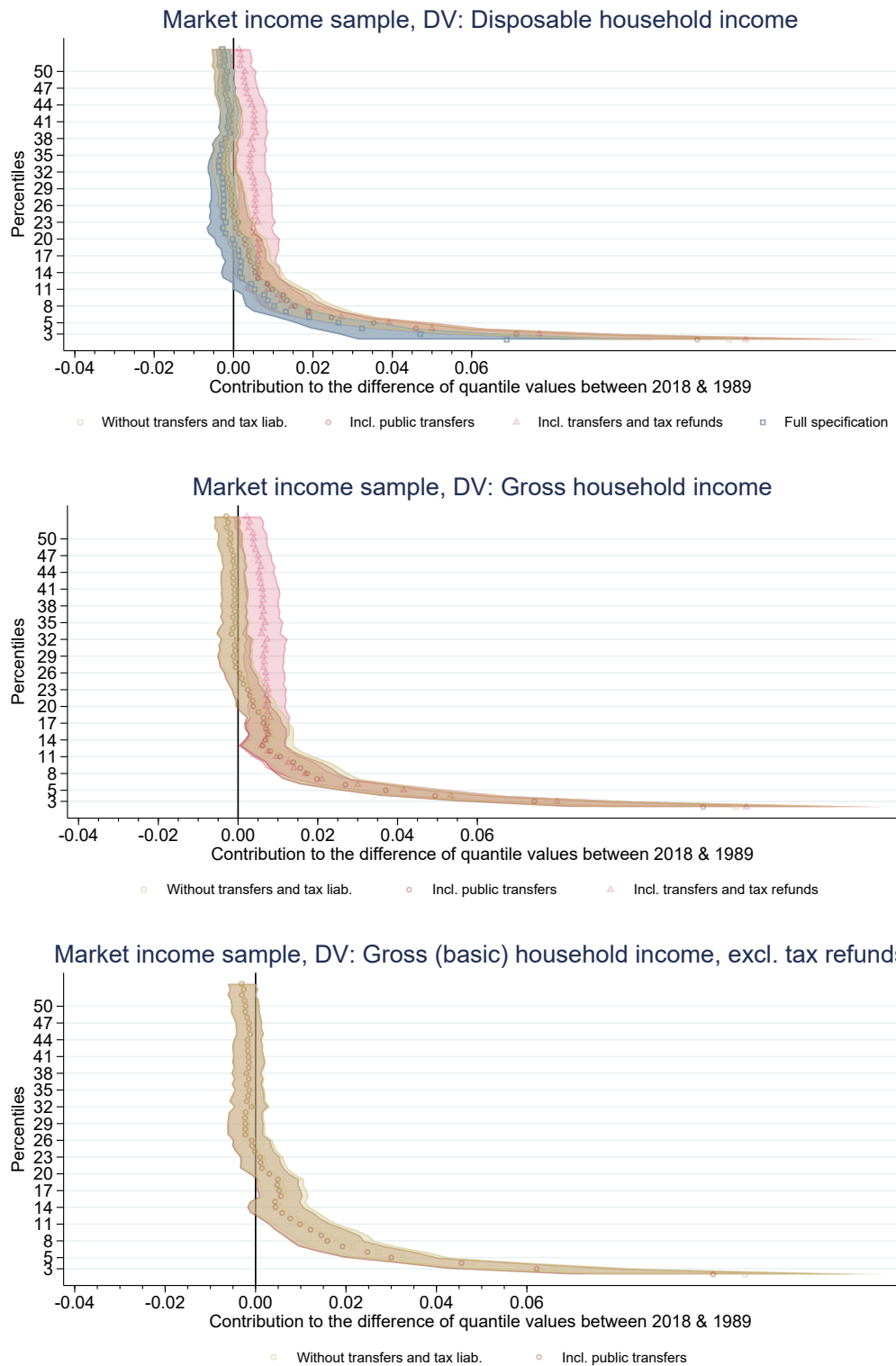


Figure 46: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications, market income sample

Note: See footnote below figure 45. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

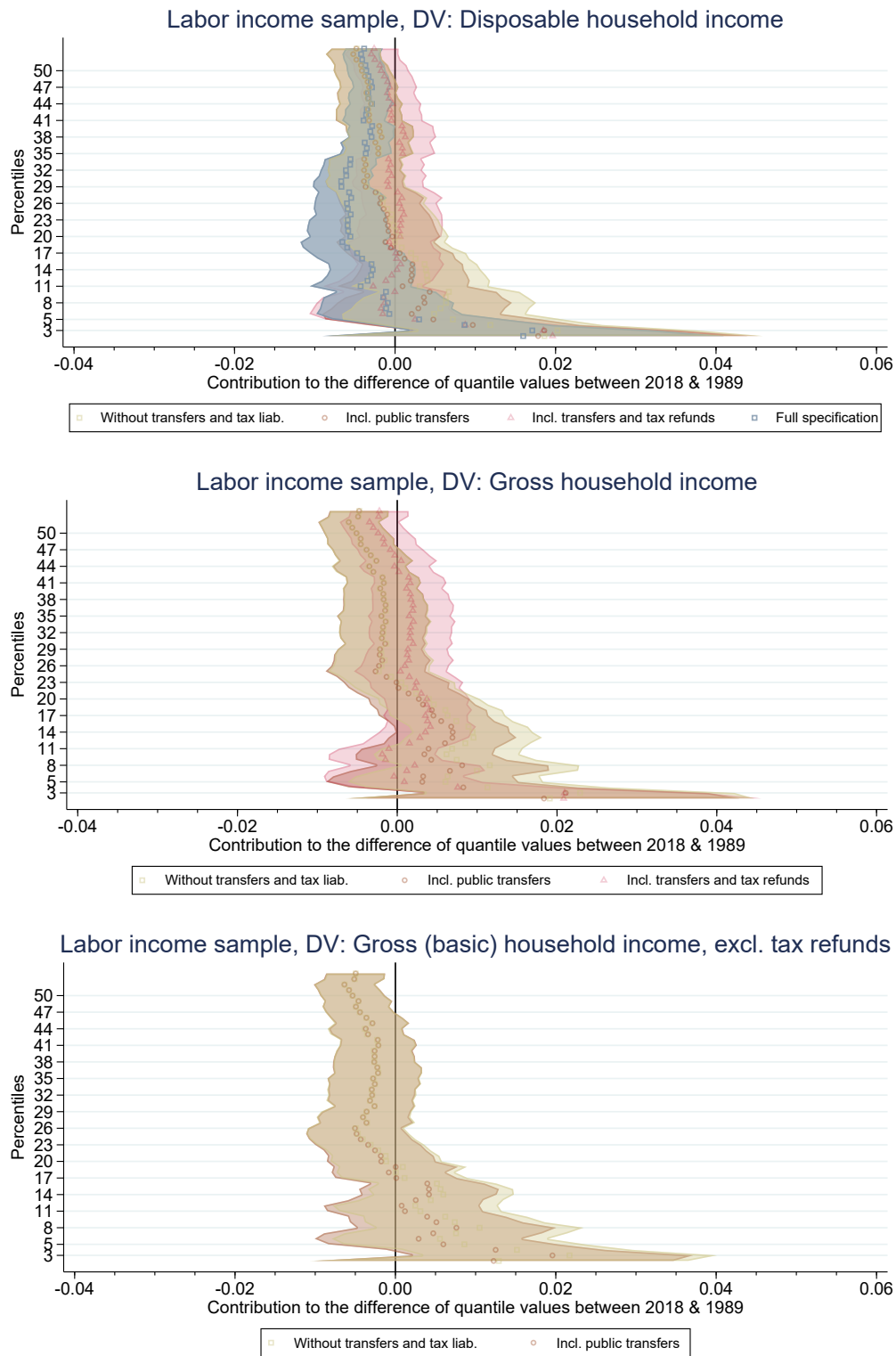


Figure 47: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of total net household income, gross household income, and gross household income excluding tax refunds, for different model specifications, labor income sample

Note: See footnote below figure 45. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

3. Robustness checks for Chapter 10.4: Multivariate results and interaction effects: Normalized coefficients

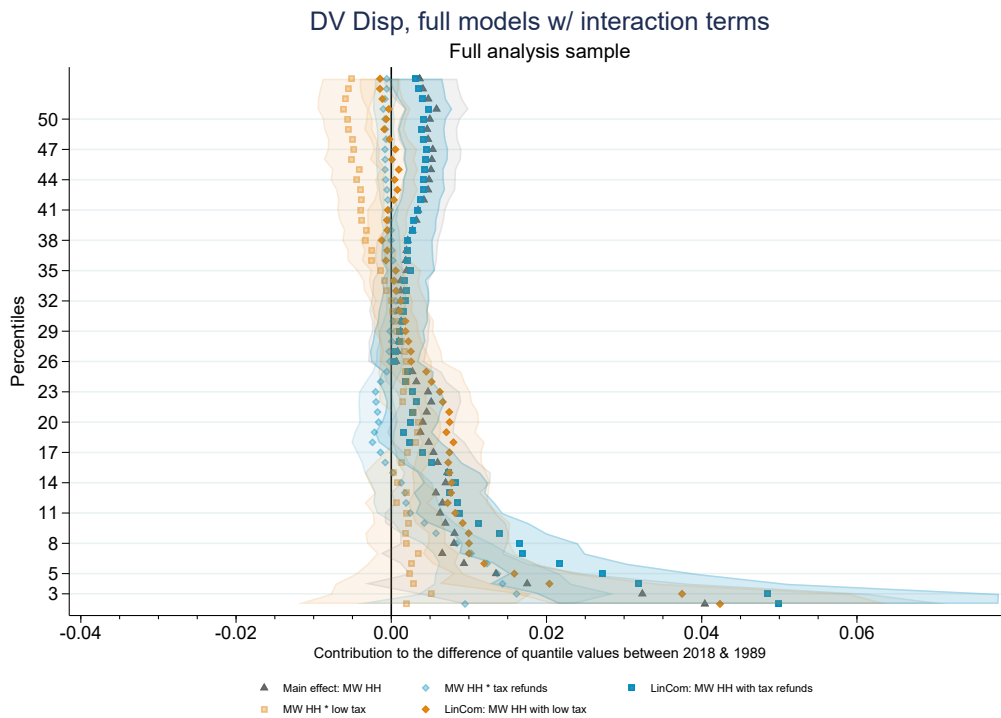


Figure 48: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, market income sample

Note: “DV” indicates the income concept of which changes in percentile values are estimated. Results in different colors show results for different coefficients. “MW HH” means minimum wage households. “LinCom” refers to the linear combination of the main effect and the interaction effect. Normalized coefficients. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

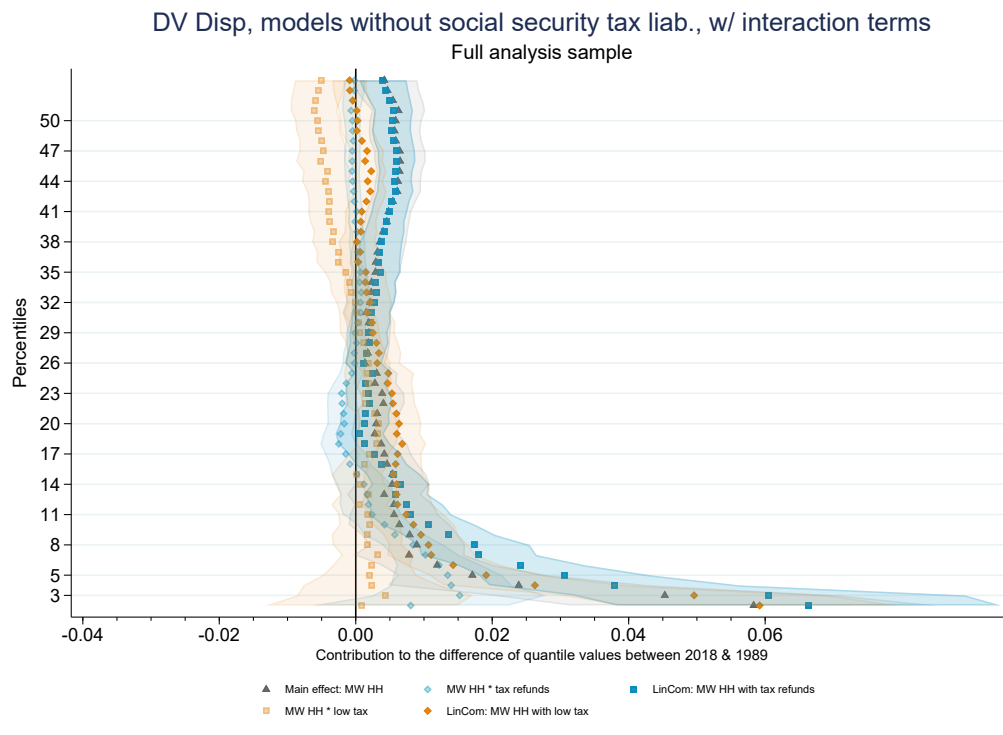


Figure 49: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household social security tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

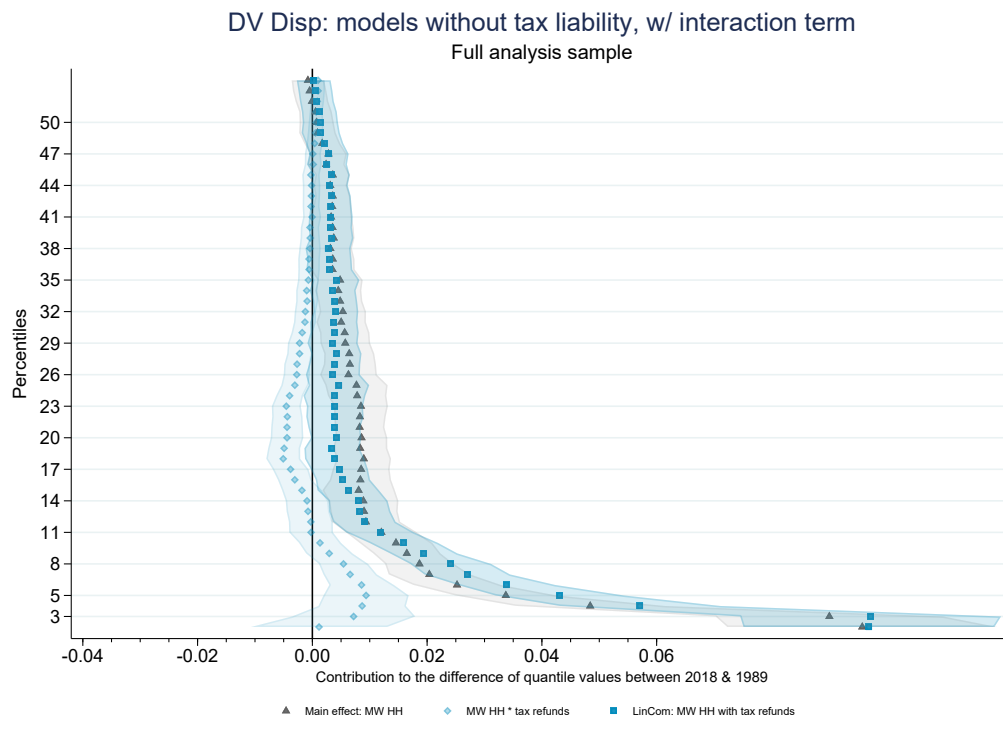


Figure 50: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

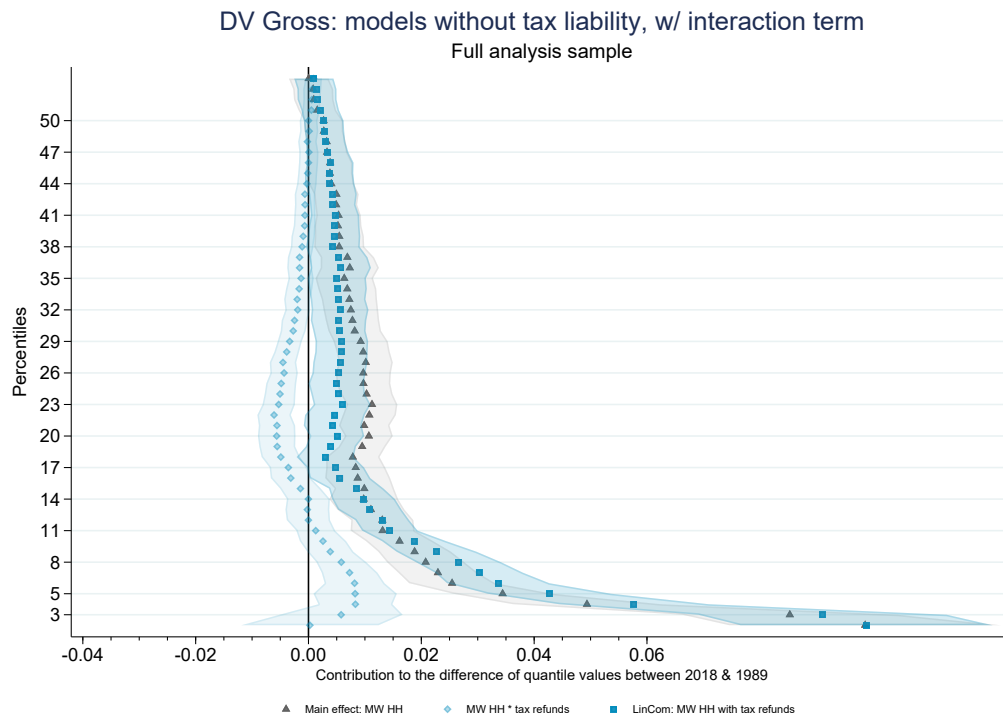


Figure 51: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of gross household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

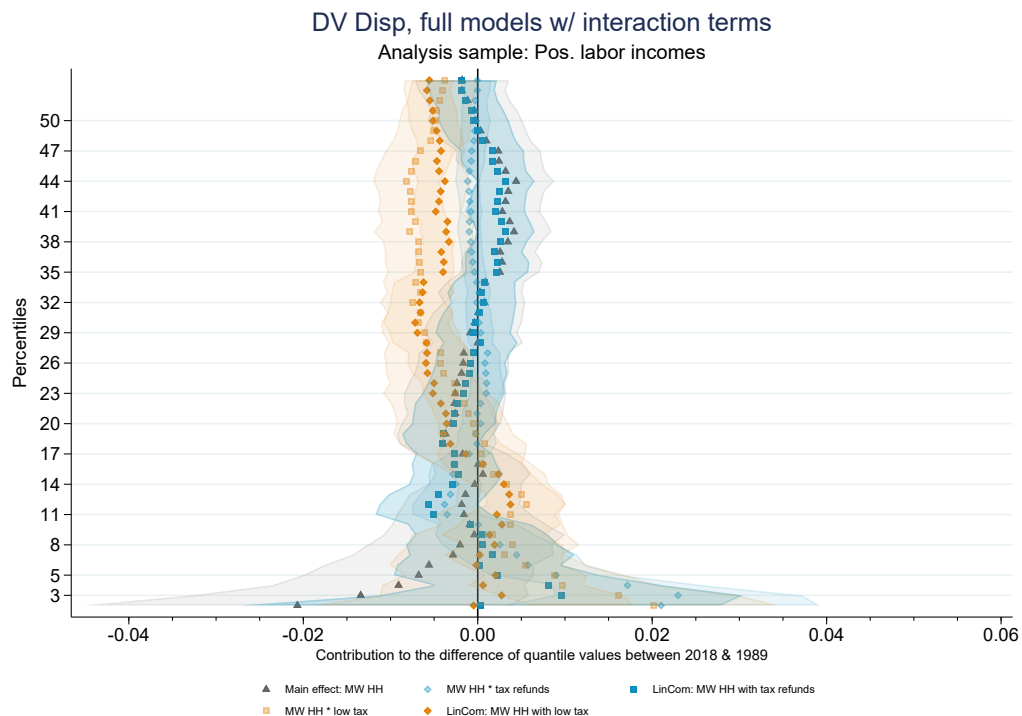


Figure 52: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

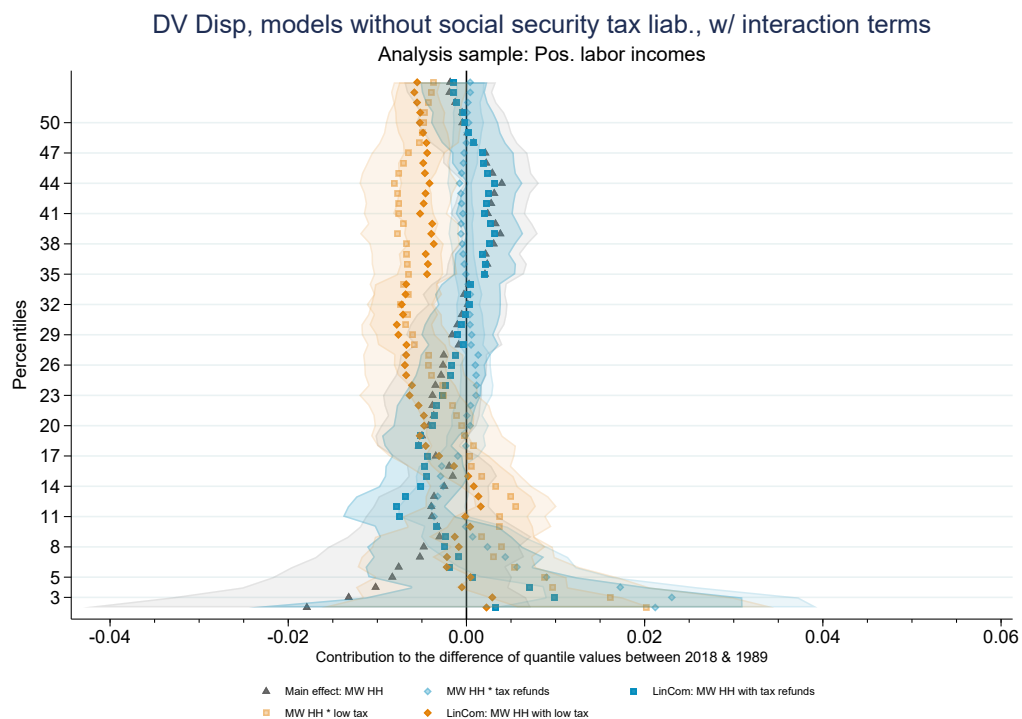


Figure 53: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household social security tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

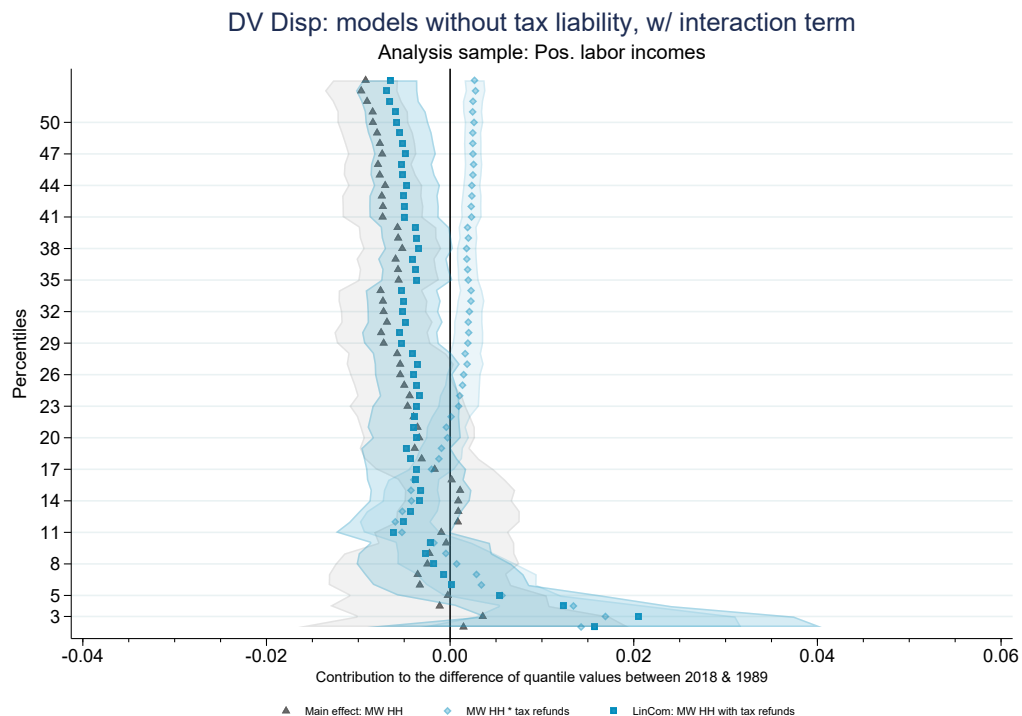


Figure 54: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

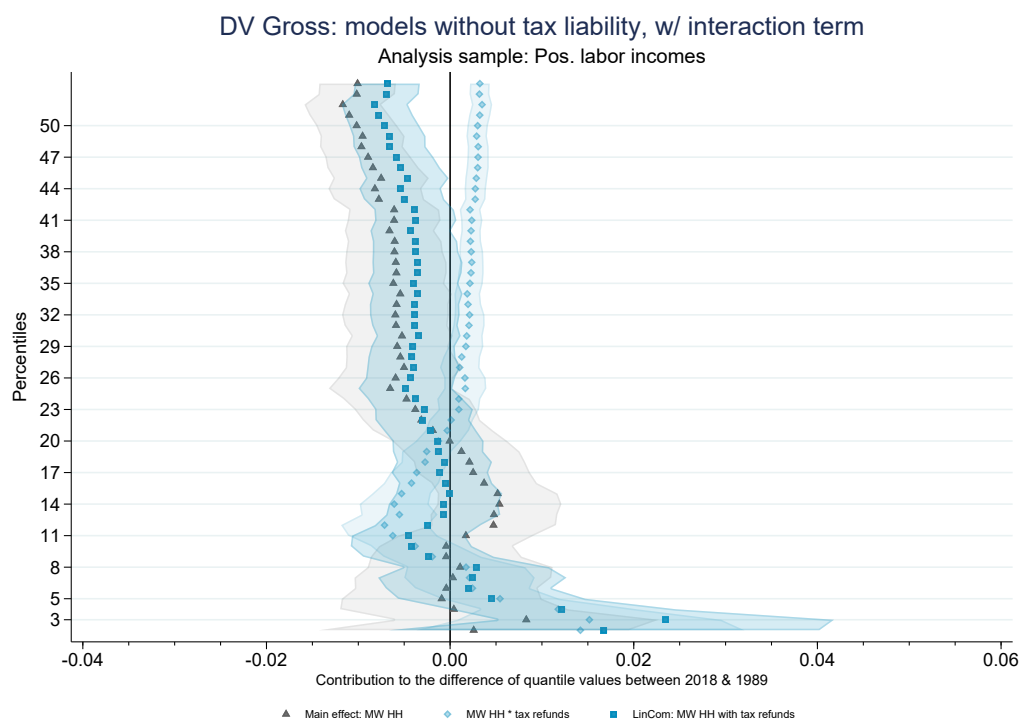


Figure 55: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of gross household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

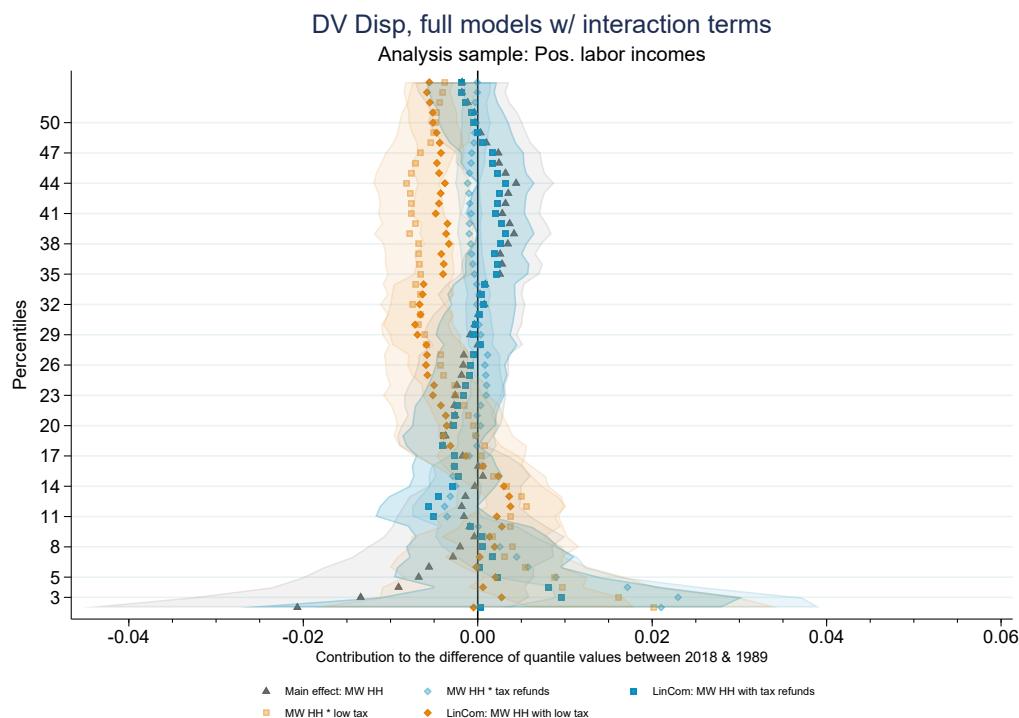


Figure 56: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on the full model specification with interaction effects, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

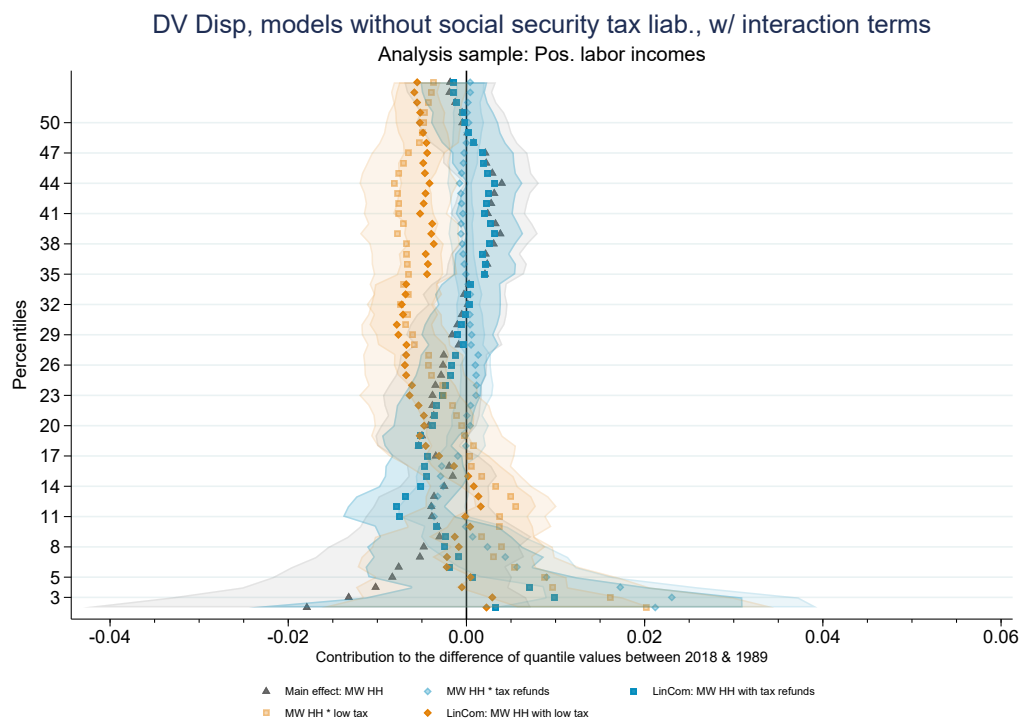


Figure 57: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household social security tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

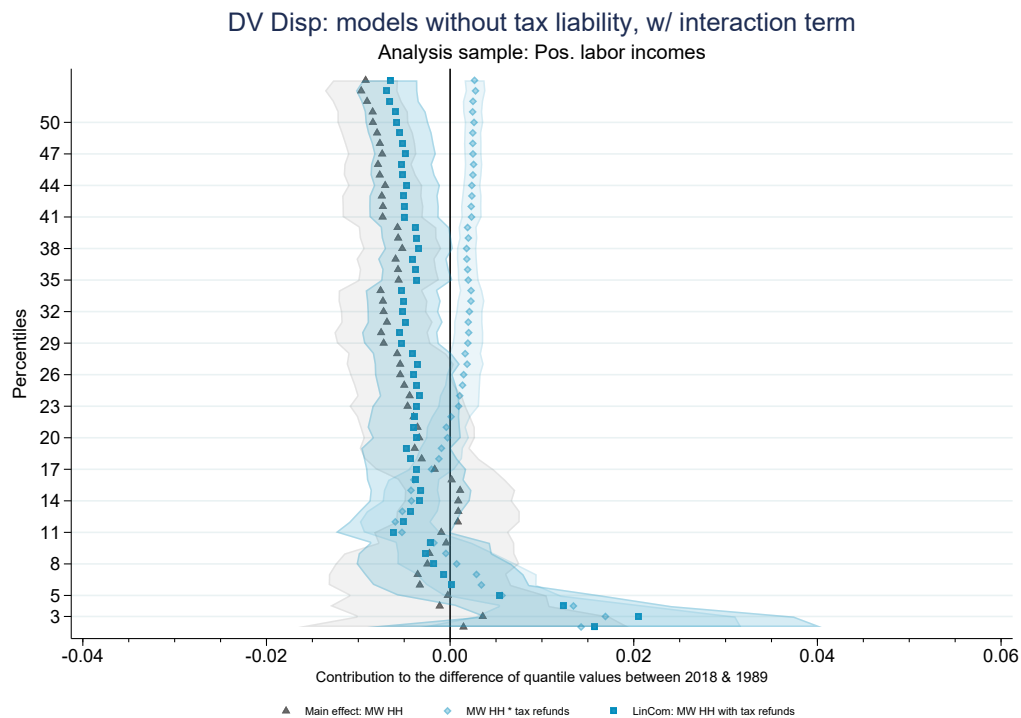


Figure 58: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of disposable household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.

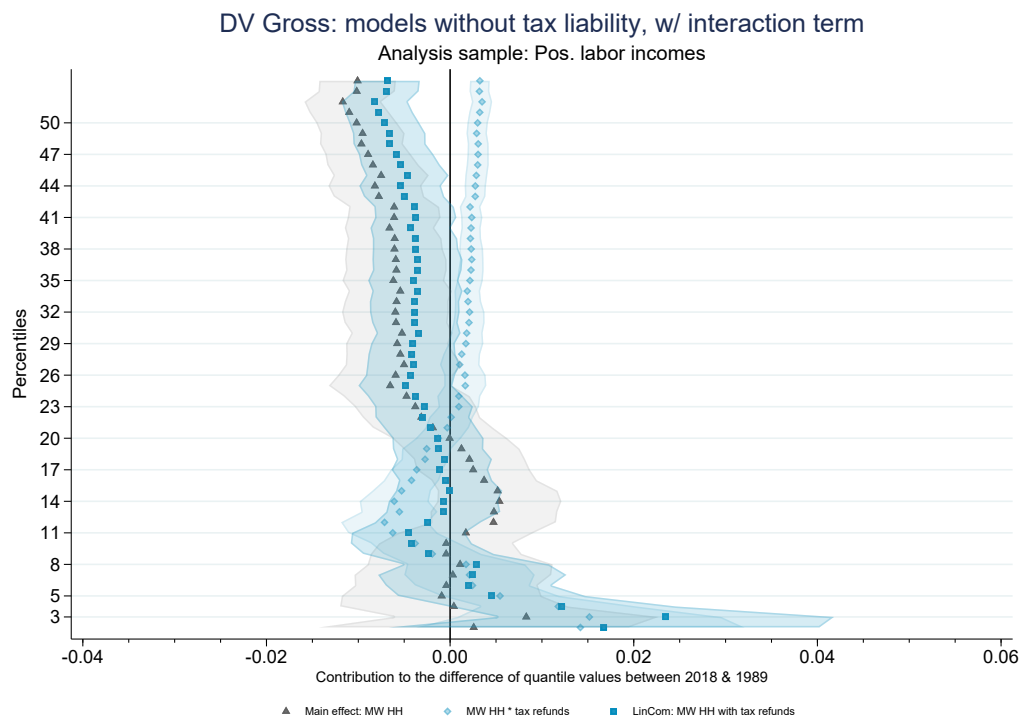


Figure 59: Results of OB-decompositions estimating the contribution of minimum wage households to percentile values of the distribution of gross household income, based on a model specification with interaction effects, excluding household tax liability, market income sample

Note: See footnote below Figure 48. IPUMS-CPS ASEC 1990 and 2019, own calculations, using Annual Social and Economic Supplement Household weights.