Charitable Giving, Taxes and Fundraising

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von

Diplom-Volkswirtin (Int.) Sarah Borgloh

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List of Abbreviations

ALLBUS	German General Social Survey
AO	Extraordinary income
ATT	Average treatment effect on the treated
CIA	Conditional independence assumption
DZI	Deutsches Zentralinstitut für soziale Fragen
FE	Fixed effects
FSO	Federal Statistical Office
GDP	Gross domestic product
GLS	Generalized least squares
ID	Identity number
ITL	Income tax law
JHCNP	Johns Hopkins Comparative Nonprofit Sector Project
OLS	Ordinary least squares
p.	Page
PV	Tax exempt income
RE	Random effects
UK	United Kingdom
US	United States
ZEW	Centre for European Economic Research

1 General Introduction

Over the past years, the public finances of many countries have experienced a reduced room for maneuver due to increasing deficit and debt levels. Accordingly, the German debt level has increased from 65.2% of GDP in 2007 to 83.2% of GDP in 2010. During the same period the budget surplus of 0.2% of GDP in 2007 has steadily decreased and has turned into a deficit of 4.3% of GDP in 2010. Generally, the public debt level may be reduced either by increasing taxes or by reducing public expenditures. In what follows, I will focus on the expenditure side of the public budget.

A certain share of public expenditures is commonly used to finance public goods such as national defense, education, cultural activities, social services, or environmental protection. A pure public good is characterized by non-rivalry and non-excludability where non-rivalry means that an "(…) individual's consumption of such a good leads to no subtractions from any other individual's consumption of that good (…)." (Samuelson, 1954) and non-excludability means that no individual can be excluded from the consumption of a public good.[1] When it comes to the provision of a public good, free-riding off others' contributions would be the optimal action for rational self-interested individuals. This is usually regarded as a justification for government intervention as a response to market failure and to avoid an underprovision of public goods.

We frequently observe, however, that certain public goods are provided by nonprofit organizations either in addition to government provision or in place of it. The number of such organizations in Germany is large: For example, 580,298 associations have been registered in Germany in 2011 and most of them are active in the recreational sector and in the social sector (Vereinsstatistik, 2011). Moreover, there are more than 18,000 foundations which have been founded under German civil law (Bundesverband Deutscher Stiftungen, 2011). Charitable organizations which step in the provision of public goods typically earn their revenues from three different sources: public subsidies, earned income from charges for the services they provide, and voluntary contributions.[2] The composition of the revenues thereby strongly depends on the sector the organization serves. The results of the German part of the Johns Hopkins Comparative Nonprofit Sector Project (JHCNP) showed that organizations in the sectors education, social services, and health largely depend on public subsidies whereas organizations involved in environmental protection

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[1] It is important to notice that different public goods are non-rival and non-excludable to different degrees.
[2] In the following, I will use the terms "voluntary contributions", "charitable contributions" and "donations" interchangeably.

and cultural activities depend on donations to a greater extent (Priller and Zimmer, 2001, p. 213).

Priller and Sommerfeld (2009) tried to derive the annual amount of donations in Germany from various data sources since Germany lacks a continuous (official) reporting on charitable giving, whereas there are annual reports which deliver precise information on charitable giving in – for example – the Netherlands (*Geven in Nederland*), the United Kingdom (*UK Giving*), and the United States (*Giving USA*). The estimates of charitable giving in Germany by Priller and Sommerfeld (2009, p. 56) range from 2.6 to 5.2 billion Euros in the year 2004, depending on the data source. These numbers show that the private provision of public goods in the form of voluntary charitable contributions is indeed a considerable economic factor. Nevertheless, it seems that charitable giving in Germany is still comparably small. The international comparative data from the JHCNP estimated annual charitable giving between 1995 and 2002 to be as high as 0.13% of GDP in Germany, versus 1.85% in the United States and 0.84% in the United Kingdom. These differences may be due to the size of the public sector where larger public sectors or larger welfare states imply a smaller philanthropic sector (Kolm, 2006).

Against the background of rising public debt levels, one might be concerned with increasing the private provision of public goods to unburden public finances to a certain extent. If, thus, charitable giving is to be promoted, it is crucial to understand the mechanisms behind an individual's decisions whether and how much to donate. In the standard public goods model (Becker, 1974; Warr, 1982, 1983; Roberts, 1984; Bergstrom et al., 1986) individual utility depends on the level of public good provision. The predictions derived from this model, such as free-riding behavior in large economies[3] and complete crowding out of voluntary contributions by government contributions, obviously do not bear up against the empirical observation that individuals are ready to make voluntary contributions. Hence, many economists have searched to explain the phenomenon of charitable giving and have proposed different theoretical models.[4] Andreoni (1989, 1990) added the notion of *warm glow* to the public goods model, where an individual derives utility, which may be described as an inner feeling of contentment, from the mere act of giving. This model leads to predictions which are more consistent with empirical observations. Further approaches explaining charitable giving include –

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[3] This has been shown by Andreoni (1988).
[4] Kotzebue and Wigger (2010) offer a comprehensive review of models of donor motivation.

among others – reciprocity (Sugden, 1984), the longing for social approval (Holländer, 1990) or prestige (Harbaugh, 1998), and the signaling of status (Glazer and Konrad, 1996).

Why individuals make voluntary contributions and how their donation behavior is affected by certain incentives from outside is ultimately an empirical question. Incentives to increase charitable giving are set either by the government through the (income) tax system or by the charities themselves through the particular design of their fundraising activities.[5] The empirical literature has examined both the effects of tax incentives and of fundraising strategies on charitable giving, but it has done so mainly in the context of the United States. As mentioned above, the markets for charitable giving differ between Germany and the United States, so it is a priori not obvious that the results from earlier studies may be easily transferred to the German case.

This thesis therefore aims at contributing additional insights on both the effects of the income tax system and of fundraising mechanisms on charitable giving in Germany. In doing so, I draw on a wide range of different methodologies, namely theoretical modeling, regression analysis, propensity score matching, and a framed field experiment, which promises to deliver quite an encompassing picture of the interplay of individual charitable giving with taxes and fundraising in Germany. Chapters 2 and 3 thereby look at how the income tax system affects charitable giving, whereas chapter 4 contributes to the literature on the effect of information given to potential donors by fundraisers.

Chapter 2 is an advancement of Borgloh (2008). It measures the income and price elasticities of charitable giving in Germany based on a panel of tax return data – the Taxpayer Panel by the German Federal Statistical Office – for the assessment periods 2001 to 2006. Thereby it contributes to the discussion whether the tax deductibility of donations is treasury efficient or not, this means whether the price elasticity is larger than one in absolute value or not. The price of giving is measured as $1 - m$ where m is the marginal tax rate of a tax unit. This chapter is the first contribution for Germany on this issue which uses panel data. The advantage of panel data over cross-sectional data is that it allows controlling for unobserved heterogeneity. Moreover, the Taxpayer Panel covers a period with two statutory changes in the tax scale and thus offers greater variation in the marginal

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[5] Kotzebue and Wigger (2008) study how the tax deductibility of donations can remedy the inefficiencies resulting from excessive fundraising. The consideration of the interrelation of both institutions, however, is beyond the scope of this thesis.

tax rates. The computation of the income and tax variables explicitly takes several particular provisions of the German Income Tax Law into account. Therefore, it is possible to derive very precise measures of disposable income and the price of giving. The results show that charitable giving in Germany seems to be income inelastic and price elastic. If the sample is restricted to donors only, their giving behavior is both income inelastic and price inelastic, but still the donors react to the tax incentive which is concluded to be effective. Compared to the numerous US studies, we find the income elasticity to be at the lower end of the range of estimates reported there and the price elasticity to be at the upper end.

Chapter 3 is joint work with Berthold U. Wigger and looks at the relationship between the German church tax and charitable giving. It is motivated by the observation that religious giving plays a more important role in the US where no church tax exists. A simple household model on the interplay of donations and the church tax delivers the following hypotheses which are tested empirically:

- Charitable donations of church members decrease when their church tax liability increases.
- A church member, who does not donate, is more likely to resign from church when the church tax liability increases than a donating church member.
- Donors are more likely to be church members than non-members.

The two hypotheses regarding the choice of church membership are confirmed by the empirical analysis. The evidence on the substitutive relationship between donations and the church tax, however, is mixed. The regression analysis finds a small but positive significant relationship for all church members and no significant effect for the subsample of church members with precise information on the federal state of residence. The results from a propensity score matching approach, on the other hand, suggest a negative effect of the church tax liability on donations, but the assumptions underlying this approach are likely to be violated. Accordingly, no definite conclusion can be drawn.

Chapter 4 is joint work with Astrid Dannenberg and Bodo Aretz and is an advancement of Borgloh et al. (2010). This chapter turns away from the income tax regulations and focuses on the fundraising efforts of charities. The impact philanthropy theory by Duncan (2004) defines an impact philanthropist as an individual that wants her donation to have a distinct effect on the supply of a charitable good. The theoretical prediction that the endowment of a charity is negatively related to the donations which an impact philanthropist gives to that

organization is tested in this chapter by means of a framed field experiment. Half of the participants from a non-student subject pool are given the choice whether to donate to a small or a large charity, where the size of the charity is defined in terms of its revenues. The subjects prefer to give to the relatively small charities, confirming the theoretical prediction that a charity's endowment affects voluntary contributions negatively. Interestingly, providing subjects with the information on charities' revenues at all has no effect on contribution behavior. Fundraisers may exploit this preference for small charities by designing their fundraising activities accordingly.

Summing up, I find that charitable giving in Germany can be incentivized in various ways. Potential donors obviously react both to incentives set through the income tax system and set through the provision of information about charities. This means that charitable giving is not an unalterable phenomenon. Rather, if the intention is to promote charitable giving, it is important to understand the mechanisms underlying the individuals' reaction to such incentives. The exploration of these mechanisms seems to be a fruitful area for further research, also beyond this thesis.

2   The Price and Income Elasticities of Charitable Giving in Germany

2.1   Motivation and Background

In many countries, donations to charitable organizations experience a preferential income tax treatment. In most countries, among others Australia, Germany, Japan, the Netherlands, and the United States, individual donations are tax deductible and thereby lower taxable income and the income tax liability. Another approach is to grant a tax credit as high as a certain percentage of the charitable contributions reported in the income tax return, as is the case in Canada, France, and Italy (Roodman and Standley, 2006).

For many years, the literature has been concerned with an evaluation of these tax incentives and, hence, with answering the question whether these tax incentives are suitable to effectively increase charitable giving or not. Indeed, several papers have estimated the price and income elasticities of charitable giving in the US. The strong preoccupation of the empirical literature with US data and the scarcity of studies for countries with larger welfare states and different markets for charitable contributions, however, is a significant shortcoming. As we have argued before, it is a priori not clear that the results from US studies can be easily generalized to the German case.

Several studies try to measure the influence of income and price on charitable giving by estimating the corresponding elasticities. While the interpretation of the income elasticity of charitable giving is straightforward, the idea behind the concept of the price elasticity is the following: In both Germany and the US, the income tax law allows for the tax deductibility of donations when taxable income is calculated. Hence, the deduction of donations from taxable income decreases the tax liability by *the amount donated times the marginal income tax rate*. For example, deducting a donation of 100 Euros decreases the tax liability of a taxpayer who faces a marginal tax rate of 0.3 by 30 Euros. Accordingly, the price of giving one monetary unit is $1 - m$, with m being the marginal tax rate a tax unit faces. With regard to the price elasticity of charitable giving ε, the interest of most studies lies in detecting whether giving behavior is price elastic or price inelastic, this means whether $|\varepsilon| > 1$ or $|\varepsilon| < 1$. When donations are tax deductible, the critical value of $\varepsilon = -1$ implies that the increase in donations which is realized by the charities offsets the resulting loss in tax revenues for the Treasury, whereas a price elasticity $\varepsilon < -1$ would then lead to an increase in charities' revenues which is even larger than the loss in tax revenues. If m is the marginal tax rate and G are the donations deducted from taxable

income, $m \times G$ is the forgone tax revenue by the government. The increase in donations is greater than the decrease in tax revenues if

$$\frac{dG}{dm} > m \times \frac{dG}{dm} + G$$

By further rearranging it can be shown that this leads to[6]

$$\frac{(1-m)}{G} \times \frac{dG}{d(1-m)} = \varepsilon < -1$$

When the price elasticity of charitable contributions assumes a value smaller than -1, and thus the loss in tax revenues is more than offset by the increase in charities' revenues, the tax deductibility of donations is said to be "treasury efficient" (Feldstein, 1975a).[7]

Is his theoretical framework, Saez (2004) derives a generalization of the efficiency concept, saying that in the absence of crowding out of private donations by government contributions the subsidies to donations should be increased if the absolute value of the price elasticity is greater than one and decreased if the absolute value is below one.

2.2   Previous Literature

Just as the seminal work by Taussig (1967), most of the studies which measure the income and price elasticities of charitable contributions have been conducted in the context of the US. These need to be distinguished by the kind of data that is used. There are studies which use cross-sectional data and others which use time series of cross sections or panel data. Furthermore, some authors recur to tax return data, while others employ survey data. The number of surveys is so impressively high that it is impossible to quote all of them, but Clotfelter (1985) and Steinberg (1990) offer excellent reviews of the studies conducted until that time. The first surveys typically used cross-sectional data either from household surveys or individual tax returns whereas in later studies panel data have become increasingly popular. Due to the application of various econometric methods and different data sets, the results for the US vary widely. For cross-sectional data, income elasticities range from 0.02 to 3.10 and price elasticities cover values between -4.97 and 0.06. The

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[6] See Roberts (1987).
[7] Andreoni (2006b) gives several examples why this criterion might be imperfect.

results from panel studies on average deliver smaller values with income elasticities between 0.24 and 0.83 and price elasticities ranging from -2.98 to 0.41, indicating a lower reagibility of donations to changes in the tax price and to changes in income. Peloza and Steel (2005) use this rich data set to conduct a meta-analysis of the price elasticities of charitable contributions. Their results show that the use of tax-return data provides significantly lower price elasticities than survey data do. According to their results, the difference in price elasticities of high income and low income donors is not statistically significant. They find a weighted mean of the price elasticity of -1.44 and conclude that the tax deductibility of private donations in the US is treasury efficient.

In recent years, with the greater availability of panel data the interest has moved towards separating transitory from permanent price elasticities. As the marginal tax rate, and thus the price of giving, is a function of income, the identification of separate income and price effects is rendered difficult if they vary simultaneously. Randolph (1995) uses a panel of tax returns which covers two tax reforms and accordingly offers greater exogenous variation in marginal tax rates. He finds a large permanent income elasticity and a small transitory income elasticity as well as a small permanent price elasticity (-0.51) and a large transitory price elasticity (-1.55). Auten et al. (2002), on the other hand, use similar data but a different approach and find the opposite, namely a small transitory price elasticity (-0.40) and a large permanent price elasticity (-1.26). Obviously, there still is no clear-cut evidence on the magnitude of the income and price elasticities of charitable giving in the US.

To our knowledge, the most recent contribution is by Bakija and Heim (2011). They also use a panel of US income tax returns and include lagged and future changes in the price and income variables in their model in order to separate transitory variation from permanent variation. They find a large permanent price elasticity (-1.16) and a smaller transitory price elasticity (-0.85) if the variation in tax rates across the states is considered. The permanent price elasticity is considerably smaller when this variation only stems from changes in the federal tax rates. Moreover, their results suggest that individuals indeed adjust their giving behavior if future price changes are large and obvious.

A few studies for countries other than the US have been conducted, such as Canada (Hood et al., 1977; Glenday et al., 1986), France (Fack and Landais, 2010), Russia (Brooks, 2002), and Singapore (Chua, 1999). Again, the results are not very clear cut and cover a wide range of values showing very elastic as well as very inelastic reactions of charitable contributions to changes in price and income.

The empirical literature which estimates income and price elasticities of charitable giving for Germany is not as large as it is for the US. Paqué (1986) has been the first to conduct such estimations for Germany. Using times series data disaggregated by income classes to 55 observations, he finds income and price elasticities greater than unity. Auer and Kalusche (2007) run a Tobit regression model on a single cross-section of tax returns. Their results show an income elasticity of 0.66 and a price elasticity of -1.11 for tax units with a total income below 200,000 DM. This income inelastic and price elastic giving behavior is also found for tax units with a total income greater than 200,000 DM, with point estimates of 0.69 and -1.05 respectively. In a recent contribution, Bönke et al. (2011) run censored quantile regressions on three pooled cross-sections of tax return data. They find that tax units which report lower amounts of charitable contributions exhibit a lower income elasticity than tax units giving larger amounts do. With regard to the price elasticity of giving, the picture is mixed: Its absolute value is greater than unity for tax units with low contributions and for tax units with very high contributions, whereas the reaction to price changes by tax units in the mid-range of the donation quantiles is inelastic. Taking the crowding out of charitable giving by government contributions into account, the authors conclude that the tax deductibility of donations in Germany is treasury efficient. The paper also reports the results from a Tobit model, where the point estimate of the income elasticity is 1.070 and the price elasticity is estimated to be -1.214.

The results which have been obtained for Germany so far suggest that the price elasticity of giving is greater than unity – at least for parts of the donors – and they provide mixed evidence with regard to the income elasticity. This chapter proceeds upon the work by these authors by using a panel of tax return data which covers six years and thus offers more exogenous variation due to statutory changes in the tax tariff. Moreover, the use of panel data allows controlling for unobserved heterogeneity. Additionally, the participation and the outcome decision are modeled separately, delivering further insights into the drivers of giving in Germany.

2.3 Charitable Giving in Germany and the United States

As we have reasoned before, there is a large number of studies estimating the income and price elasticities of charitable giving for the US. These estimates cannot be easily transferred to the German case, however, because it needs to be taken into account that these countries differ in various characteristics. First, Germany and the US have different welfare state traditions: while the US has a strong tradition of the private provision of

public goods, Germany has a larger public sector. According to OECD data, public social expenditures as a share of GDP in 2007 amounted to 25.2% in Germany and to 16.2% in the US.

Second, this discrepancy may be reflected in the respective national markets for charitable giving. The international data collected by the JHCNP indeed suggest that there is an enormous difference in philanthropic behavior between both countries: in the 1990s, the sum of all donations by individuals, business and foundations to civil society organizations amounted to 0.13% of GDP in Germany and to 1.01% of GDP in the US (Salamon and Sokolowski, 2004, p. 89).

When looking at more recent data on individual giving, the huge difference in the giving markets of the two countries is confirmed. The following numbers for the year 2009 are taken from the *Giving USA Annual Report* for the US (Giving USA Foundation, 2010) and from the *TNS Infratest Spendenmonitor* survey for Germany (TNS Infratest, 2009). Thereby it is important to consider that the estimates of individual giving for Germany stem from a representative survey of 4,000 individuals whereas those for the US are taken from tax returns filed in 2009 plus an estimate of the donations by individuals not filing a tax return. Total individual giving was estimated to be 2.9 billion Euros in Germany between October 2008 and October 2009. In the US, however, individual giving amounted to US\$ 227.41 billion. To adjust the numbers for the size of the respective country, one needs to compare these values to the respective GDP: still, individual giving in the US was 1.61% of GDP whereas in Germany it was only 0.12% of GDP. Even if we add the German church tax, which summed up to 9.263 billion Euros in 2009, to individual donations, the share of German GDP is only 0.51%. If donations are broken down to the household or individual level, the average donation per household in the US was US\$ 1,940 if non-donors are included, whereas it was only 115 Euros per capita in Germany for donors only.

Third, it may be that the enormous differences in religiosity between the two countries partly account for the difference in charitable giving. According to the 2006 data of the *World Values Survey*, 72.1% of all surveyed individuals in the US coin themselves a "religious person" while the corresponding share in Germany is 42.9%. This difference is also mirrored in the frequency of attendance of religious services. In the US, 36.0% indicate that they attend religious services at least once a week whereas in Germany 8.1% do so. However, the literature on the interrelation of charitable giving and religiosity (e.g. Eckel and Grossman, 2004; Brown and Ferris, 2007; Bekkers and Schuyt, 2008), or

prosocial behavior in general (Saroglou et al., 2005; Tan, 2006), does not deliver clear-cut evidence on whether religiosity affects charitable giving or not.

Hence, the two countries under scrutiny differ not only in their welfare state tradition but also with regard to their markets for charitable giving and the religiosity of individuals which makes a good cause for studying whether there are any considerable differences in the price and income elasticities of charitable giving.

2.4   The Institutional Setting in Germany

Before examining the effects of the tax deductibility of charitable contributions on giving behavior, the institutional setting in Germany needs to be described. The focus is on the German Income Tax Law (ITL) and its provisions regarding the tax treatment of charitable contributions. As the data set covers the assessment periods from 2001 to 2006, the following section displays the tax regulations which were valid at this time and does not enlarge upon the current situation.

2.4.1   The German Income Tax Law (ITL)

In Germany, the income of all tax units that file an income tax return is taxed according to the ITL. The simplified scheme for the calculation of the income tax liability is as follows:

Income from seven different categories[8]

= **Overall income**

- Reliefs for the elderly, single parents, and farmers

= **Total income**

- Loss deduction

- Special personal deductions (including charitable giving)

- Extraordinary personal expenses

= **Income**

- Personal allowances

= **Taxable income**[9]

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[8] This includes income from agriculture and forestry, income from trade or business, self-employment income, income from employment, income from capital investments, rental income, and other income.
[9] We translated the terms from the ITL as follows: Summe der Einkünfte = overall income, Gesamtbetrag der Einkünfte = total income, Einkommen = income, zu versteuerndes Einkommen = taxable income.

The tax rate which is applied to taxable income is derived from the income tax scale. The income tax liability is obtained by applying the tax rate, subtracting various tax reductions, and considering add backs.

The German income tax scale is progressive, which means that the average tax rate increases with taxable income. Taxable incomes below a certain threshold face a tax liability of zero. Beyond this threshold, two linear-progressive zones with increasing marginal tax rates follow, whereas the income shares above the upper threshold underlie the maximum marginal tax rate. The tax scale for the assessment periods 2001 to 2003 is basically the same, but it was significantly modified in 2004 and 2005. The illustration of the marginal tax rates in the case of single assessment (Figure 1) shows that these have decreased over time for all income classes, but the changes in marginal tax rates have been most pronounced for the upper income classes. From 2001 to 2003, the top marginal tax rate was 48.5% and it decreased to 45% in 2004 and further to 42% in 2005 and 2006.

Figure 1: Marginal income tax rates in Germany 2001 to 2006, in case of single assessment
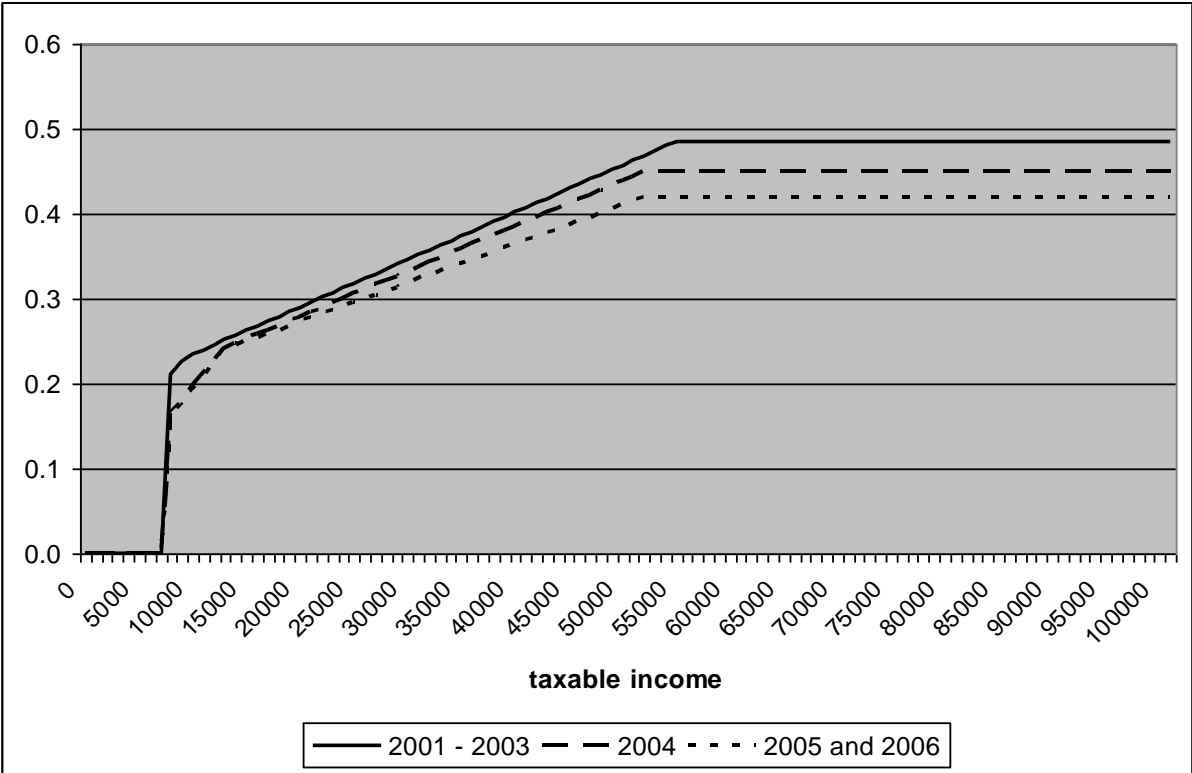
Source: Own calculations.

To promote married couples and families, the ITL provides the possibility of joint assessment, meaning that a couple pays twice the income tax which would be due on half its aggregated taxable income:

$$T_{joint}(TI) = 2 * T\left(\frac{TI}{2}\right)$$

where T is the income tax liability and TI is the taxable income of a tax unit.

Accordingly, the amount of income which is freed from income tax is twice as high as in the case of single assessment as is the limit above which the top marginal tax rate applies. Due to the tax progression, the savings in tax payments are greater the more diverse the incomes of husband and wife are.

Furthermore, the German tax law contains two regulations which increase an individual's effective tax burden: First, the payment of a solidarity surcharge as high as 5.5% of income tax payments (under the consideration of child allowances, see section 2.7.1) is obligatory for every tax unit whose income tax liability exceeds a certain limit. The main reason for the introduction of this extra charge in 1991 was the cost of the German reunification. All revenues which stem from the solidarity surcharge go to the Federal Government and are not earmarked. Second, in Germany for some religious communities which are recognized as public corporations the state collects the church tax from the communities' members. Due to its complexity, we defer a detailed treatment of the German church tax to chapter 3. The solidarity surcharge, however, is taken into account when determining the price and income variables.

2.4.2 The Tax Treatment of Charitable Contributions in Germany

In Germany, private contributions to charities fall into the category of *expenses for tax-privileged purposes* according to §10b of the ITL. The beneficiary needs to be either a domestic public corporation or a charitable corporation. These expenses are tax-deductible in the assessment period they have been made and include both private donations and membership fees. Membership fees, however, are not deductible if they are paid to organizations which predominantly perform services for their members or organize leisure activities, such as sports clubs, certain cultural clubs, and local history clubs. In the following, when referring to "donations" or "contributions" which are declared in an income tax return, we subsume both deductible donations and membership fees under these terms. When assessing the income tax, these contributions – as well as further special

expenses – may be deducted from the gross amount of income, which results in a reduction of taxable income and thereby in a lower income tax liability.

Until 2006[10], donations were tax-deductible if they were given to benevolent, ecclesiastical, religious, scientific or "particularly eligible" charitable purposes up to an amount of five percent of gross income.[11] For donations to benevolent, scientific and "particularly eligible" cultural purposes the upper limit of deductibility increased by additional five percentage points to ten percent of gross income. Beyond that amount, the German ITL provided the opportunity to deduct donations to foundations up to a sum of 20,450 Euros and to deduct contributions to newly founded foundations up to an amount of 307,000 Euros. In the latter case, a carry-forward has been possible for up to nine years.

It is important to notice that in the following we exclude all donations and fees paid to political organizations because the ITL treats them differently: contributions to political parties and voters' unions generally lower the income tax liability through tax rebates, so the degree of tax relief is independent from the marginal tax rate. According to §34g ITL, the tax rebate amounts to 50% of the contributions to political parties and voters' unions, but the maximum rebate is 825 Euros in case of single assessment and 1,650 Euros in case of joint assessment.[12] If the contributions to political parties exceed this limit, they may be deducted from gross income up to an amount of 1,650 Euros in case of single assessment and up to 3,300 Euros in case of joint assessment. Aside from the different tax treatment, there is no general agreement whether donations to organizations which principally aim at assisting their candidates to secure their political function should be recognized as charitable.

2.5   The Data

For the following analysis we employ the 0.5%-sample of the German Taxpayer Panel by the German Federal Statistical Office (FSO). The Taxpayer Panel which is derived from the yearly German Income Tax Statistics by the FSO currently covers six assessment periods from 2001 to 2006 and contains observations on nearly 32 million taxpayers of which 18.6 million are observed every year. To construct a panel data set, the FSO linked up, where possible, the observations of the single years according to the individual's tax

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[10] In 2007, a law which was intended to promote civic involvement came into force. It also contained some new regulations regarding the tax treatment of charitable contributions. As our data set only covers the years 2001 to 2006, however, we disregard these provisions.

[11] We translated the terms from the ITL as follows: mildtätig = benevolent, gemeinnützig = charitable.

[12] If someone has made contributions to both a political party and a voters' union the maximum rebate increases to 1,650 and 3,300 Euros respectively.

identification number. The tax identification number, however, could change due to marriage, divorce, or relocation from one federal state to another; hence, further individual identifiers were used to match the cross-sectional observations (Kriete-Dodds and Vorgrimler, 2007).[13] Persons that could not be easily linked up are typically young professionals or retirees because they do not regularly file an income tax return, which implies that the average income of the panel is higher than that of the cross-sections. It is important to point out that the unit of observation is the single tax return and not the single taxable individual. If married couples choose the option of joint assessment, they get the identical tax identification number and are therefore considered as one observation, so in the following the term 'tax unit' will be used to identify the unit of observation.

The 0.5%-sample is a factually anonymized subsample of the stratified 5%-sample of the Taxpayer Panel. The anonymization process leads to an exclusion of the ten tax units with the highest incomes for both East and West Germany and sets all dates of birth to January 1st of the respective year. The 0.5%-sample is a balanced panel and contains observations on around 92,900 income tax returns for each of the six assessment periods.

Since the German ITL is very complex, the data set contains very detailed information on numerous income and tax variables. This allows an accurate computation of disposable income and marginal tax rates under consideration of the different factual positions a tax unit faces. From the data we can infer both the amount of donations declared in a tax unit's income tax return and the amount of donations which is regarded for tax purposes by the fiscal authorities, that is the amount that is tax-deductible in the end. Importantly, the data set does not provide any information on the charitable causes which donations go to, so we are not able to distinguish, for example, donations to environmental organizations from those to cultural activities.[14]

The Taxpayer Panel does not only provide various income and tax variables, but it also contains information on several socio-demographic characteristics of the taxpayers like gender, marital status, age, religious affiliation, the number of children living with the taxpayer and the federal state of residence.

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[13] These identifiers include among others place of residence, religious affiliation, gender, and existence of income from a certain source.

[14] Some studies have shown that the income and/or price elasticities of charitable giving vary across the various charitable causes (Feldstein, 1975b; Reece, 1979; Backus, 2010).

2.6 The Methods

The variable we want to explain in the following analysis, the amount of charitable contributions reported in a tax return, is a typical corner solution outcome: The variable is partly continuous and has positive probability mass at the point of zero contributions. In this case, estimating the effect of a certain explanatory variable on $E(y|x)$ by OLS is problematic because of the implication that the marginal effect on $E(y|x)$ is constant. This may lead to negative predicted values of y. A model frequently used to avoid this problem in applications on charitable giving (Duncan, 1999; Andreoni et al., 2003; Auer and Kalusche, 2007; Wilhelm et al., 2008; Wilhelm, 2010; Hill and Vaidyanathan, 2011) is the Tobit model named after Tobin (1958) which is characterized by the following latent variable formulation:

$$y^* = x\beta + u$$
$$y = \max(0, y^*)$$

where it is assumed that $u|x \sim Normal(0, \sigma^2)$ and u is independent of x.[15]
Then

$$y_{it} = \begin{cases} y_{it}^* \ if \ y_{it}^* > ll \\ ll \ if \ y_{it}^* \leq ll \end{cases}$$

where ll denotes the lower limit or the corner solution outcome (which need not necessarily be equal to zero). This means that the observed outcome y_{it} equals the value of the latent variable if this is greater than the lower limit and the observed outcome is equal to the lower limit if the latent variable is below the limit.

The latent variable y^* often has no meaningful interpretation[16] and we are rather interested in the expected value of the observed contribution $E(y|x)$. This is given by

$$E(y|x) = P(y = 0|x) \cdot 0 + P(y > 0|x) \cdot E(y|x, y > 0)$$

From

$$P(y > 0|x) = P(y^* > 0|x) = P(u > -x\beta|x) = \Phi\left(\frac{x\beta}{\sigma}\right)$$

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[15] The illustration of the Tobit model and further details on the methods we employed for regression analysis can be found in Wooldridge (2010).
[16] In our context, it might be regarded as a desired charitable contribution. It could take negative values if a tax unit would prefer to receive donations instead of making them.

and

$$E(y|x, y > 0) = x\beta + E(u|u > -x\beta) = x\beta + \sigma \left[\frac{\varphi(\frac{x\beta}{\sigma})}{\Phi(\frac{x\beta}{\sigma})} \right]$$

it follows that

$$E(y|x) = \Phi\left(\frac{x\beta}{\sigma}\right) \cdot \left[x\beta + \sigma\lambda\left(\frac{x\beta}{\sigma}\right) \right]$$

$$= \Phi\left(\frac{x\beta}{\sigma}\right) \cdot x\beta + \sigma\varphi(\frac{x\beta}{\sigma})$$

where $\lambda = \frac{\varphi(\frac{x\beta}{\sigma})}{\Phi(\frac{x\beta}{\sigma})}$ is called the inverse Mills ratio and $\Phi(.)$ is the standard normal

distribution function.

The partial effect of a continuous variable x_j on $E(y|x)$ is

$$\frac{\partial E(y|x)}{\partial x_j} = \Phi\left(\frac{x\beta}{\sigma}\right) \cdot \beta_j$$

The value $\Phi\left(\frac{x\hat{\beta}}{\hat{\sigma}}\right)$ is the estimated probability of observing a positive amount of charitable

contributions given x. If this adjustment factor is close to one, the marginal effect gets

close to β_j. Obviously, the marginal effects on $E(y|x)$ need to be evaluated at certain

values of x, and in the following we will always compute them at the mean values of

continuous x.[17] From the formulation above it becomes obvious that an estimation of the

marginal effects by OLS would suffer from omitted variable bias, whereby the strength of

this bias depends on the probability of observing zero outcomes. For binary explanatory

variables the marginal effect is the change in $E(y|x)$ which results when the dummy

variable changes from 0 to 1. The parameters of the Tobit model are estimated by a

maximum likelihood approach.

A limitation of the Tobit model is the implication that the decision whether to make

charitable contributions at all and the decision how much to contribute are affected

similarly by the explanatory variables, this means that the effects necessarily have the same

signs. One might hypothesize, however, that, for example, having children increases the

propensity to donate because parents might be more aware of the social needs of the

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[17] The mean values of x might not correspond to any particular observation, so it might be more interesting to compute average marginal effects. This, however, was not possible due to technical limitations of the computers at the Federal Statistical Office.

community. On the other hand raising children is costly, so having children might be negatively related to the amount that is contributed. Frequently, the Heckman two-step sample selection model, also called the Heckit model, is applied in such cases. This model has been designed to deal with problems of sample selection where the potential outcome, for example wages of individuals that do not work, cannot be observed. However, the Heckit model will be poorly identified if the same set of explanatory variables is included in both the participation and the outcome equation because of possible multicollinearity between the inverse Mills ratio and the covariates (Dow and Norton, 2003). This problem can be attenuated by excluding variables which explain the participation decision from the outcome equation. Such exclusion restrictions are hard to justify in this context because we believe that all covariates we use to explain charitable giving are likely to affect both decisions. Moreover, as discussed by Dow and Norton (2003) another consideration is whether the interest lies in looking at potential or actual outcomes of the dependent variable. In our context, zero charitable contributions are true zeros and no problem of missing data, hence, we are interested in the actual outcome. Accordingly, we apply the two-part model which disregards possible sample selection bias and thus omits the inverse Mills ratio from the outcome equation. Summing up, to control whether the explanatory variables affect the participation and outcome decision differently, we estimate the two-part model as a robustness check to the Tobit model, and we assume independence between both decisions conditional on a set of explanatory variables. The first stage of the two-part model estimates the probability of being a donor by maximum likelihood using a Probit model:

$$P(y^* > 0|x) = P(z = 1|x) = \Phi(x\beta)$$

where z is an indicator variable which equals one for all tax units that report a positive amount of charitable contributions and the error term in the latent variable equation is drawn from a standard normal distribution. The marginal effect of a continuous variable x_j on the response probability $P(z = 1|x)$ is

$$\frac{\partial \Phi(x\beta)}{\partial x_j} = \varphi(x\beta) \cdot \beta_j$$

The marginal effect of a binary explanatory variable is the change in the response probability when this variable switches from zero to one. The second stage of two-part

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model leads to a linear regression conditional on reporting a positive amount of charitable contributions

$$E(y|z = 1, x) = x\beta + E(u|z = 1, x)$$

under the assumption that $E(u|z = 1, x) = 0$.

The panel structure of our data set allows controlling for unobserved heterogeneity, where usually fixed effects and random effects models are distinguished. The central idea is that an individual time-invariant effect a_i enters the model:

$$y_{it} = x_{it}\beta + a_i + u_{it}$$

where the subscript i denotes the unit of observation and the subscript t denotes the time period. The a_i captures individual characteristics which do not change over time such as innate altruism. The linear fixed effects estimator, the within estimator, controls for this unobserved heterogeneity by time-demeaning of the variables:

$$y_{it} - \bar{y}_i = (x_{it} - \bar{x}_i)\beta + u_{it} - \bar{u}_i$$

This procedure removes the individual-specific time-invariant effect a_i, thus the within estimator does not impose any restrictions on the relationship between a_i and x_{it}. The within estimator for the parameters β is the OLS estimator of the time-demeaned data. Obviously, this estimator exclusively uses the variation within each observation and thus explains why y_{it} differs from the individual mean. Generally, the drawback of this method is that time-invariant explanatory variables, such as gender and education, are differenced out of the equation as well. Hence, the identification of the effects of covariates which do not exhibit a sufficient amount of within variation is rendered difficult.

The linear random effects model, on the other hand, requires that a_i and x_{it} are independent because it puts a_i into the composite error term $a_i + u_{it} = v_{it}$ which leads to serial correlation of v_{it}. The random effects generalized least squares (GLS) estimator uses the fact that

$$Corr(v_{it}, v_{is}) = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_u^2} \quad for \ t \neq s$$

and is obtained as the OLS estimator of

$$y_{it} - \theta \bar{y}_i = (x_{it} - \theta \bar{x}_i)\beta + (v_{it} - \theta \bar{v}_i)$$

where

$$\theta = 1 - \sqrt{\left[\frac{\sigma_u^2}{T\sigma_a^2 + \sigma_u^2}\right]}$$

As opposed to the fixed effects estimator, the random effects estimator subtracts only a certain share of the individual mean of a variable and this share depends on the variances of the components of the error term and the number of time periods. When $\theta = 1$, which is the case for a large T and when σ_a^2 is relatively large compared to σ_u^2, random and fixed effects estimators yield the same results. On the other hand, if $\theta = 0$, this is when the unobserved effect a_i is relatively small, the pooled OLS estimator would be obtained. The advantage of the random effects estimator over the fixed effects estimator is that time-invariant explanatory variables may be included in the model.

Combining the estimation of nonlinear models through maximum likelihood with panel data is somewhat more complicated. The central problem is that the a_i cannot be eliminated as easily as in a linear model. If the unobserved effects were treated as fixed parameters to be estimated, one would incur the "incidental parameters problem". With fixed T and a growing sample size N the number of parameters grows and they cannot be consistently estimated.[18] Instead, for both the Probit and the Tobit model we assume that a_i and x_{it} are independent – as in the linear random effects model – and we assume furthermore that $a_i|x_i \sim Normal(0, \sigma_a^2)$. In this case, a_i is integrated out of the density of y_i and the parameters of interest can be estimated by maximum likelihood which allows to compute marginal effects.

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[18] Moreover, using conditional maximum likelihood does not solve the problem. As Verbeek (2004) points out, it has been shown that for the Probit model (and therefore for the Tobit model, too) no sufficient statistic for a_i exists.

2.7 The Empirical Analysis

2.7.1 Definition of the Variables of Interest

Before starting with the analysis, some adjustments need to be made to the dataset. First of all, we exclude all tax units with inconsistent socio-demographic information across the years 2001 to 2006.[19] In a second step, all observations with restricted tax liability, i.e. taxpayers who earn their income in Germany but live abroad, as well as observations from taxpayers aged below 15 are excluded. We generate the following variables for our analysis:

Giving (G) is the sum of donations and membership fees a tax unit declared in the income tax return. As mentioned before, we are not able to distinguish whether the amount declared is a membership fee paid to a certain association or a charitable contribution. There may be different motives underlying the various types of contributions, but the data set does not allow estimating their relevance separately. Moreover, contributions to political parties are not included because they underlie a different tax treatment. To compute elasticities, we take the logarithm of the amount of donations. In about 55% of all tax returns no donations are declared, so five Euros are added to the donations of each tax unit to account for this problem. As a consequence, in our Tobit model the lower limit of contributions is at $\log(5)$ and not at zero.

Income (Y) is disposable after-tax income of a tax unit. As the data set only offers income measures which are derived from tax law, some adjustments need to be made to obtain a measure which better reflects the consumption possibilities of a tax unit. Here, disposable income is determined as follows:

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[19] More precisely, the data set contains several taxpayers which are assessed separately in consecutive years but nevertheless change their gender. We entirely dropped these tax units from the data set because it was impossible to infer the correct information.

	Income from agriculture and forestry, trade and business, and self-employment
+	income from employment, capital investments, rental income, and other income
+	tax exempt gains, allowances, and tax exempt income
+	tax-free share of pension income[20]
+	child benefit
-	extraordinary personal expenses
-	alimony
-	income tax liability and solidarity surcharge (before donations)

The term "tax exempt income" embraces the so-called *Einkünfte unter Progressionsvorbehalt*, henceforth abbreviated as PV. According to §32b ITL, earnings replacement benefits – such as unemployment and maternity benefits – as well as the income earned abroad which is not subject to income tax in Germany are not included in the assessment base, but they are accounted for when the average tax rate for the taxable income components is determined. In case that a tax unit has earned such tax exempt income, the income tax liability[21] is computed as follows:

$$T = \frac{T(TI + PV)}{TI + PV} \times TI$$

with T = income tax liability and TI = taxable income. The income tax liability is equal to zero if $TI + PV$ is below the basic tax-free amount or if the taxable income is non-positive. Another special case to be considered is when a tax unit has earned extraordinary income (*außerordentliche Einkünfte*), henceforth abbreviated as AO. §34 ITL, paragraphs I and II, subsumes (inter alia) income from sales of business and indemnifications under this term. The income tax liability is then

$$T = T(rTI) + 5 \times \left[T\left(rTI + \frac{1}{5} AO\right) - T(rTI) \right]$$

$$= 5 \times T\left(rTI + \frac{1}{5} AO\right) - 4 \times T(rTI)$$

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[20] For the assessment periods 2001 and 2004, we assume the income element share of an annuity – which is taxable – to be 0.3. Since the taxation of annuities changed afterwards, we assume this share to be 0.5 in the assessment periods 2005 and 2006.

[21] As has been explicated before, the income tax liability is obtained by applying the tax rate, subtracting various tax reductions, and considering add backs. To keep the illustration simple, we abstract from the tax reductions and add backs.

where $rTI = TI - AO$ is called the "remaining taxable income" (*verbleibendes zu versteuerndes Einkommen*).[22]

In case that $rTI < 0$ and $TI > 0$, the income tax liability turns out to be

$$T = 5 \times T(^1/_5 \, TI)$$

If a tax unit reports both PV and AO, the formula for computing the income tax liability becomes:

$$
\begin{aligned}
T &= \frac{T(rTI + PV)}{rTI + PV} \times rTI \\
&+ 5 \times \left[\frac{T\left(rTI + ^1/_5 \, AO + PV\right)}{rTI + ^1/_5 \, AO + PV} \times \left(rTI + ^1/_5 \, AO\right) - \frac{T(rTI + PV)}{rTI + PV} \times rTI \right] \\
&= 5 \times \frac{T(rTI + ^1/_5 \, AO + PV)}{rTI + ^1/_5 \, AO + PV} \times \left(rTI + ^1/_5 \, AO\right) - 4 \times \frac{T(rTI + PV)}{rTI + PV} \times rTI
\end{aligned}
$$

Importantly, if $rTI < 0$ and a tax unit reports PV at the same time, an unambiguous calculation of the income tax liability is not possible (Kirchhof, 2006, p. 1297)[23], and we will accordingly drop these tax units.

Since the solidarity surcharge is determined as a function of a hypothetical income tax liability, we first need to subtract the child allowances from taxable income for its computation.[24] Based on this hypothetical taxable income the hypothetical income tax liability T_{hyp} is computed. According to §4 SolzG the solidarity surcharge is case of single assessment (joint assessment) is:

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[22] If a tax unit reports AO income, the tax authorities automatically check whether this computation is more favorable for the tax unit than considering the AO share of the income as "normal" taxable income. For all our computations, we take into account that the most favorable tax treatment is relevant for determining the tax liability.

[23] The same is true if a tax unit reports AO as defined above (§34 I, II ITL) and at the same time extraordinary income as defined in §34 III ITL (Kirchhof, 2006, p. 1298).

[24] This is done for every tax unit with tax-relevant children. Usually, the tax authorities undertake comparative calculations whether a tax unit is better off with the child benefit or with the child allowance. For the solidarity surcharge this is disregarded and the child allowances are subtracted in each case.

	T_{hyp}	Solidarity surcharge (in Euro)
1.	$< 972\ € \ (< 1{,}944\ €)$	0
2.	$972\ € < T_{hyp} < 1{,}341\ €$	$0.2 \times (T_{hyp} - 972)$
	$(1{,}944\ € < T_{hyp} < 2{,}681\ €)$	$(0.2 \times (T_{hyp} - 1{,}944))$
3.	$T_{hyp} > 1{,}341\ €$	$0.055 \times T_{hyp}$
	$(T_{hyp} > 2{,}681\ €)$	

Due to the tax deductibility of donations, the larger the sum of charitable contributions, the lower is the taxable income. To obtain an exogenous income measure, the income tax payments and the solidarity surcharge have been recalculated under the assumption that a tax unit has not made any charitable contributions. We drop all observations with non-positive incomes in order to take the logarithm of the income measure.

The tax-determined *price (P)* of giving is customarily defined as $1 - m$, with m being the marginal tax rate that a tax unit faces.[25] This is quite straightforward due to the tax deductibility of donations. Defined in this way, *P* measures the taxpayer's opportunity cost of giving in terms of forgone personal consumption. If we take the progressivity of the German income tax system into account, this implies that tax units earning high incomes face a considerably lower price of giving than low income earners do. As the marginal tax rate is a function of taxable income which itself depends on the amount of charitable contributions, we ensure the exogeneity of *P* by computing the so-called "first-dollar price of giving". This means that we define *m* as the marginal tax rate relevant if no donations were made which is a standard procedure in the literature. To obtain the marginal tax rate, we apply the tax scales of the assessment periods 2001 to 2006 to taxable income plus deductible donations. Furthermore, as discussed before, the German ITL defines categories of income which are tax exempt but effectively raise average and marginal tax rates (see Appendix A for a detailed illustration of how marginal tax rates are calculated). Depending on the relative magnitude of taxable income and tax exempt income, marginal tax rates equal to or larger than unity may occur. Tax units facing such expropriating taxation are excluded from the analysis as are tax units that exhibit a combination of AO income and PV income which does not permit an unambiguous computation of marginal tax rates. Furthermore, all tax units whose donations are below the standard deduction for special expenses, they are called non-itemizers, are assigned a price of giving of 1. The so-called

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[25] More precisely, we calculate the price of giving as $1 - m_{effective}$. See Appendix A for further details.

borderline itemizers, however, whose itemization status depends solely on the amount they donated, which means they exceed the standard deduction only due to their charitable contributions, are excluded from the analysis to maintain exogeneity of the price variable with regard to giving (Clotfelter, 1980).

T stands for the *time dummy variables* which are to account for up- and downturns in giving during the observed time period. Giving in Germany may have been exceptionally high in the year 2002 due to the flood along the river Elbe and in 2005 due to the earthquake in the Indian Ocean and the following Tsunami at the end of the year 2004. Moreover, the Euro has been introduced as a means of payment in 2002 and according to the so-called "Euro Effect" it might be that people gave more in 2002 due to metric effects. Hence, time dummies for the years 2002 to 2006 are included, some of which should have a positive coefficient compared to the baseline year 2001.

Furthermore, we include several *socio-demographic variables (X)* in our analyses:

The variable *gender* has no clear interpretation in this context because its value complies with the gender of the individual which generates the "principal" income. If the tax unit is a married couple, this is usually the husband. Therefore, the gender variable is combined with the information about whether a tax unit has chosen single or joint assessment. Married individuals do not necessarily have to be jointly assessed but they may also opt for separate assessment if this is beneficial to them. Therefore, dummy variables for single females, single males as well as separately assessed married individuals are included in the analysis, whereas married couples serve as the baseline.

With regard to *religious affiliation* the data distinguishes Catholics, Protestants, tax units belonging to other Christian denominations or being Jewish (*other confession*), and tax units having no such religious affiliation. In the analysis, a dummy variable for tax units being Catholic and a second one for tax units being Protestant are included. For married couples, the identifying information stems from the "principal" income earner.

To account for the possible effect of increasing *age* on donations, several dummy variables are generated for tax units aged from 15 to 24, aged from 25 to 34, aged from 35 to 44, aged from 45 to 54, aged from 55 to 64, and aged 65 and above. Again, the identifying information is the age of the principal income earner if the tax unit is a jointly assessed couple. All age dummy variables are included in the model except the one for tax units aged from 45 to 54 which serves as the baseline.

Furthermore, several dummy variables for the number of *children* are included. The respective variable in the tax return data, however, only contains information on the

number of tax-relevant children, i.e. children which have not turned 18 years old yet. A child aged 18 to 26 is also considered if it has not completed its educational career yet. The model includes dummy variables for having one child, two children, three children, and more than three children, so tax units without any children constitute the baseline.

The information on the *federal state of residence* is used to construct a dummy variable for all tax units living in the Eastern part of Germany (including Berlin).

Summing up, we define the amount of contributions reported in the tax return to be a function of the variables defined above:

$$\log(G_{it} + 5) = f(logY_{it}, logP_{it}, T_t, X_{it})$$

2.7.2 Descriptive Statistics

The data screening procedures described above leave us with an unbalanced panel which contains 475,272 observations. All monetary values are converted into constant 2006 Euro values using the consumer price index by the FSO.

The descriptive statistics (Table 1) show that our sample disposes of a relatively high income with an average of around 87,000 Euros. This confirms that many low income households do not file an income tax return at all. The share of tax units which declare a positive amount of charitable contributions is 45.7%, and the average amount declared is 733 Euros including non-donors. This large average contribution is not surprising because grants to foundations, which have been tax deductible up to an amount of 307,000 Euros per year, are included. Again, this is a hint that the sample of income tax return filers used here is not representative of the overall German population because the average amount of donations which is reported in surveys is considerably lower (see chapter 2.3).

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.
Donations	733.40	27663.34
Donations Dummy	0.457	0.498
Income	87004.89	252110.10
Price	0.761	0.206
Eastern federal state	0.208	0.406
Single female	0.150	0.357
Single male	0.215	0.411
Married, separately assessed	0.015	0.122
Married couple	0.620	0.485
Aged 15 to 24	0.026	0.160
Aged 25 to 34	0.114	0.318
Aged 35 to 44	0.256	0.436
Aged 45 to 54	0.262	0.440
Aged 55 to 64	0.203	0.402
Aged 65 and above	0.139	0.346
Catholic	0.300	0.458
Protestant	0.298	0.457
Other confession	0.001	0.024
No confession	0.402	0.490
No children	0.547	0.498
One child	0.185	0.389
Two children	0.193	0.395
Three children	0.059	0.235
More than three children	0.017	0.128
Year 2001	0.171	0.377
Year 2002	0.167	0.373
Year 2003	0.169	0.375
Year 2004	0.169	0.374
Year 2005	0.167	0.373
Year 2006	0.156	0.363

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations. All monetary values have been converted into constant 2006 Euros values. The information on the religious affiliation is available for only 475,023 individuals.

Table 2 and Table 3 take a closer look at the distribution of donations across income quintiles which are computed from the pooled observations.

Table 2: Share of donors per income quintile

Quintile	Income in Euro	Share of donors
1	Below 21,655.88	0.155
2	21,655.88 – 35,348.94	0.286
3	35,348.95 – 56,990.97	0.428
4	56,990.98 – 122,017.59	0.630
5	Above 122,017.59	0.784

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.

Table 3: Average and relative donation per income quintile

Quintile	Average donation	Average giving relative to individual income
1	33.66	0.0143
2	72.86	0.0025
3	170.00	0.0037
4	507.81	0.0058
5	2882.64	0.0082

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.

Obviously, the share of tax units which declare a positive amount of donations increases with income. In the lowest income quintile, only 15.5% report charitable contributions whereas 78.4% in the highest income quintile do so. The same increase may be observed for the average donation declared: it rises from 33.66 Euros in the lowest quintile to 2,882.64 Euros in the highest quintile. An interesting effect occurs when looking at individual donations relative to the respective individual income. The lowest income class gives on average 1.43% of its income to charitable causes whereas the second quintile gives on average 0.25% of its income. For the third to fifth quintile this share is rising again, leading to a U-shaped pattern of giving which is also observed in the US (James and Sharpe, 2007).

2.7.3 The Results

In the following, we apply the methods described in chapter 2.6. As the descriptive statistics have shown, the share of non-donors in the sample is around 55%, so the corner solution nature of charitable giving seems to be much more prominent in the German case as compared to the US. We include the same explanatory variables in each model and depart from a random effects Tobit model with 475,023 observations (due to missing information on the religious affiliation for some tax units) and complement this by the results from a two-part model, where we estimate the linear part for the subsample of donors by both a random effects and a fixed effects model.

The marginal effects resulting from the random effects Tobit and Probit models and the coefficients estimated by the linear models indicate that giving behavior is positively related to the income of a tax unit and is negatively related to the price of giving, which implies that charitable giving is a normal good (see Table 4). More precisely, if income increases by 1%, donations are expected to increase by 0.27% in the Tobit model, whereas a 1% decrease in price increases donations by around 1.7%. Thus, giving seems to be income inelastic and price elastic, whereby the price elasticity suggests that the tax deductibility of donations is treasury efficient. If we separate the decision whether to donate at all from the decision how much to donate, we see that the direction of the effects of the explanatory variables is the same for both decisions in the Probit random effects model and the linear random effects model, except for the *one child* dummy variable.

Looking at the results for the subsample of donors, however, the treasury efficiency of the tax deductibility is called into question. According to the random effects model, the increase in charitable contributions is disproportionately low at around 0.95% if the price of giving decreases by 1%. The absolute price elasticity decreases further to 0.56% in the fixed effects model, where only the within variation of the variables is taken into account. The substantially higher absolute price elasticity estimated by the Tobit model underlines the severity of the corner solution problem in our data set. The different models estimated on different samples, thus, lead to different conclusions of whether the tax treatment of donations in Germany is treasury efficient or not. Obviously, the reaction to changes in the marginal tax rate is more pronounced if all tax units – whether they are donors or not –, and thus the corner solution problem, is taken into account, whereas among the donating tax units the contributed amount of donations does not react as strongly to such changes.

Table 4: Regression results

	RE Tobit	RE Probit	RE	FE
Dependent variable: log(donations + 5) in (1), (3), (4) binary variable = 1 for donors in (2)				
Variables	(1)	(2)	(3)	(4)
log(income)	0.271***	0.124***	0.323***	0.126***
	(0.004)	(0.003)	(0.008)	(0.008)
log(price)	-1.695***	-0.942***	-0.945***	-0.557***
	(0.014)	(0.009)	(0.029)	(0.026)
Eastern states	-0.528***	-0.214***	-0.166***	0.113
	(0.012)	(0.006)	(0.015)	(0.091)
single female	-0.279***	-0.121***	-0.067***	-0.360***
	(0.013)	(0.007)	(0.017)	(0.056)
single male	-0.445***	-0.223***	-0.101***	-0.252***
	(0.009)	(0.005)	(0.014)	(0.022)
married sep. ass.	-0.268***	-0.149***	-0.050*	-0.240***
	(0.017)	(0.011)	(0.028)	(0.032)
age 15-24	-0.673***	-0.318***	-0.134***	0.047
	(0.018)	(0.008)	(0.033)	(0.049)
age 25-34	-0.467***	-0.239***	-0.234***	-0.087***
	(0.011)	(0.006)	(0.016)	(0.024)
age 35-44	-0.229***	-0.128***	-0.139***	-0.043***
	(0.008)	(0.005)	(0.009)	(0.012)
age 55-64	0.270***	0.163***	0.160***	-0.032***
	(0.009)	(0.006)	(0.009)	(0.012)
age 65 +	0.570***	0.314***	0.363***	-0.044**
	(0.014)	(0.007)	(0.013)	(0.019)
Catholic	0.399***	0.242***	0.088***	-0.097***
	(0.012)	(0.006)	(0.013)	(0.032)
Protestant	0.349***	0.204***	0.081***	-0.079***
	(0.012)	(0.006)	(0.012)	(0.027)
one child	0.065***	0.044***	-0.019*	-0.002
	(0.009)	(0.006)	(0.010)	(0.013)
two children	0.194***	0.124***	0.034***	0.026
	(0.011)	(0.007)	(0.012)	(0.018)
three children	0.331***	0.186***	0.183***	0.090***
	(0.018)	(0.010)	(0.017)	(0.027)
> 3 children	0.462***	0.232***	0.340***	0.127***
	(0.032)	(0.017)	(0.030)	(0.044)
No. observations	475,023	475,023	216,957	216,957
sigma (a)	2.728	1.726	1.096	1.345
sigma (u)	1.626	---	0.734	0.734
rho	0.738	0.749	0.690	0.770

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.

Notes: Standard errors in parentheses (robust errors clustered on the individual level in (3) and (4)). Time dummies are included in all models. Column (1) reports marginal effects on the unconditional mean of the dependent variable, column (2) reports marginal effects on the probability of being a donor. Marginal effects are evaluated at the means of explanatory variables.

Levels of significance: * 10%, ** 5%, *** 1% significance.

The finding of income inelastic giving behavior, however, is also confirmed for the subsample of donors and therefore robust across all models.

The parameter estimates for the socio-demographic characteristics show that tax units living in the Eastern part of Germany are less generous givers than those living in the West, whereas jointly assessed couples give more than singles do. Furthermore, tax units, where the principal income earner is aged below 45, report less donations compared to the baseline group aged between 45 and 54, and tax units older than this baseline group report more donations. Furthermore, being Catholic or Protestant, and having children increases the amount of charitable contributions. The parameter estimates for the socio-demographic variables in the fixed effects model differ in parts substantially from those in the other models. This is probably due to the small amount of within variation in these variables which would render the fixed effects estimates imprecise.

To control whether there are any timing effects in the reporting of charitable contributions by the tax units in our data set, we follow Fack and Landais (2010) and Bakija and Heim (2011). Accordingly, we include lagged and future differences of the income and price variables in our model, more precisely we define

$$\Delta logP_{it} = logP_{it} - logP_{it-1}$$
$$\Delta logP_{it+1} = logP_{it+1} - logP_{it}$$

$$\Delta logY_{it} = logY_{it} - logY_{it-1}$$
$$\Delta logY_{it+1} = logY_{it+1} - logY_{it}$$

We do not find any optimizing behavior of the households (see Table B1). Instead, our results suggest that if the income is to increase in the next assessment period, that means $\Delta logY_{it+1} > 0$, contributions would increase in the current period. Moreover, if the price of giving is going to increase in the next period, that means $\Delta logP_{it+1} > 0$, then donations would decrease in the current period which is not what we would expect.[26] Especially with regard to the price variable, it might be that individuals cannot perfectly foresee the changes and that they react with a delay to them. As Figure 1 shows, the statutory changes in marginal tax rates have been relatively small for tax units with low

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[26] Fack and Landais (2010) cannot find any optimizing behavior for the case of France as well and report the same unexpected signs for their parameter estimates.

and middle incomes. For those tax units it would have been very difficult to foresee these changes correctly and optimize their behavior.

2.8 Conclusion

This chapter contributes to understanding in how far tax units adjust their giving behavior in response to changes in their income and to changes in the price of giving. Despite the numerous studies that have been conducted for the US, it cannot be taken for granted that the insights on income and price elasticities of giving can be generalized to countries with large welfare states like Germany.

The results show that the decisions whether to donate at all and how much to give are both positively related to income and negatively related to the price of giving. The results from the Tobit model deliver an income elasticity of 0.27 and the price elasticity is estimated to be -1.7. Accordingly, giving seems to be income inelastic and price elastic. The result for the price elasticity is challenged if we look at donors only although the point estimate of the price elasticity still is close to unity in the random effects model and decreases to -0.56 in the fixed effects model. Since there is a large number of estimated income and price elasticities for the US, it is difficult to compare the results, but the estimates for Germany definitely fall into the range of the US estimates. Thereby, the income elasticity falls into the lower end of the range of values from US studies using panel data, whereas the price elasticity falls into the upper range if we include non-donors and estimate a Tobit model. This suggests that giving in Germany might be less income elastic and more price elastic compared to the US.

If we compare the results to other German studies, the results from the Tobit model confirm the finding by Paqué (1986) and Auer and Kalusche (2007) that the tax deductibility of charitable contributions is treasury efficient even if a possible crowding-out effect is not controlled for, and the same finding by Bönke et al. (2011) who control for crowding-out. Our point estimate for the price elasticity, however, is higher than the cross-section Tobit estimates by Auer and Kalusche (2007) and Bönke et al. (2011). Their studies differ in many aspects from our approach, in that they use different data sets and use different model specifications. Moreover, Auer and Kalusche (2007) exclude all non-itemizers from their analysis. With the appropriate caution, our results for the subsample of donors may be compared to the quantile regression estimates by Bönke et al. (2011) because their procedure effectively estimates elasticities for donors only. For mid-range

donors, this means for the majority of tax units reporting donations, they find price elasticities below unity and similar to the ones we obtain in the linear models.

Our results suggest that the tax treatment of charitable contributions is treasury efficient if we take non-donors into account. If we evaluate the results based on this (simple) standard, this would mean that the loss in tax revenue by the government is more than offset by the increase in donations. For the subsample of donors this efficiency result does not hold, but nevertheless they obviously react to this tax incentive even if this reaction is not elastic. Therefore, we conclude that the tax deduction is effective in promoting charitable contributions. Abolishing the tax incentive might considerably decrease private voluntary contributions and, thus, increase the need for the public provision of certain charitable goods. The case for maintaining this tax deduction is even stronger if the private provision of public goods is more effective than the public provision.

There are, however, some limits to this study which must be left to further research. First, we cannot distinguish the various charitable causes donations go to, for example environmental groups, cultural activities, and social services. Therefore we assume that all types of donations react in an identical manner to changes in income and price which is not necessarily the case. Second, by using tax return data we eliminate those individuals with very low incomes and may not come to any conclusions regarding their giving behavior. So, the results obtained here are only predictive of the giving behavior of the particular tax units in the sample and should not be improvidently translated to the German population in general. Third, we cannot find any optimizing behavior of the tax units with regard to anticipated changes in income and price of giving. With longer and possibly more balanced panel data, distinguishing transitory and permanent price elasticities is a promising project for future research.

3   On the Impact of the German Church Tax on Private Charitable Contributions

3.1   Motivation and Background

As we have seen in the previous chapter, the markets for charitable giving in Germany and the US are very different. This is not only the case with regard to overall charitable contributions, but there is also a notable difference in religious giving in the two countries. According to the *TNS Infratest Spendenmonitor*, 24% of all German individual donors gave to religious causes in 2009 while disabled care and child welfare are the causes chosen most frequently (TNS Infratest, 2009). In the US, on the other hand, religion received more than a third of all charitable giving which is the largest share among all charitable causes (Giving USA Foundation, 2010). Even if these numbers are not directly comparable, it seems that religious giving is more prominent in the US as compared to Germany.

One possible reason for this difference in religious giving is the German church tax which has to be paid by all Catholics and Protestants and by the members of some Jewish and free religious communities if the individual is liable to income tax. The reasoning is that the church tax payments may be regarded as a substitute for (religious) giving, even more so because a small share of the church tax revenues goes to educational institutions and to social services. To our knowledge, the relationship of the church tax and charitable contributions has not been examined empirically yet, and this chapter offers some first insights. Thereby, we treat the church tax payments as a voluntary contribution to religious causes.

There are only very few studies which look at the relationship of religious giving and secular giving. A survey by the Independent Sector (2002) revealed that religious givers are more generous than nonreligious givers. Religious givers are those that contribute to religious congregations, such as churches, temples, and mosques as opposed to secular organizations. Interestingly, donors who give to both religious congregations and secular organizations make higher donations to secular organizations than those who give only to secular organizations. This means that giving to religious causes does not interfere negatively with financial support to other nonprofit organizations. Using survey data from the US, Wilhelm (2010) confirms this result for contributions to organizations that help people in need, finding positive associations between religious giving and giving to these organizations. Hill and Vaidyanathan (2011) use the same data set as Wilhelm (2010) and find that religious giving and secular giving are positively related. This symbiotic

relationship – as the authors put it – also occurs if giving to different secular causes, namely helping the needy, education, and health, is separately regressed on religious giving. If we translate the results from these previous studies to our setting, this suggests that a positive effect of the German church tax on charitable contributions may prevail. It is not obvious, however, that these results might be easily transferred to the German case because the church tax is a very specific institution whose mechanisms need to be explored. One advantage of estimating the effect of the church tax on charitable giving over estimating the effect of religious giving on secular giving is that the problem of reverse causality should play a minor role because the church tax liability is given exogenously for church members.

3.2   The German Church Tax

A church tax system can be found only in very few countries as religious communities' revenues usually stem from other sources. Indeed, there are many different ways in which churches are financed:

- For example, in the US and in France the churches rely on voluntary contributions.
- In Belgium, Norway, and Greece the churches are basically funded by the state.
- The church in Great Britain relies on the return on its assets.
- Independently of being a church member or not, in Italy and Spain each taxpayer may choose whether to give a certain share of the income tax to a church or to other charitable causes. Similarly, taxpayers in Iceland are free to direct their church tax payments to one of the officially recognized religious communities. The payments of taxpayers who do not belong to one of these communities are forwarded to the University of Iceland.
- In Austria, members of the Catholic and Protestant churches are obliged to make a contribution (i.e. a certain share of their taxable income) which is collected by the churches themselves.
- In Denmark, Finland and Sweden members of the respective state churches are obliged to pay church tax, but the tax rate is determined by the respective municipality.[27]

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[27] In Switzerland, a church tax is raised in several cantons, but the regulations differ between them.

According to the German Constitution, religious communities which are recognized as public law corporations are entitled to raise church tax from their members. The Church Tax Laws of the sixteen federal states provide the guidelines which are complemented and further specified by the decrees of the religious communities. The federal structure of Germany thus leads to sixteen distinct church tax regulations which differ in various aspects. Tables D1 to D16 display the regulations which were in force in each of the sixteen states in the years 2001 to 2006.[28]

The church tax from income is computed and collected by the tax authorities when assessing a taxpayer's income tax and then forwarded to the respective religious community.[29] In all federal states, the Catholic Church and the Protestant Church make use of the opportunity to have the tax collected by the tax authorities, and in some states the Jewish Communities and some free religious communities do so. For members of these churches and religious communities, the payment of the tax is obligatory and the only possibility to avoid it is to leave the community officially.

The church tax from income amounts to 8% (in the federal states of Bavaria and Baden-Wuerttemberg) or 9% (in all other federal states) of the so-called *fictitious income tax liability*. The computation of this fictitious income tax liability is based on a *fictitious taxable income* concept. The fictitious taxable income is equal to usual taxable income less child allowances and under disregard of the shareholder-relief system.[30] The application of the income tax scale to this fictitious taxable income delivers the fictitious income tax. However, there are some further provisions which differ between the federal states and which eventually determine the church tax liability: Some religious communities limit the church tax liability to a certain share of the fictitious taxable income, for example in Berlin the church tax is limited to 3 % of the fictitious taxable income. In some federal states the consideration of this upper limit is guaranteed ex officio whereas in the other states the taxpayer needs to send a request to the respective religious community. Furthermore, some religious communities demand that each member pays a minimum amount of church tax which is 3.60 Euros per year in most states. This minimum amount is to be paid only if the fictitious income tax was greater than zero.

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[28] As our data set covers the years 2001 to 2006, we display the tax regulations that were valid at this time and do not enlarge upon the current situation.

[29] The federal state of Bavaria is the only exemption. Here, the so-called "church tax offices" collect the church tax, so it is not administered by the tax authorities.

[30] From 2001 to 2008, the German income tax law stipulated that 50% of the income from shareholdings in corporations (= "partial exempt income") would be exempt from income tax (= "shareholder-relief"). For the computation of the church tax liability, however, this exempt part of the income is added to taxable income and thus taken into account.

The church tax payments of individuals that are individually assessed as well as the church tax payments of married couples which are jointly assessed and where husband and wife are members of the same religious community are easily calculated and fully benefit the respective religious community. The computation of the church tax liability is more complex, however, for couples with different religious affiliations. A marriage is called "inter-denominational" if husband and wife have different religious affiliations (e.g. Catholic husband and Protestant wife, Protestant husband and Jewish wife) and both religious communities raise church tax in the federal state the couple lives in. This is different from the case of "interreligious" marriages where one partner is subject to church tax in the federal state the couple lives in and the other partner is not. See Appendix D for more detailed information on the computation of the church tax liability in case of joint assessment.

Table 5: Church fee in interreligious marriage

Fictitious taxable income in Euros	Church fee in Euros
30,000 – 37,499	96
37,500 – 49,999	156
50,000 – 62,499	276
62,500 – 74,999	396
75,000 – 87,499	540
87,500 – 99,999	696
100,000 – 124,999	840
125,000 – 149,999	1,200
150,000 – 174,999	1,560
175,000 – 199,999	1,860
200,000 – 249,999	2,220
250,000 – 299,999	2,940
300,000 and more	3,600

This table displays the regulation valid in the years 2002 to 2006. In 2001, the Deutsche Mark was still the means of payment. How the church fee was determined in that year is shown in Table D19 in the appendix.

Moreover, in the case of an interreligious marriage, a comparative calculation between the church tax liability and the *church fee in interreligious marriage* is conducted whereby the higher amount of both is to be paid. The intention is that the income of the partner without church tax liability should not be drawn on when assessing the church tax liability of the

partner who actually is obliged to pay church tax. The fictitious taxable income of the couple (i.e. less child allowances and under consideration of partial exempt income) is the assessment base of the church fee in interreligious marriage which is determined as can be seen in Table 5.

Church tax payments are regarded as a special expense and may be deducted from taxable income.

3.3 The Model

In this section we establish a simple household model in order to identify some of the determinants that we are convinced to shape the interplay between charitable donations and church tax liabilities. The model relies on the assumption that households rationally decide on how much to donate and on whether being a church member and as such liable to a church tax or not being a church member. We assume that being a church member impinges in two ways on individual utility. First, households derive a direct benefit (possibly negative) from being a church member. We do not rationalize where this benefit might come from. Rather, we take the direct benefit of church membership as given and consider it as an exogenous parameter in the model. Second, households perceive the church tax liability as a contribution similar to a charitable donation.[31] This is because being a church member and, thus, being liable to a church tax is voluntary. In contrast to other charitable donations, however, the exact amount of the church tax liability is not at the discretion of the household.

Consider a household with a utility function of the form

$$U(X, Z) = \begin{cases} u(X) + v(Z) + \beta, & \text{if a church member,} \\ u(X) + v(Z), & \text{if not,} \end{cases}$$

where X denotes the amount of private consumption and Z the household's contribution to charitable causes. The utility parameter β measures the benefit the household (directly) derives from church membership. We assume that $\beta \in (-\infty, \infty)$, that is, the household may either derive a positive or a negative benefit from being a church member. The functions u and v are assumed to be strictly concave and twice continuously differentiable. The function u satisfies $u'(0) = \infty$, implying that private consumption X is essential. In

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[31] See, for example, Iannaccone (1998) for a discussion on the economic role of churches.

contrast, for the function v we assume that $v'(0)$ is finite. This allows for the possibility that the household chooses not to make any donations to a charitable cause.

Church members pay a church tax amounting to C, whereas non-members face no church tax liabilities. Since church membership is voluntary, church members perceive the church tax C as a contribution to a charitable cause. Therefore, total charitable giving of a church member amounts to $Z = C + G$, where G measures charitable giving other than the church tax liability. Total charitable giving of a non-member, on the other hand, simply reads $Z = G$.

The household's budget constraint is given by

$$X = \begin{cases} Y - PC - PG, & \text{if a church member,} \\ Y - PG, & \text{if not.} \end{cases}$$

Here, Y is the disposable income of the household and P is the tax-determined price of both the tax liability C and other charitable giving G. The tax-determined price P is normally smaller than 1. This is because both, the church tax liability and charitable donations are tax deductible so that the household only gives away $1 - m$ currency units when contributing an additional currency unit to a charitable cause, with m being the household's marginal income tax rate. Like the church tax liability C, we treat the tax-determined price P as exogenously given to the household, although the tax-determined price generally varies with taxable income. The reason is that in the subsequent empirical analysis we treat both, the church tax liability C and the tax-determined price P as independent variables that impinge on the amount of charitable giving G. Section 3.4.1 elaborates on how C is implemented as exogenous variable in the empirical study.

The household maximizes utility U by choice of church (non-)membership and donations G. Consider first the choice of G, given church (non-)membership. The first order condition for maximum utility with respect to G reads

$$-Pu'(X_i) + v'(Z_i) \leq 0, \quad \text{with } = 0 \text{ if } G_i > 0, \tag{1}$$

where $i = m, n$ denotes church membership and non-membership, respectively. For $G_i > 0$ the first order condition implies a function $G_i = G_i(Y, P, C)$ with

$$\frac{\partial G_i}{\partial Y} = \frac{Pu''(X_i)}{P^2 u''(X_i) + v''(Z_i)} > 0, \quad i = m, n, \tag{2a}$$

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$$\frac{\partial G_i}{\partial P} = \begin{cases} \dfrac{u' - P(C + G_i)u''(X_i)}{P^2 u''(X_i) + v''(Z_i)} < 0, & \text{if } i = m, \\[4mm] \dfrac{u' - PG_i u''(X_i)}{P^2 u''(X_i) + v''(Z_i)} < 0, & \text{if } i = n. \end{cases} \tag{2b}$$

$$\frac{\partial G_i}{\partial C} = \begin{cases} -1, & \text{if } i = m, \\ 0, & \text{if } i = n, \end{cases} \tag{2c}$$

Equation (2a) embodies the standard result that charitable giving increases with disposable income. Technically, this result is due to the fact that the additive separability of the utility function guarantees that charitable giving is a non-inferior good. Equation (2b) states that donations decrease when the tax-determined price of giving increases. This result is also standard and has been demonstrated in chapter 2. Generally, an increase in the price triggers both an income effect and a substitution effect. However, since charitable giving is a non-inferior good both the income effect and the substitution effect have the same sign, so that an increase in the price unambiguously decreases donations. Equation (2c) is about the interplay between the church tax liability and donations. While a non-church member's donations are not affected by an increase in the church tax liability, a church member fully neutralizes a higher church tax liability by reducing donations to other charitable causes. This result leads us to our first hypothesis on the interplay between church tax liabilities and charitable donations.

Hypothesis 1: Charitable donations of church members decrease, when their church tax liability increases.

Consider next the maximum household utility of church members and non-members. Substituting for utility maximizing donations G_i as implicitly defined by condition (1) in the utility function U yields the indirect utility function of church members and non-members as

$$V_m(Y, P, C) = u(Y - PC - PG_m) + v(C + G_m) + \beta,$$
$$V_n(Y, P) = u(Y - PG_n) + v(G_n).$$

As a utility maximizer, the household will choose to be a church member if $V_m \geq V_n$, and a non-member otherwise. If a church member, the household is affected by an increase in the church tax liability as follows

$$\frac{\partial V_m}{\partial C} = \begin{cases} 0, & \text{if } G_m > 0, \\ -Pu'(X_m) + v'(Z_m) < 0, & \text{if } G_m = 0. \end{cases}$$

Thus, as a church member the household only suffers a utility loss from an increase in the church tax liability if she does not donate to charitable causes in addition to her church tax liability. The intuition underlying this result is simple. A church member neutralizes the effect of an increase in the church tax liability by reducing donations in the same amount. The increase in the church tax liability does not affect the total amount she wants to contribute to charitable causes including the church. In contrast, a church member who does not donate, generally contributes more to a charitable cause in the form of the church tax liability than she regards to be optimal. If the church tax liability increases, she is urged to contribute an even higher amount than the one she already regards to be too high. As a consequence, an increase in the church tax liability makes a non-donating church member worse off. Since a non-member is generally not affected by an increase in the church tax liability, its effect on a church member has a straightforward empirically testable implication. We formulate this implication as our second hypothesis.

Hypothesis 2: A church member, who does not donate, is more likely to resign from church when the church tax liability increases than a church member who does donate.

Consider next the conditions that determine whether a household is a church member or not and whether a household is a donor or not. Consider first a household with $\beta < 0$, that is, a household who derives a negative direct benefit from church membership. Such a household will not opt for church membership irrespective of the size of the church tax liability. Whether the household donates or not only depends on her disposable income Y and the tax-determined price of giving P. Generally, the household will be a donor, if her disposable income is high and/or the price of giving is low.

More interesting and more involved is the case $\beta > 0$, that is, the case in which the household derives a positive direct utility form church membership. For $\beta > 0$ we have to distinguish between four types of households, namely, a church member who donates to a charitable cause in addition to the church tax liability, a church member who does not

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donate, a non-member who donates, and a non-member who does not donate. We distinguish between these four types in the (C, Y)-space, that is, in the church tax liability-disposable income-space. Based on the conditions that determine optimal charitable giving and church membership we construct C-Y-loci that separate the four types from one another.

We start with the C-Y-locus that separates donating non-members from non-donating non-members (the derivations of the properties of all the loci are relegated to Appendix C). Considering condition (1), this locus, denoted as Locus I, is implicitly defined by

$$-Pu'(Y) + v'(0) = 0. \qquad\qquad (Locus\ I)$$

Locus I is a horizontal line in the (C, Y)-space, with a positive intercept with the Y-axis. Above Locus I, non-members donate, and below Locus I, non-members do not donate. In Figure 2, Locus I is only plotted for larger church tax liabilities. This is because for a given disposable income Y, non-donating households will be church members if the church tax liability is low. As a consequence, Locus I does not separate non-donating non-members from donating non-members for low church tax liabilities.

The second locus, denoted as Locus II, separates donating church members from non-donating church members. Considering condition (1), it is implicitly defined by

$$-Pu'(Y - PC) + v'(C) = 0. \qquad\qquad (Locus\ II)$$

As Figure 2 illustrates, Locus II is an increasing curve in the (C, Y)-space with the same intercept as Locus I. Above Locus II households will donate both as church members and as non-members. However, above Locus II households will always be church members. This is because $G_n = C + G_m$ holds when a household donates both as a church member and as a non-member. As church members, however, households receive higher utility than non-members since they enjoy the direct benefit $\beta > 0$ as church members.

The third locus, denoted as Locus III, separates non-donating church members from non-donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = G_n = 0$, which is equivalent to

$$u(Y - PC) + v(C) + \beta = u(Y) + v(0). \qquad\qquad (Locus\ III)$$

Locus III is an increasing curve in the (C, Y)-space. Generally, Locus III springs with infinite slope from the origin and is located above the $C - Y$ −locus defined by $Y = PC$ for all $C > 0$.[32] As Figure 2 shows, Locus III is only defined below Locus I. This is because above Locus I, non-members are donors so that Locus III cannot separate non-donating church members from non-donating non-members any longer. The fourth locus, denoted as Locus IV, separates non-donating church members from donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = 0$ and $G_n > 0$, that is,

$$u(Y - PC) + v(C) + \beta = u(Y - PG_n) + v(G_n) \qquad (Locus\ IV)$$

As Figure 2 illustrates, Locus IV is also an increasing curve in the (C, Y)-space. Locus IV is only defined above Locus I, because below Locus I households as non-members do not donate. Like Locus III also Locus IV is located above the $C - Y$ −locus defined by $Y = PC$. Locus III and Locus IV intercept Locus I at the same point and have the same slope in that point. Generally, Locus IV may or may not have an intercept with Locus II.

Figure 2: Illustration of the four loci in the (C,Y)-space
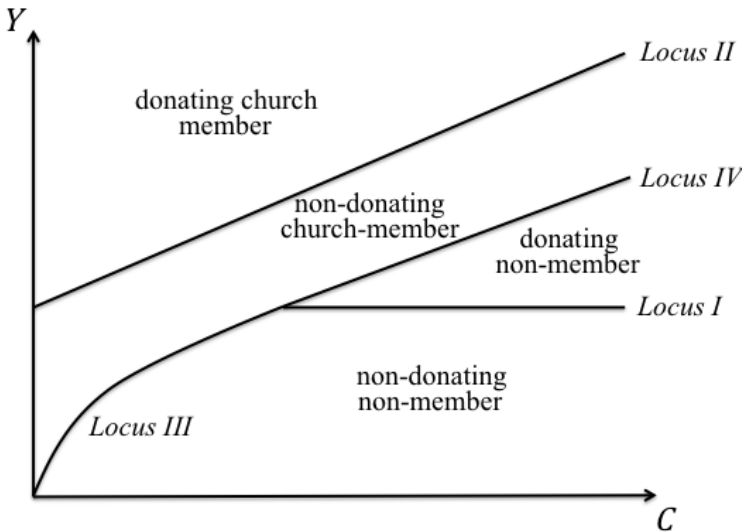
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[32] The Appendix also considers the special case that Locus III coincides with the C-Y-locus defined by $Y = PC$.

Below Locus I households are non-donating non-members. Between the Loci I and IV households are donating non-members. Between the combination of the Loci III and IV and Locus II household are non-donating church members. Finally, above Locus II households are donating church members.

Generally, the higher the disposable income Y and the lower the church tax liability C, the more likely it is that the household is both a church member and a donor. With a high disposable income it is likely that the total amount the household contributes exceeds the church tax liability. In this case the household can enjoy the direct benefit from church membership β (provided it is positive) without incurring additional costs. The household just offsets the burden of the church tax liability by reducing giving to other charitable causes. If the disposable income and the church tax liability are such that the household wants to contribute to a charitable cause in an amount lower than the church tax liability, the household will be a donating non-member. However as a donating non-member the household faces a double burden of not being a church member. First, the household forgoes the direct benefit of church membership. Second, the household does not fully "save" herself the church tax liability by being a non-member as she would offset the church tax liability by reducing other charitable giving when being a church member. Finally, if disposable income is low, the household will either be a non-donating church member or a non-donating non-member. The latter becomes the more likely, the higher the church tax liability.

Figure 2 suggests that either being a non-donating church member or a donating non-member are the most constrained types. With increasing income households not only prefer to become donors but also to become church members (provided that $\beta > 0$). With increasing church tax liabilities, on the other hand, households prefer to become non-members. Thus, non-donating church members and donating non-members are to some extent the most transient among the four types. This reasoning leads us to our third hypothesis.

Hypothesis 3: Donors are more likely to be church members than non-members.

Strictly speaking, the third hypothesis only applies to those households who do derive a positive direct benefit from church membership. However, to the extent that disposable income Y and the direct benefit of church membership β are independently distributed across households, the hypothesis should apply more generally.

3.4 The Empirical Analysis

3.4.1 Variables and Descriptive Statistics

The data set on which we base the following the analysis is the 0.5%-sample of the German Taxpayer Panel which has been described in section 2.5. We conduct the same data screening procedures and define the same variables. In addition, we now compute the church tax liability for the tax units in our sample.

C is the *church tax liability*. As the church tax liability is a function of taxable income which depends on the amount of charitable contributions we need to compute an exogenous measure of the church tax liability under the assumption of zero donations. This procedure is analogous to the computation of exogenous income and the exogenous "first-dollar price" of giving. The church tax liability is then calculated for each tax unit as explicated in section 3.2 and in Appendix D. Due to the anonymization process, however, there is no information on the federal state of residence for the tax units in the two highest income classes with total incomes above 150,000 Euros. Instead, we only know whether these tax units live in one of the Western or in one of the Eastern federal states. We approximate their church tax liability by computing the sum that would have to be paid under the regulations which have been valid for the majority of members of a certain religious community in a certain year in either the Western or the Eastern federal states. Moreover, we do not know whether a tax unit has resigned form church during a certain year, so we assume that the church membership indicated in a tax return has been effective during the entire year.[33] If a tax unit lives in a federal state where the upper limit to the church tax does not come into effect ex officio, we assume that the income-maximizing tax unit requests the exercise of this limit. As we are interested in the elasticity of charitable giving with regard to the church tax liability, we add 5 Euros to the church tax liability of every church member in order to be able to take the logarithm.

The data screening procedures described above leave us with an unbalanced panel which contains 475,171 observations. The number of observations differs from that in the previous chapter because we had to exclude some tax units whose combination of income did not permit an unambiguous calculation of the church tax liability (compare p. 23). All monetary values are converted into constant 2006 Euro values using the consumer price index by the German Federal Statistical Office.

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[33] In practice, if a taxpayer resigns from church in the course of a certain year, she needs to pay church tax only for the months of her membership.

Table 6: Descriptive statistics

Variable	Mean	Std. Dev.
Donations	733.46	27666.27
Donations Dummy	0.457	0.498
Income	87002.91	252071.40
Price	0.761	0.206
Church Tax	2090.70	12177.88
Church Tax Dummy	0.676	0.468
Eastern federal state	0.208	0.406
Single female	0.150	0.357
Single male	0.215	0.411
Married, separately assessed	0.015	0.122
Married couple	0.620	0.485
Aged 15 to 24	0.026	0.160
Aged 25 to 34	0.114	0.318
Aged 35 to 44	0.256	0.436
Aged 45 to 54	0.262	0.440
Aged 55 to 64	0.203	0.402
Aged 65 and above	0.139	0.346
No children	0.547	0.498
One child	0.185	0.389
Two children	0.193	0.395
Three children	0.059	0.235
More than three children	0.017	0.128
Year 2001	0.171	0.377
Year 2002	0.167	0.373
Year 2003	0.169	0.375
Year 2004	0.169	0.374
Year 2005	0.167	0.373
Year 2006	0.156	0.363

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations. All monetary values have been converted into constant 2006 Euros values. The information on religious affiliation is available for only 474,922 tax units.

The descriptive statistics are very similar to those in chapter 2. 67.6 % of the tax units are liable to church tax which means that either the taxpayer in a single household or at least one partner of a jointly assessed couple is a member of a religious community which raises church tax. The average church tax liability before any donations are made is around 2,090 Euros.

If we take a closer look at the relationship between the church tax and charitable contributions, an interesting picture is revealed. Among the tax units which are church members[34], the majority reports a positive amount of donations whereas most of the tax units without church membership are non-donors.

	Church tax = 0	Church tax = 1
Non-donors	114,364	143,808
Donors	39,805	177,194

As predicted by the model, donors seem to be more likely to be church members than non-members. Among the tax units which report a positive amount of charitable contributions, 39,805 are not church members, whereas the majority of 177,194 donating tax units owns a church membership. We test the hypothesis of whether the probability of being a church member equals 0.5 by means of a binomial test which is rejected ($p < 0.01$).

Interestingly, the tax units which are church members dispose of a considerably higher average income than the tax units without any church membership. Thus, they seem to have greater financial resources available for donations[35], but at the same time the average donations of the tax units without church membership are slightly higher than those of the church members. Obviously, the fewer donors without church membership make on average substantially higher contributions than the many donors who are church members.

	Church tax = 0	Church tax = 1
Average income	72,021 €	94,197 €
Average donations	757.58 €	721.88 €

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[34] For the remainder of this chapter we will subsume singles that are church members and jointly assessed couples where at least one partner is member of a religious community which raises church tax under the term "church members".

[35] We do not have any information about the wealth of the tax units which may also be an important driver for charitable contributions.

3.4.2 The Results

The effect of the church tax on charitable contributions

In order to gain further insights into the relationship between the German church tax and charitable contributions, we first test the hypothesis derived from the theoretical model that church members' donations decrease with their church tax liability. As in the previous chapter, we apply both a Tobit model and a two-part model to the subsample of church members.

Table 7 displays the regression results from all four models. Across all models, the church tax liability has a significantly positive effect on the amount of charitable contributions reported by the same tax unit. The magnitude of this effect, however, is rather small: The marginal effect (evaluated at the mean of the explanatory variables) derived from the Tobit model is 0.02 which implies a 0.02% increase in donations when the church tax liability increases by 1%, so the reaction of charitable contributions to an increase in the church tax liability is very inelastic. If we separate the decision whether to donate at all from the decision how much to contribute, we see that the probability of being a donor increases by 0.0012 if the church tax liability increases by 10%. For the subsample of donors, the elasticity of charitable contributions with regard to the church tax liability is estimated to be 0.017% in the random effects model and in the fixed effects model the church tax parameter estimate is insignificant. Summing up, the economic significance of the church tax variable obviously is very limited.

As a robustness check, we estimated the same models only for those tax units where precise information regarding the federal state of residence is available. This means that we dropped all tax units with overall income above 150,000 Euros. The results may be found in Table B2 in the Appendix. Restricting the analysis to the individuals with precise information about the federal state of residence and therefore possibly more precise computations of the church tax liability, we do not find a significant effect of the church tax payments on charitable contributions at all.

Table 7: Regression results including the church tax liability

	RE Tobit	RE Probit	RE	FE
	Dependent variable: log(donations + 5) in (1), (3), (4)			
	binary variable = 1 for donors in (2)			
Variables	(1)	(2)	(3)	(4)
log(income)	0.357***	0.124***	0.374***	0.155***
	(0.007)	(0.004)	(0.010)	(0.010)
log(price)	-1.414***	-0.744***	-0.521***	-0.326***
	(0.023)	(0.014)	(0.035)	(0.032)
log(churchtax)	0.018***	0.012***	0.017***	0.006
	(0.003)	(0.002)	(0.004)	(0.004)
Eastern states	-0.326***	-0.145***	-0.030	0.159
	(0.022)	(0.012)	(0.020)	(0.119)
single female	-0.318***	-0.120***	-0.064***	-0.362***
	(0.019)	(0.010)	(0.019)	(0.062)
single male	-0.490***	-0.234***	-0.076***	-0.210***
	(0.014)	(0.009)	(0.017)	(0.026)
married sep. ass.	-0.292***	-0.154***	-0.042	-0.249***
	(0.026)	(0.019)	(0.035)	(0.040)
age 15-24	-0.871***	-0.430***	-0.154***	0.020
	(0.024)	(0.014)	(0.034)	(0.051)
age 25-34	-0.600***	-0.301***	-0.263***	-0.099***
	(0.015)	(0.009)	(0.017)	(0.027)
age 35-44	-0.275***	-0.147***	-0.143***	-0.040***
	(0.010)	(0.006)	(0.010)	(0.013)
age 55-64	0.294***	0.156***	0.157***	-0.035***
	(0.012)	(0.006)	(0.010)	(0.013)
age 65 +	0.580***	0.263***	0.345***	-0.043**
	(0.018)	(0.006)	(0.014)	(0.020)
one child	0.048***	0.034***	-0.023**	-0.001
	(0.012)	(0.007)	(0.011)	(0.014)
two children	0.179***	0.114***	0.006	0.012
	(0.015)	(0.007)	(0.013)	(0.019)
three children	0.331***	0.159***	0.157***	0.090***
	(0.022)	(0.009)	(0.019)	(0.029)
> 3 children	0.488***	0.205***	0.274***	0.105**
	(0.041)	(0.014)	(0.032)	(0.048)
No. observations	321,002	321,002	177,194	177,194
sigma (a)	2.645	1.859	1.089	1.316
sigma (u)	1.516	---	0.722	0.722
rho	0.753	0.776	0.695	0.769

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.
Notes: Standard errors in parentheses (robust errors clustered on the individual level in (3) and (4)). Time dummies are included in all models. Column (1) reports marginal effects on the unconditional mean of the dependent variable, column (2) reports marginal effects on the probability of being a donor. Marginal effects are evaluated at the means of explanatory variables.
Levels of significance: * 10%, ** 5%, *** 1% significance.

When employing regression analysis, we cannot confirm the prediction of the theoretical model that charitable contributions decrease with the church tax liability of church

members. For the larger sample we find a positive relationship instead which is closely related to the finding from previous studies for the US that religious giving affects secular giving positively. It might be that the church tax payments are regarded as benefiting exclusively religious causes, so they would not be seen as a substitute for further secular charitable contributions. We cannot shed any further light on this issue because we do not know towards which charitable causes the contributions reported by church tax members are directed. On the other hand, it may be that the income and price variables effectively control for the church tax liability of a tax unit because the church tax is largely determined by these two variables and the remaining variation is rather small, which renders the precise estimation of the church tax effect difficult.

Therefore, in a next step, we make use of the differing church tax rates within Germany. As explicated before, the rate is 8% of the fictitious income tax in the southern federal states of Baden-Wuerttemberg and Bavaria and 9% in all other federal states. We would like to measure whether living in a state with the lower 8% church tax rate (the treatment group) has a measurable effect on the charitable contributions reported in the tax return. Our control group consists of the tax units living in a state with the 9% church tax rate. This approach encounters the difficulty that we observe only the actual outcome for each tax unit and we do not have any information on the counterfactual outcome, this means we do not know which amount of contributions the same tax unit would make if it was underlying a different church tax treatment.

The "average treatment effect on the treated" (ATT) is the difference in contributions G(1), the observed outcome for tax units living in a state with 8% church tax rate, minus G(0), the contributions by the same treated tax units if they lived in a state with 9% church tax rate.

$$ATT = E\lfloor G_i(1)|D_i = 1 \rfloor - E\lfloor G_i(0)|D_i = 1 \rfloor$$

where $D_i = 1$ for tax units in the treatment group and $D_i = 0$ for tax units in the control group. The ATT is often measured by matching approaches (see Rosenbaum and Rubin, 1983, Dehejia and Wahba, 2002, Caliendo and Kopeinig, 2005) which compare individuals with similar characteristics living in different circumstances, i.e. either in the treatment or in the control group. To obtain reliable results, the *conditional independence assumption* (CIA) must be fulfilled which demands that conditional on a set of covariates x the treatment indicator D and the outcomes $G(0), G(1)$ are independent. In other words, if we

control for enough variables which determine the assignment of the treatment, this assignment is independent of the outcome. This is also called the "selection on observables" assumption. Moreover, we need to ensure that for any combination of the covariates x both the probabilities for being in the treatment group and for being in the control group are positive because otherwise we would not be able to estimate a treatment effect for certain tax units in the sample. Formally, this *common support* assumption is

$$0 < P(D = 1|X) < 1$$

A matching of the tax units in the treatment and control group based on the covariates x may be difficult because the number of tax units with exactly identical x values might be low. To avoid this problem, Rosenbaum and Rubin (1983) show that it is sufficient to estimate a propensity score – this is the estimated probability that a tax unit is part of the treatment group – to compare members of the treatment group to members of the control group.

To conduct the propensity score matching, we dropped all observations with imprecise information about the federal state of residence and without any church membership and pooled all remaining observations. We estimated the propensity score through a Probit Model, where the dependent variable equals 1 for all tax units living in Baden-Wuerttemberg or Bavaria and 0 for residents in all other federal states. We include income, the price of giving as well as several socio-demographic variables as explanatory variables. Table 8 shows that only few of the explanatory variables can actually explain the probability of being in the treatment group. This probability increases with income and the marginal tax rate and Catholics and Protestants have a higher propensity of being in the treatment group. Moreover, the Pseudo R^2 is only 0.0382 which hints at very low explanatory power of the estimated model. The implications for the validity of our matching estimator will be discussed at a later point.

Table 8: Estimation of propensity scores

Variables	
income	2.85e-07*
	(1.46e-07)
1 – marginal tax rate	-0.249***
	(0.036)
single female	0.004
	(0.019)
single male	-0.038**
	(0.019)
married sep. ass.	0.030
	(0.052)
age 15-24	0.240***
	(0.032)
age 25-34	0.021
	(0.021)
age 35-44	-0.014
	(0.017)
age 55-64	-0.013
	(0.019)
age 65 +	-0.072***
	(0.022)
Catholic	0.606***
	(0.026)
Protestant	0.073***
	(0.026)
other confession	0.137
	(0.267)
one child	-0.059***
	(0.018)
two children	0.007
	(0.020)
three children	0.072**
	(0.032)
> 3 children	0.020
	(0.059)
No. observations	223,920

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.
Notes: Standard errors in parentheses (robust errors clustered on the individual level).
Levels of significance: * 10%, ** 5%, *** 1% significance.

The following results are derived from a radius matching with a radius of 0.05 which means that the difference in the estimated propensity for being in the treatment group must not differ by more than five percentage points between a tax unit from the treatment group and the matched observations from the control group. A tax unit from the treatment group is matched with all observations from the control group whose propensity score does not

differ by more than 0.05. This procedure avoids the drawback of a nearest-neighbor-matching with potentially weak matches if the distance to the nearest neighbor is large.

Our results hint at higher average contributions by the tax units living in a state with the 8% church tax rate as compared to the matched tax units in the control group.[36]

	Treatment Group	Control Group	Difference
Average contributions	224.92 €	175.60 €	49.32 €

This difference in the reported charitable contributions may suggest that the church tax liability has a negative impact on the contributions by church members as predicted by the theoretical model. However, there are some serious limitations to this procedure which may render the difference of 49.32 Euros an invalid estimate.

First of all, the CIA assumption is likely to be violated. We needed to assume that the assignment to the treatment group – this means living in the federal states Baden-Wuerttemberg or Bavaria – is only determined by the observable characteristics we included in the Probit model. However, it might be possible that there are further individual characteristics and preferences which influence both the decision where to live and how much to donate. For example, the economically strong federal states of Baden-Wuerttemberg and Bavaria might attract many high-skilled workers who usually exhibit higher mobility.[37] At the same time education has been shown to have a positive impact on donations (see for example Schervish and Havens, 1997). In this case, the difference in contributions would not necessarily result from the difference in church tax rates. Indeed, the low Pseudo R^2 of the Probit model we used to estimate the propensity scores suggests that the explanatory power of the variables included is very low. Summing up, there might be individual characteristics which affect the decision in which federal state to live but cannot be controlled for by using tax return data because tax return data usually do not dispose of comprehensive socio-demographic information.

Moreover, the estimation of propensity scores may suffer from endogeneity. It might be reasonable to assume that income, number of children and religious affiliation do not determine the federal state of residence but vice versa. If mobility within Germany is not so high and individuals remain in the federal state where they have grown up, the cultural

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[36] Bootstrapping of the standard errors was not possible due to technical limitations. The t-statistic for the difference given by the Stata psmatch2 command is 4.96.
[37] According to Frick (1996), a higher education goes along with higher flexibility.

background and the economic opportunities in the state will determine income, number of children and religious affiliation, and the estimated propensity scores would be biased.

The interrelation of charitable contributions and church membership

A second hypothesis which can be derived from the theoretical model is that church members who do not make charitable contributions are more likely to resign from their religious community when the church tax liability increases than church members who donate.

To test this hypothesis, we estimate a Probit model for the probability of resigning from church by pooling all observations. First, we generate a dummy variable indicating whether a tax unit has resigned from church. The binary variable *resign* equals 1 if a tax unit has exhibited some kind of church membership in period t-1 and is not liable to church tax anymore in period t. The variable *non-donor* equals 1 in period t if the tax unit has not reported any charitable contributions in the period t-1, and equals 0 otherwise. As we assume that t-1 is the period in which the decision whether to resign or not is made by the tax unit, we include the lagged values from period t-1 of several socio-demographic variables. To account for changes in the consumption possibilities of the tax unit at the point where the decision whether to resign is made, we include the change in *income* and *price of giving* from period   t-2 to period t-1 in the analysis.

We restrict the sample to those tax units with complete information regarding the variables defined above and experiencing an increase in the church tax liability between period t-2 and period t-1, the period in which the decision whether to resign from church in period t is made.

The results in Table 9 show that indeed the probability of resigning from church is higher for those tax units that have not donated in the previous period. Being a non-donor increases the probability of resigning from church by 0.01 which confirms the prediction from the theoretical model, although the effect is small. Interestingly, an increase in income before the decision is taken increases the probability of resigning from church, too. Moreover, tax units living in the Eastern federal states have a higher propensity to leave their religious community as do singles and separately assessed individuals, whereas the presence of children decreases this propensity. Compared to the baseline group of tax units with a household head aged between 45 and 54 years, tax units with a younger household head are more likely to resign from church whereas tax units with an older household head are less likely to do so.

Table 9: Estimation of probability to resign from church

Dependent variable: binary variable =1 for tax units which resigned from church

Variables	Probit
non-donor in t-1	0.010***
	(0.001)
income in t-1 minus income in t-2	0.005***
	(0.001)
price in t-1 minus price in t-2	-0.002
	(0.004)
Eastern federal state in t-1	0.006***
	(0.002)
presence of children in t-1	-0.002**
	(0.001)
single female in t-1	0.008***
	(0.002)
single male in t-1	0.008***
	(0.002)
married sep. ass. in t-1	0.012**
	(0.006)
age 15 – 24 in t-1	0.008**
	(0.003)
age 25 – 34 in t-1	0.004**
	(0.002)
age 35 – 44 in t-1	0.004***
	(0.001)
age 55 – 64 in t-1	-0.004***
	(0.001)
age 65 + in t-1	-0.013***
	(0.001)
No. observations	82,271
Pseudo R2	0.0302

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.
Notes: Standard errors in parentheses (robust errors clustered on the individual level). Marginal effects are evaluated at the means of explanatory variables.
Levels of significance: * 10%, ** 5%, *** 1% significance.

3.5   Conclusion

This chapter delivers some first insights on the interplay between the German church tax and charitable giving. We establish a simple household model where we treat the church tax as a voluntary contribution and derive three hypotheses which we empirically test with the tax return data.

With regard to the choice of church membership, the empirical analysis confirms both hypotheses: Donors are more likely to be church members than non-members and the

probability to resign from church after an increase in the church tax liability is higher for tax units which have not reported any charitable contributions in the previous period. While donating church members are able to compensate a higher church tax liability by increasing their donations, this is not true for non-donating members. Instead, they are worse off when the church tax liability increases and decide to leave church.

The empirical evidence on the third hypothesis, that the amount of individual charitable contributions decreases when the individual church tax liability increases, is mixed. The regression results indicate a small but significant positive relationship between the church tax and charitable giving for all church members. If we restrict the sample to the church members for which we have precise information regarding the federal state of residence, which makes the computation of the exogenous church tax liability more reliable, we cannot establish a significant effect of the church tax on charitable giving. This result is similar to the findings by US studies that religious giving does not negatively interfere with giving to other causes.

The results from the propensity score matching approach, which exploits the fact that the church tax rate varies across the federal state, suggest that tax units which face the lower church tax rate are more generous givers than tax units facing the higher church tax rate. The assumptions underlying the matching approach, however, are very likely to be violated in our setting.

Due to the mixed results, we refrain from drawing definite conclusions with regard to the relationship of the church tax and charitable giving in Germany. With hopefully more detailed data available in the future, more precise analyses would be possible. For example, comprehensive information on the federal state of residence for all income classes could be useful for a better approximation of the church tax liability. With even more detailed information on the municipality where a church member lives, it would also be possible to incorporate the local church fee into the analysis. The local church fee is raised by several local religious communities and can be of both obligatory and voluntary nature. Its consideration could add additional variation to the data and thereby deliver additional insights on the interplay of religious contributions and other charitable giving.

4 Experimental Evidence on Donors' Preferences for Charities

4.1 Introduction to the Topic

When individuals make a real-life donation decision, they usually do not have precise information about a charity's income streams. They do not know whether and how much their neighbors or other people in their social community donate to a certain charity. Furthermore, it is questionable whether they are aware of the exact amount of government subsidies given to that charity. They may rather have a belief about the charity's size in terms of entire revenues, i.e. whether it is small or large. In this paper, we explore whether the size of a charity increases or decreases the willingness to donate to that charity which may have implications for the fundraising policies of such organizations. To this end, we conducted a donation experiment where we provided potential donors with information about the charities' revenues.

With regard to the impact of information about a charity's revenues on charitable contributions, various approaches may be relevant. So far, most theoretical models and empirical studies have analyzed either the effects of government contributions or those of other individuals' contributions on private donations. The public goods model predicts complete or incomplete crowding out of voluntary contributions by government financial support. On the other hand, the approaches of quality signaling and conditional cooperation predict that donations increase with others' contributions. The experimental evidence hints at incomplete crowding out of private donations by government subsidies, while several studies on social information find a positive relation between others' contributions and those of one's own. Unlike other approaches, the model of impact philanthropy explicitly models the effect of an increase in a charity's entire revenues – i.e. its endowment – on donations. As the charity's endowment goes up, the impact philanthropist's utility decreases because the relative impact of her donations is reduced.

In this chapter, we present a framed field experiment where a non-student subject pool was asked to make a real donation decision. Half of the subjects could choose whether to give to a charity with relatively low annual revenues or to a charity with relatively high annual revenues. We thereby present evidence on the overall effect of a charity's endowment on private donations and show a negative relation between the two.

4.2 Background and Motivation

Third-party contributions to a charity may stem from government subsidies or other individuals' donations, respectively. So far, several theoretical models and empirical studies have separately looked at the effects of either government contributions or others' contributions on private donations.

The standard public goods model (Warr, 1982; Roberts, 1984; Bergstrom et al., 1986), where an individual derives utility from private consumption as well as the total supply of the public good, predicts that private contributions to the public good are completely crowded out by government contributions to the same good. It is reasonable, though, to assume that a potential donor also derives positive utility from the mere act of contributing. Andreoni (1989, 1990) coins the term 'warm glow' to describe such preferences, where an individual's utility increases with the contributed amount. In this case, government contributions are not a perfect substitute for voluntary contributions, which implies that the former crowd out the latter only incompletely.

The empirical evidence on the theoretical predictions of crowding out is mixed. While many studies find evidence for incomplete crowding out (among others Ribar and Wilhelm, 2002; Gruber and Hungerman, 2007; Andreoni and Payne, 2011)[38], there is also empirical evidence for crowding in of voluntary contributions (see, for example, Khanna et al., 1995; Khanna and Sandler, 2000). Brooks (2000) uses data for the special case of symphony orchestras and finds evidence for crowding in at low levels of government funding and crowding out at high levels of government funding indicating a non-linear relationship of private giving and government funding. Furthermore, the majority of lab experiments, which test the hypothesis of complete crowding out, find evidence for partial crowding out of voluntary contributions (Andreoni, 1993; Bolton and Katok, 1998; Chan et al., 2002; Konow, 2010).

As charities do not only earn income from government contributions, but also from individuals' private donations, further theoretical approaches have to be taken into account. One approach is to model contributions by other individuals as a signal of the charity's quality as Vesterlund (2003) suggests. Typically, donations are not made simultaneously, but rather in a sequential manner, where high donations by other individuals signal a high-quality charity which may induce donors to give larger amounts to that organization. Andreoni (2006a) remarks that leadership gifts may also be perceived as a signal for the respective charity's quality. Furthermore, the phenomenon of conditional cooperation

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[38] See Steinberg (1991) for a literature review.

predicts that individuals will be more willing to contribute if they know that others contribute (Fischbacher et al., 2001). Several natural field experiments deliver evidence that information about other individuals' contributions affects donations positively, e.g. Frey and Meier (2004), Croson and Shang (2008, 2009), and Martin and Randal (2008).

In his theory of impact philanthropy, Duncan (2004) explicitly models how a change in a charity's endowment affects individual donations. An impact philanthropist wants her donation to have a distinct effect on the supply of a charitable good and thus to "personally make a difference". According to Duncan (2004), the revenues needed for the production of a charitable good consist of the charity's endowment e and the individual's contributions g. The production function $Z(y)$ with $y = e + g$ satisfies $Z' > 0$ and $Z'' < 0$. The utility function of the impact philanthropist is $V = U(w - g) + f(\theta)$ where w is the individual's wealth, $U' > 0$ and $f' > 0$ and $\theta = Z(e + g) - Z(e)$ is the impact of the philanthropist's donation. Because

$$\frac{\partial V}{\partial e} = f'(\theta) \cdot [Z'(e + g) - Z'(e)] < 0 \qquad if \ g > 0$$

an increase in the charity's endowment decreases the impact philanthropist's utility; the importance and the impact of the philanthropist's donation are reduced. It then may be that an impact philanthropist – if provided with the choice between two charities of different size – chooses to give to the charity with smaller income streams because this strengthens the relative impact of her gift. The model of impact philanthropy, however, does not lead to clear predictions how a change in the endowment of a charity would affect the size of the gift.[39] It can be shown that $\frac{\partial g^*}{\partial e} > -1$ where g^* is the contribution which maximizes the impact philanthropist's utility, so the direction of the effect is not clear a priori. Moreover, Duncan (2004) emphasizes that an impact philanthropist dislikes the administrative costs of a charity to be financed by her contribution because this also reduces the charitable impact of the donation.

Our approach differs from previous experiments in two important aspects. First, the information presented to each subject in our experiment consists of an interval stating the yearly revenues received by an organization which comprises donations, membership fees and public subsidies, i.e. its endowment. We deem this kind of information to be very close to the situation potential donors find themselves in the real world, as they usually cannot

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[39] To keep our remarks as concise as possible, the interested reader is referred to Duncan (2004) for a more detailed description of the derivation of this result.

distinguish the size of other donors' gifts and government subsidies. The information is provided to distinguish charities solely by their size. We empirically test the prediction of the model of impact philanthropy by offering subjects two charities of different size for the same charitable cause. If an increase in the endowment does affect utility negatively, subjects should choose the smaller charity. Moreover, we test how a change in the charity's endowment affects the size of the gift and we compare the donation decision of subjects who receive information about the charity's endowment with those who do not receive this information.

Second, we use a framed field experiment rather than a natural field experiment. Unlike in a natural field experiment, subjects in a framed field experiment undertake the task in an artificial environment and know that they are part of an experiment (Harrison and List, 2004). Although this may bias the subjects' behavior to some extent, we can make use of the advantages of framed field experiments in terms of more control and the elicitation of personal characteristics of our participants. In addition, we can exploit the fact that the donation decisions are made completely anonymously in our setting. In door-to-door-fundraising, solicitation letter campaigns or other kinds of donation campaigns the identity of the donor is usually known to the organization. By means of our double-blind procedure, neither other experimental subjects nor the experimenter know the decision made by a certain participant. This enables us to rule out an experimenter effect or certain motivations such as signaling of wealth (Glazer and Konrad, 1996) or social approval (Holländer, 1990). That such social incentive effects can arise from removing anonymity or increasing visibility is shown in the field (Soetevent, 2005, 2011) as well as in the lab (Hoffman et al. 1994; Andreoni and Petrie, 2004).

Moreover, framed field experiments are characterized by a non-student subject pool and field context in the commodity and therefore offer more realism than conventional lab experiments (Harrison and List, 2004). A weakness of lab experiments is often seen in the low representativeness of the sample and thus the lacking generalizability of results. Especially in the case of donation decisions representativeness may be important. Carpenter et al. (2008) for example show that students in a lab experiment tend to be less likely to donate to a charity than members from the broader community. In addition, a more representative sample offers the possibility to analyze the impact of the socio-demographic characteristics on charitable contributions.

4.3 Experimental Design

4.3.1 Implementation and Participants

For subject recruitment, invitation letters were randomly distributed in the city of Mannheim, Germany (see Appendix G). The letter contained an invitation to take part in a scientific study and informed people that they would receive €40 for participation. It was announced that there would be a kind of survey in which they could (voluntarily and anonymously) make consumption decisions. We used a relatively high show-up fee in order to avoid underrepresentation of people with high opportunity costs of time. Furthermore, we already emphasized in the invitation letter that the money was a reward for participation in the study in order to make people feel entitled to their endowment and to avoid a bias due to unexpected gift money. The experiment took place in July 2009 on the premises of the Centre for European Economic Research (ZEW) in Mannheim. A total of 223 participants took part in the experiment. At the beginning of each session, the participants individually drew lots to determine their ID number (which remained unknown to other participants and the experimenters) and chose a table. The tables had privacy screens on every side to ensure private decisions and answers. The participants were not allowed to talk to each other. If they had questions, the experimenters answered them privately. The 12 experimental sessions lasted around 60 minutes each. Within one session, all the subjects performed exactly the same task. At first, all the participants obtained detailed instructions about the course of the experiment (see Appendix F). The main features were orally repeated. We emphasized that all the information given in the instructions was true. The participants in all the treatments filled out a questionnaire with questions about socio-demographic characteristics, their donation habits, and their attitude toward their own social standing within society and toward government responsibilities. The attitudinal questions were taken from the German General Social Survey (ALLBUS) which is conducted every two years with a representative sample of the German population.[40] At the end of each session, the participants had the chance to comment on the experiment and to give reasons for their decisions (see Figure E1 in Appendix E for an overview of the experimental proceedings).

The participants' socio-demographic characteristics are shown in Appendix E (Table E1 and Table E2). The subject pool is highly diversified with for example age ranging from 18 to 75 years. Although it is not fully representative of the German resident population, it is

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[40] For detailed information, see http://www.gesis.org/en/services/data/survey-data/allbus/.

sufficiently diversified in all socio-demographic variables in order to examine the influence of each variable on charitable behavior. Moreover, in case of gender, income, and religion, the distribution of our subject pool does not significantly differ from that of the German population (binomial test, chi squared test, t-test, p>0.1)[41]. More precisely, 46.2% of subjects are male. 22.9% dispose of a monthly net household income of less than €1,000, most of the subjects live in households with incomes between €1,000 and €3,000 and only 13.0% have more than €3,000 per month disposable. With regard to religion, Catholics (31.4%) and Protestants (31.8%) are equally represented, whereas 6.7% possess another religious affiliation and 30.0% of all the subjects do not belong to any religious community. The participants' responses to questions regarding their giving behavior in the past as well as their attitudes are also displayed in Appendix E (Table E3 and Table E4).

4.3.2 Treatments

The experiment comprised two treatments which both contained a real donation stage where the subjects simultaneously and independently decided how much (if any) of their endowment to donate to a certain charity. The subjects were informed that all of the selected charities have obtained the 'DZI Spendensiegel', a label for charities that use their funds economically and according to their statutes.[42] The subjects could choose one of four charitable causes, namely disabled care, development aid, medical research, and animal protection. To avoid any reputation effects, the subjects knew only the purpose but not the name of the organizations. All the donation decisions were completely voluntary and anonymous. We used a double-blind procedure in which neither the other subjects nor the experimenters came to know if, how much and to which cause a subject donated. The subjects received a large envelope containing two small envelopes and the endowment of €40 broken into two 10-euro notes, one 5-euro note, six 2-euro coins, and three 1-euro coins. This breakdown enabled subjects to donate any integer amount between €0 and €40 and abated incentives to only give the coins. The subjects placed the amount they wished to donate in one of the small envelopes assigned to donations, labeled the envelope with their ID number and, in case they were willing to give a positive amount, the charitable cause to which they wished to donate. The amount of money the subjects wished to keep for themselves was placed in the other small envelope. Afterwards, the subjects dropped the sealed envelope specified for donations in a box.

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[41] Unless stated otherwise, all tests in this paper are two-sided.
[42] For more information (in German language), see www.dzi.de.

The baseline treatment (*"NoInfo"*) with 113 participants involved the above described donation stage and the completion of the questionnaire. The 110 participants in the treatment *"Info"* were informed not only about the charitable cause of the organizations but also about the total revenues in 2006, which comprise donations, membership fees and public subsidies. For each charitable cause, we offered two organizations, one relatively small organization with revenues between €40,000 and €300,000 and one relatively large organization with revenues between €5 million and €11 million. Thus, the subjects in this treatment could choose one of eight organizations for their donation. All the donations made during the experiment were transferred in full to the respective organizations. In case of the *NoInfo* treatment, donations were equally assigned to small and large organizations of the same cause. The counting of donations and the transfer to the organizations were notarially monitored and certified. This procedure and the name of the notary were already announced in the experimental instructions.[43]

4.4 Results

4.4.1 The Effects of Charities' Size

In total, €1,225 are donated to the charities. The mean donation per participant is €5.49 or 13.7% of the endowment, the median donation is €3.00. Broken down by purposes, €448 are donated to disabled care, €318 to development aid, €274 to medical research, and €185 to animal protection. Disabled care is not only the purpose which is selected most frequently (21%) but which also receives the highest average donations (€9.53). Whereas average donations do not significantly differ between the four purposes, animal protection is the only charitable cause which is chosen with a probability significantly below 0.25 (binomial test 5% significance). Overall, 33% of the subjects do not make a donation at all. Table 10 contains the descriptive statistics of the donation decisions.

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[43] Some participants also completed another task (a dictator game) in the experiment which is not part of this paper. As this task did not affect the donation decision, we pooled the data.

Table 10: Descriptive statistics

	Observations	Share in %	Total donation (in €)	Average donation (in €)
No donation	74	33	0	0
Donation	149	67	1,225	8.22
Disabled care	47	21	448	9.53
Development aid	39	17	318	8.15
Medical research	38	17	274	7.21
Animal protection	25	11	185	7.40
Total	223	100	1,225	5.49

In the *NoInfo* treatment in which the subjects do not obtain information about charity revenues, the mean donation per participant is €5.56. In the *Info* treatment in which subjects obtain this information, the mean donation is €5.43 (compare Table 11). Interestingly, providing participants with the information about a charity's revenues and giving them the opportunity to choose between charities of different size neither has an impact on individual donations nor on the probability to select a certain charitable cause. However, it shifts donations *within* the group of subjects who are given the choice and the information; €455 are donated to the small organizations and only €132 are donated to the large organizations. On average, the participants donate €8.92 to the small organizations and €6.95 to the large organizations; this difference, however, is not statistically significant.

Table 11: Descriptive statistics – *NoInfo* versus *Info* Treatment

	Observations	Share in % by treatment	Total donation (in €)	Average donation (in €)
NoInfo treatment	113	100	628	5.56
No donation	35	31	0	0
Donation	78	69	628	8.05
Info treatment	110	100	597	5.43
No donation	39	36	0	0
Small organization	51	46	455	8.92
Large organization	19	17	132	6.95
Total	223	100	1,225	5.49

Out of the 110 subjects who receive the information and make a positive donation, 73% choose the small organization, and only 27% choose the large organization. Thus, the shift of donations occurs mainly because the small organizations are selected more frequently than the large organizations (chi squared test 1% significance). We observe this effect for all the charitable causes, but if we look at each cause separately it is only significant for disabled care (chi squared test 1% significance, compare Figure 3). Indeed, the preference for the small organizations appears to be very pronounced in the case of disabled care; here, 86% of donors choose the small organization while only 14% choose the large one. In case of development aid (medical research, animal protection), 68% (64%, 69%) of donors select the small organization. Obviously, the strength of the preference for small charities differs between the four charitable causes. For example, for charities which are active in the field of medical research this preference is not as strong as in the case of disabled care. It may be that donors deem a large charity to be more effective than many small charities in fighting diseases whereas they prefer smaller and possibly more locally oriented charities in the case of disabled care.

Figure 3: Selection of organization size in the *Info* treatment [in % of donors]
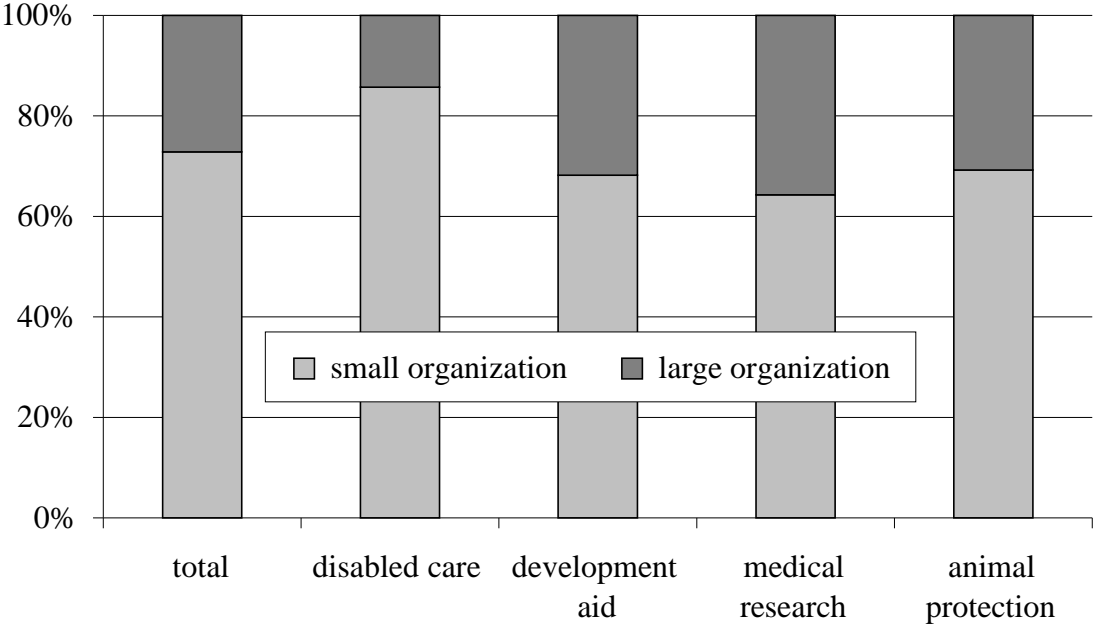
Overall, this result supports the prediction derived from impact philanthropy theory that an increase in a charity's endowment decreases the donor's willingness to give to that charity. So, if provided with the choice of charities of different size which serve the same charitable cause, individuals tend to prefer the small ones. However, there may be some other possible reasons for this preference which are not captured by the impact philanthropy model. For example, Fong and Luttmer (2009) show that people who feel close to their racial or ethnic group donate substantially more when the recipients are of the same race than when they are from a different race. Similar reasoning may hypothesize that people who feel close to their region are more likely to donate to small charities if they associate them with more local activities.

For this reason, we conducted an ex-post online survey with the subjects who participated in the *Info* treatment. The survey was completely anonymous and contained questions about the decisions in the experiment, namely (i) whether subjects donated a positive amount, if so (ii) to which charitable cause, (iii) to a small or a large organization, and given that choice (iv) for what reason they chose the small or the large organization. All questions offered predetermined answers including the option "I cannot remember". If participants had chosen the small organization, they were provided with the following answers: "For my decision to donate to the small organization, it was decisive that (a) my donation to the small organization has a higher impact compared to a large organization, (b) small organizations are discriminated against compared to large ones and therefore need more support, (c) small organizations have lower administrative costs compared to large ones and therefore my donation is more likely to benefit the actual charitable cause,

(d) small organizations are more likely to act on a local level compared to large ones, (e) small organizations are more specialized in certain fields of activity compared to large ones, (f) other reasons." If participants had chosen the large organization, they were provided with the following options: "For my decision to donate to the large organization, it was decisive that (a) the large organization was able to already collect many funds (consisting of donations, membership fees and public subsidies), (b) large organizations can achieve more with my donation than the small ones, (c) large organizations have a higher level of familiarity compared to small ones, (d) large organizations are more likely to act professionally compared to small ones, (e) other reasons." In both cases, the order of the predetermined options varied randomly between participants, they could select several options and give further reasons in an open description field.

Figure 4: Reasons to choose the small organization [in % of donors]
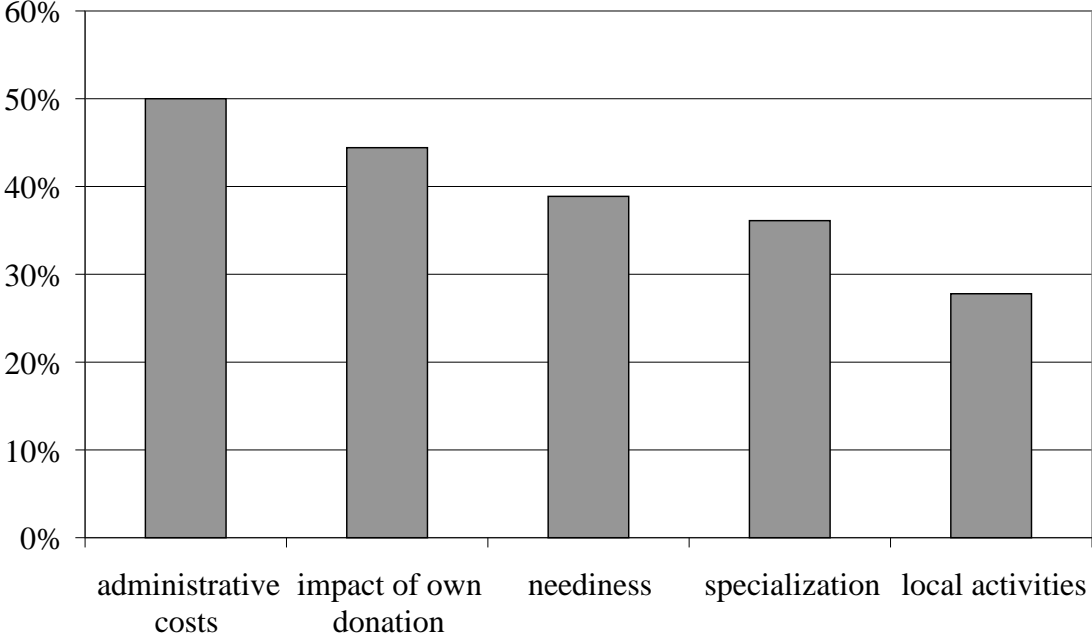
Out of the 104 individuals who were invited to the survey 81 individuals took part.[44] The statements made in the survey are consistent with the observed behavior in the experiment, i.e. there are no significant differences between the survey data and the experimental data. For example, the 68% of respondents stating in the survey that they donated a positive amount correspond to 64% who in fact donated a positive amount in the experiment. The reasons which are mentioned most frequently for the decision to choose a small

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[44] As an incentive to participate, everyone who completed the survey took part in a drawing for 5 times 30 Euros. A few people completed the survey via mail because they did not provide an email address. Six participants in the *Info* treatment were not invited to the survey because they did not provide any contact details.

organization are lower administrative costs (50%) and a possible higher impact of the own donation (44%). Recall that both of these motives are captured by the impact philanthropy theory. A further reason which is mentioned frequently is the neediness of small organizations (39%), indicating that crowding out considerations may also play a role (see Figure 4).

Regarding the choice of the large organization, the most frequently stated reason is the professionalism of large organizations (86%) followed by the achievement of objectives (43%) and the apparent ability to acquire funds (29%). All these motivations support the quality signaling approach. However, this signal attracts only few donors in our experiment.

4.4.2 The Effects of Individual Characteristics

In the following, we report the results from a series of econometric estimations to explore the impact of various socio-demographic variables which have been surveyed in the questionnaire.[45] Around 33% of the subjects decided not to donate, hence there is a large number of observations clustered at zero donations. Since ordinary least squares estimates would not be accurate, we apply a Tobit model. In the baseline estimation, we include the following socio-demographic variables: *age*, *household size* as the absolute number of household members including children, dummy variables for *male* subjects, *unmarried* subjects, subjects not having any religious affiliation (*no religion*), voters of the *left party*, highly educated subjects (*education*, owning a graduate degree), high *income* subjects (monthly net household income of 2,000 € or more).

We additionally include four attitudinal variables taken from the ALLBUS to control for one's perceived standing within society and the attitude towards the state. More precisely, the variable *position* is a dummy variable for subjects thinking they receive their fair share or more compared to others living in Germany. The variable *disparities* is coded as '1' for those subjects believing that the social disparities in Germany are just. The variable *state resp* is a dummy for subjects who want the state to care for a good living in case of illness, misery, unemployment, and old age. Similarly, the variable *equalize* takes the value '1' if a subject indicates that it is the responsibility of the state to reduce income disparities. Although it is quite common to include attitudinal variables in econometric estimations (see, for example, Corneo and Grüner, 2002), the causality between these variables and the

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[45] The number of observations in the econometric analysis corresponds to the number of subjects with complete socio-demographic information.

dependent variable (donations) may run in both directions, i.e. these variables may be endogenous. For this reason, Table 12 displays both estimations with attitudinal variables and those without these variables in order to show whether effects are robust to this modification. The second specification furthermore includes a dummy variable for the subjects who already made a charitable donation in the year 2009 (*donor 2009*) in order to control for offsetting effects. Furthermore, we run both estimations with and without outliers. Outliers are defined as those subjects donating more than half their endowment (€20, five subjects).

Our results show a positive and highly significant effect of age on charitable contributions, whereas the coefficients for male donors and household size are not significant. These findings are robust across all four specifications. Moreover, across all four estimations, the voters of the left party – which tend to assign the responsibility for tackling social issues to the government – give significantly smaller amounts than all the other subjects whereas being unmarried affects the donation decision positively.

The subjects without a religious affiliation seem to make significantly lower contributions, but the corresponding coefficient is only significant when outliers are excluded. As expected from previous empirical investigations, high income and high education both have a positive impact on donations although the significance levels vary according to the estimation specification. The relation between donations in the experiment and donations that have been made in the year 2009 previously to the experiment is negative, though not significant. Furthermore, the attitudinal variables do not have any explanatory power.[46]

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[46] We also investigated whether the subjects' characteristics differ between donors choosing the small organization and donors choosing the large organization. Using a nested logit model, we do not find any significant differences between the two groups.

Table 12: Tobit estimation results

Dependent variable: amount donated				
	Including outliers		Excluding outliers	
Variables	(1)	(2)	(3)	(4)
_cons	-11.27***	-9.088*	-5.904*	-5.685
	(-2.671)	(-1.931)	(-1.782)	(-1.532)
age	0.232***	0.236***	0.170***	0.183***
	(3.760)	(3.780)	(3.461)	(3.648)
male	-1.563	-1.658	-0.773	-1.083
	(-1.094)	(-1.147)	(-0.689)	(-0.950)
household size	-0.00620	-0.125	-0.298	-0.461
	(-0.00738)	(-0.147)	(-0.451)	(-0.686)
unmarried	6.419***	5.893***	4.193***	4.099**
	(3.201)	(2.939)	(2.646)	(2.572)
no religion	-1.279	-1.200	-3.179**	-3.120**
	(-0.812)	(-0.762)	(-2.522)	(-2.457)
left party	-9.109***	-9.315***	-6.822***	-6.611***
	(-2.996)	(-2.996)	(-2.899)	(-2.747)
education	3.991***	3.962**	2.187*	2.271*
	(2.622)	(2.593)	(1.834)	(1.890)
income	4.695***	4.614***	3.357**	3.353**
	(2.722)	(2.675)	(2.480)	(2.470)
donor 2009		-2.194		-1.369
		(-1.333)		(-1.058)
position		0.0959		-0.301
		(0.0621)		(-0.248)
disparities		0.988		1.730
		(0.605)		(1.349)
state resp		-2.541		-0.212
		(-1.411)		(-0.145)
equalize		1.100		-0.467
		(0.748)		(-0.398)
No. observations	189	189	184	184
LR Chi²	44.53***	49.09***	39.95***	43.39***
Pseudo R²	0.0418	0.0460	0.0414	0.0450

Notes: t-statistics in parentheses. Estimations (3) and (4) exclude outliers.
Levels of significance: * 10%, ** 5%, *** 1% significance.

4.5 Conclusions

The results of our experiment contribute to the understanding of how the provision of information about charities' entire revenues affects individual donation decisions. We deem this kind of information to be realistic, because in real-life donation decisions, individuals usually do not precisely know whether and how much other individuals or government institutions have given to a charity but rather have a belief about its size. While the announcement of other individuals' contributions, as implemented in previous experiments, is likely to lead to the emergence of anchor points or the desire to comply

with own or others' expectations, the information provided in our experiment does not point in one specific direction but rather offers two charities of different size.

Providing individuals with the information about the charities' revenues and the opportunity to choose between small and large charities increases neither the propensity to donate nor the donated amount compared to the situation without this information. We do find, however, that the subjects prefer to give to small charities with relatively low revenues as compared to large charities. Thus, our results support the predictions that may be derived from the model of impact philanthropy by Duncan (2004), which assumes that donors try to achieve the biggest impact possible with their charitable contribution. More precisely, in our experiment donors prefer smaller charities to larger ones, confirming the theoretical prediction that an impact philanthropist's utility decreases with a charity's endowment. As our survey results show, however, crowding out considerations as well as quality considerations as suggested by Vesterlund (2003) and Andreoni (2006a) also play a role for some donors.

Moreover, the results of our econometric analysis confirm previous findings that the individual willingness to donate increases with the subjects' age, income, and education (e.g. Pharoah and Tanner, 1997; Schervish and Havens, 1997). This suggests that the donation decisions in our experiment are a good indicator of real-life decisions. As individuals with certain characteristics are more likely to react positively when provided with the opportunity to make a donation, fundraisers may be able to increase donations by specifically targeting those individuals.

The key result of our study, the donors' preference for smaller charities, has to be seen in the light of the experimental design. The experiment offered the participants a choice of pre-selected charities which all fulfill a certain minimum quality standard. Thus, the preference for small charities is conditional on third-party validation and may be different in the absence of such validation. Indeed, the lack of convergence of small and large charities, that would eventually be a consequence of our findings, may be explained by this design element. Our findings are nevertheless important as they indicate a general preference for smaller charities when the donors can assume a minimum quality. Charities may exploit this preference by designing their fundraising efforts accordingly. Interestingly, the strength of the preference for small charities differs between the four charitable causes. For charities which are active in the field of medical research this preference is not as strong as in the case of disabled care. Donors may deem a large charity to be more effective than many small charities in fighting diseases whereas they prefer smaller and possibly more locally oriented charities in the case of disabled care. Thus, the

natural size of a charity depends on the charitable cause it engages in, which means that there would hardly be any convergence between small and large charities.

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Appendix A: Computation of Marginal Income Tax Rates

In the following, we show in detail how the marginal income tax rates have been computed. First of all, the income tax tariffs for the assessment periods 2001 to 2006 are displayed:

Income tax tariff 2001 (in DM)

Taxable income (TI)	Tariff
$< 14,094 \; DM$	0
$14,094 \; DM - 18,089 \; DM$	$(387.89 \times y + 1,990) \times y$
$18,090 \; DM - 107,567 \; DM$	$(142.49 \times z + 2,300) \times z + 857$
$> 107,567 \; DM$	$0.485 \times TI - 19,299$

$$y = \frac{TI - 14,040}{10,000}$$

$$z = \frac{TI - 18,036}{10,000}$$

Income tax tariff 2002 and 2003 (in Euro)

Taxable income (TI)	Tariff
$< 7,236 \; \text{€}$	0
$7,236 \; \text{€} - 9,251 \; \text{€}$	$(768.85 \times y + 1,990) \times y$
$9,252 \; \text{€} - 55,007 \; \text{€}$	$(278.65 \times z + 2,300) \times z + 432$
$> 55,007 \; \text{€}$	$0.485 \times TI - 9,872$

$$y = \frac{TI - 7,200}{10,000}$$

$$z = \frac{TI - 9,216}{10,000}$$

Income tax tariff 2004 (in Euro)

Taxable income (TI)	Tariff
$< 7{,}665\ \text{€}$	0
$7{,}665\ \text{€} - 12{,}739\ \text{€}$	$(793.10 \times y + 1{,}600) \times y$
$12{,}740\ \text{€} - 52{,}151\ \text{€}$	$(265.78 \times z + 2{,}405) \times z + 1{,}016$
$> 52{,}151\ \text{€}$	$0.45 \times TI - 8{,}845$

$$y = \frac{TI - 7{,}664}{10{,}000}$$

$$z = \frac{TI - 12{,}739}{10{,}000}$$

Income tax tariff 2005 and 2006 (in Euro)

Taxable income (TI)	Tariff
$< 7{,}665\ \text{€}$	0
$7{,}665\ \text{€} - 12{,}739\ \text{€}$	$(883.74 \times y + 1{,}500) \times y$
$12{,}740\ \text{€} - 52{,}151\ \text{€}$	$(228.74 \times z + 2{,}397) \times z + 989$
$> 52{,}151\ \text{€}$	$0.42 \times TI - 7{,}914$

$$y = \frac{TI - 7{,}664}{10{,}000}$$

$$z = \frac{TI - 12{,}739}{10{,}000}$$

In what follows, we take the same approach as Auer and Kalusche (2007) and depart from the income tax tariff as a quadratic function of income

$$T(TI) = a \times TI^2 + b \times TI + c$$

where T is the income tax liability and TI is taxable income as above.
The marginal tax rate is

$$m = \frac{dT}{dTI} = 2a \times TI + b$$

In case of joint assessment

$$T = 2 \times \left[\left(a \times \frac{TI}{2} + b \times \frac{TI}{2} + c\right)\right]$$

and the marginal tax rate is

$$m = a \times TI + b$$

The values for a and b may be derived from the income tax tariff of the respective assessment period. To save some space we will show the details of this derivation only for the assessment period 2001.

Assessment period 2001

Taxable income (TI)

$< 14{,}094\ DM$	$a = 0, b = 0$
$14{,}094\ DM - 18{,}089\ DM$	$a = \dfrac{387.89}{10{,}000^2}, b = 0.09008$
$18{,}090\ DM - 107{,}567\ DM$	$a = \dfrac{142.49}{10{,}000^2}, b = 0.178601$
$> 107{,}567\ DM$	$a = 0, b = 0.485$

For incomes between 14,094 DM and 18,089 DM:

$$\left[387.89 \times \left(\frac{TI - 14{,}040}{10{,}000}\right) + 1{,}990\right] \times \left(\frac{TI - 14{,}040}{10{,}000}\right)$$

$$= \left[\frac{387.89 \times TI}{10{,}000} - \frac{387.89 \times 14{,}040}{10{,}000} + 1{,}990\right] \times \left(\frac{TI - 14{,}040}{10{,}000}\right)$$

$$= \frac{387.89 \times TI^2}{10{,}000^2} - \frac{387.89 \times TI \times 14{,}040}{10{,}000^2} - \frac{387.89 \times 14{,}040 \times TI}{10{,}000^2} + \frac{387.89 \times 14{,}040^2}{10{,}000^2}$$

$$+ \frac{1{,}990 \times TI}{10{,}000} - \frac{1{,}990 \times 14{,}040}{10{,}000}$$

$$= \frac{387.89}{10{,}000^2} \times TI^2 + 0.09008 \times TI - 2{,}029.35$$

For incomes between 18,090 DM and 107,567 DM:

$$\left[142.49 \times \left(\frac{TI - 18{,}036}{10{,}000}\right) + 2{,}300\right] \times \left(\frac{TI - 18{,}036}{10{,}000}\right) + 857$$

$$= \left[\frac{142.49 \times TI}{10{,}000} - \frac{142.49 \times 18{,}036}{10{,}000} + 2{,}300\right] \times \left(\frac{TI - 18{,}036}{10{,}000}\right) + 857$$

$$= \frac{142.49 \times TI^2}{10{,}000^2} - \frac{142.49 \times TI \times 18{,}036}{10{,}000^2} - \frac{142.49 \times 18{,}036 \times TI}{10{,}000^2} + \frac{142.49 \times 18{,}036^2}{10{,}000^2}$$

$$+ \frac{2{,}300 \times TI}{10{,}000} - \frac{2{,}300 \times 18{,}036}{10{,}000} + 857$$

$$= \frac{142.49}{10{,}000^2} \times TI^2 + 0.178601 \times TI - 2{,}827.76$$

Assessment periods 2002 and 2003

Taxable income (TI)

$< 7{,}236 \ €$	$a = 0, b = 0$
$7{,}236 \ € - 9{,}251 \ €$	$a = \dfrac{768.85}{10{,}000^2}, b = 0.088286$
$9{,}252 \ € - 55{,}007 \ €$	$a = \dfrac{278.65}{10{,}000^2}, b = 0.178639$
$> 55{,}007 \ €$	$a = 0, b = 0.485$

Assessment period 2004

Taxable income (TI)

$< 7{,}665 \ €$	$a = 0, b = 0$
$7{,}665 \ € - 12{,}739 \ €$	$a = \dfrac{793.10}{10{,}000^2}, b = 0.038434$
$12{,}740 \ € - 52{,}151 \ €$	$a = \dfrac{265.78}{10{,}000^2}, b = 0.172785$
$> 52{,}151 \ €$	$a = 0, b = 0.45$

Assessment periods 2005 and 2006

Taxable income (TI)

$< 7{,}665 \ €$	$a = 0, b = 0$
$7{,}665 \ € - 12{,}739 \ €$	$a = \dfrac{883.74}{10{,}000^2}, b = 0.01454$
$12{,}740 \ € - 52{,}151 \ €$	$a = \dfrac{228.74}{10{,}000^2}, b = 0.181422$
$> 52{,}151 \ €$	$a = 0, b = 0.42$

The computation of marginal tax rates turns out to be more complicated if a tax unit reports tax exempt income (PV) or extraordinary income (AO). We will distinguish three cases aside from tax units which report neither PV nor AO:

1. $PV \neq 0$ and $AO = 0$[47]

$$T(TI, PV) = \frac{T(TI + PV)}{TI + PV} \times TI$$

$$
\begin{aligned}
m &= \frac{\partial T(TI, PV)}{\partial TI} \\
&= \frac{[t'(TI + PV) \times TI + T(TI + PV)] \times (TI + PV) - T(TI + PV) \times TI}{(TI + PV)^2} \\
&= \frac{TI}{(TI + PV)} \times t'(TI + PV) + \frac{PV}{(TI + PV)} \times t(TI + PV)
\end{aligned}
$$

with $t'(.)$ the marginal income tax rate derived for a certain income and $t(.)$ the average income tax rate to be paid. The values for a and b necessary to compute $t'(TI + PV)$ are the same as described above, evaluated at $TI + PV$.

2. $AO > 0$ and $PV = 0$

$$T = 5 \times T\left(rTI + \frac{1}{5} AO\right) - 4 \times T(rTI)$$

$$m = \frac{\partial T(rTI, AO)}{\partial rTI} = 5 \times t'\left(rTI + \frac{1}{5} AO\right) - 4 \times t'(rTI)$$

In case that $rTI < 0$ and $TI > 0$, the marginal tax rate is

$$m = t'\left(\frac{1}{5} TI\right)$$

3. $PV \neq 0 \; and \; AO > 0$

$$T = 5 \times \frac{T(rTI + {}^1\!/_5\, AO + PV)}{rTI + {}^1\!/_5\, AO + PV} \times \left(rTI + {}^1\!/_5\, AO\right) - 4 \times \frac{T(rTI + PV)}{rTI + PV} \times rTI$$

$$
\begin{aligned}
m &= \frac{\partial T(rTI, PV, AO)}{\partial rTI} \\[2mm]
&= 5 \times \left[\begin{array}{l} t'\!\left(rTI + {}^1\!/_5\, AO + PV\right) \dfrac{rTI + {}^1\!/_5\, AO}{rTI + {}^1\!/_5\, AO + PV} \\[3mm] + t(rTI + {}^1\!/_5\, AO + PV) \dfrac{PV}{rTI + {}^1\!/_5\, AO + PV} \end{array} \right] \\[4mm]
&\quad - 4 \times \left[t'(rTI + PV) \dfrac{rTI}{rTI + PV} + t(rTI + PV) \dfrac{PV}{rTI + PV} \right]
\end{aligned}
$$

Independently of the income composition, it is important to take into account that a marginal change in the effective income tax liability ($m_{effective}$) is caused by both the marginal change in the income tax liability m and the marginal change in the solidarity surcharge Δ_{Soli}:

$$m_{effective} = m + \Delta_{Soli}$$

$$\Delta_{Soli} = \frac{d\left(Soli(T_{hyp})\right)}{dTI_{hyp}} = \frac{dSoli}{dT_{hyp}} \times \frac{dT_{hyp}}{dTI_{hyp}}$$

$\frac{dSoli}{dT_{hyp}}$ can be derived from the illustration in section 2.7.1, page 24, and is equal to 0, 0.2, or 0.055. The second component $\frac{dT_{hyp}}{dTI_{hyp}}$ is computed according to the rules which have been explicated in this appendix, where TI_{hyp} is taxable income less child allowances.

Appendix B: Regression Results

Table B 1: Regression results controlling for timing effects

Variables	RE Tobit
log(income)	0.446***
	(0.008)
$log(income_t) - log(income_{t-1})$	-0.144***
	(0.007)
$log(income_{t+1}) - log(income_t)$	0.155***
	(0.007)
log(price)	-2.771***
	(0.028)
$log(price_t) - log(price_{t-1})$	0.702***
	(0.018)
$log(price_{t+1}) - log(price_t)$	-0.624***
	(0.018)
No. observations	277,495
sigma (a)	2.622
sigma (u)	1.510
rho	0.751

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.

Notes: Standard errors in parentheses. Table reports marginal effects on the unconditional mean, evaluated at the means of explanatory variables.

Levels of significance: * 10%, ** 5%, *** 1% significance.

Table B 2: Regression results if federal state of residence is known

Dependent variable: log(donations + 5) in (1), (3), (4)
binary variable = 1 for donors in (2)

Variables	RE Tobit (1)	RE Probit (2)	RE (3)	FE (4)
log(income)	0.146***	0.076***	0.122***	0.025**
	(0.007)	(0.005)	(0.011)	(0.012)
log(price)	-1.261***	-0.826***	-0.725***	-0.547***
	(0.026)	(0.018)	(0.061)	(0.051)
log(churchtax)	-0.0002	0.002	0.003	0.001
	(0.003)	(0.002)	(0.005)	(0.005)
Eastern states	-0.197***	-0.116***	0.043*	0.026
	(0.021)	(0.011)	(0.022)	(0.165)
single female	-0.199***	-0.106***	-0.041**	-0.283***
	(0.017)	(0.010)	(0.020)	(0.067)
single male	-0.417***	-0.223***	-0.085***	-0.222***
	(0.014)	(0.008)	(0.019)	(0.032)
married sep. ass.	-0.264***	-0.147***	-0.068	-0.275***
	(0.027)	(0.018)	(0.046)	(0.052)
age 15-24	-0.672***	-0.321***	-0.204***	-0.013
	(0.019)	(0.007)	(0.035)	(0.055)
age 25-34	-0.444***	-0.244***	-0.222***	-0.075**
	(0.014)	(0.008)	(0.019)	(0.031)
age 35-44	-0.197***	-0.123***	-0.098***	-0.021
	(0.011)	(0.007)	(0.013)	(0.018)
age 55-64	0.264***	0.178***	0.129***	-0.041**
	(0.013)	(0.009)	(0.013)	(0.018)
age 65 +	0.516***	0.332***	0.324***	-0.024
	(0.019)	(0.011)	(0.017)	(0.026)
one child	0.027**	0.025***	-0.023*	-0.016
	(0.012)	(0.008)	(0.013)	(0.018)
two children	0.112***	0.094***	-0.004	-0.025
	(0.016)	(0.010)	(0.017)	(0.026)
three children	0.212***	0.136***	0.148***	0.051
	(0.026)	(0.017)	(0.027)	(0.042)
> 3 children	0.255***	0.172***	0.228***	-0.043
	(0.051)	(0.032)	(0.049)	(0.069)
No. observations	223,920	223,920	97,777	97,777
sigma (a)	2.927	1.956	0.996	1.146
sigma (u)	1.598	---	0.637	0.637
rho	0.770	0.793	0.710	0.764

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder, Taxpayer Panel 2001- 2006, own calculations.
Notes: Standard errors in parentheses (robust errors clustered on the individual level in (3) and (4)). Time dummies are included in all models. Column (1) reports marginal effects on the unconditional mean, column (2) reports marginal effects on the probability of being a donor. Marginal effects are evaluated at the means of explanatory variables.
Levels of significance: * 10%, ** 5%, *** 1% significance.

Appendix C: Derivation of Loci

This appendix derives the properties of the four (C, Y)-loci defined in section 3.3.

Locus I

Locus I separates non-donating non-members from donating non-members. It is implicitly defined by

$$-Pu'(Y) + v'(0) = 0,$$

which can be inferred from condition (1). Obviously, Locus I is a horizontal line in the (C, Y)-space and has an intercept with the Y-axis amounting to $Y = u'^{-1}[v'(0)/P] > 0$.

Locus II

Locus II separates donating church members from non-donating church members. It is implicitly defined by

$$-Pu'(Y - PC) + v'(C) = 0.$$

which again can be inferred from condition (1). Implicit differentiation yields

$$\frac{dY}{dC} = \frac{P^2 u''(Y - PC) + v''(C)}{Pu''(Y - PC)} > 0.$$

For $C = 0$ Locus I and Locus II coincide, that is, also Locus II has an intercept with the Y-axis amounting to $Y = u'^{-1}[v'(0)/P]$.

Locus III

Locus III separates non-donating church members from non-donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = G_n = 0$, that is,

$$u(Y - PC) + v(C) + \beta = u(Y) + v(0).$$

Implicit differentiation of Locus III leads to

$$\frac{dY}{dC} = \frac{-Pu'(Y - PC) + v'(C)}{-u'(Y - PC) + u'(Y)} > 0.$$

The numerator is negative as can be inferred from condition (1). The denominator is also negative, since u is strictly concave. Therefore, Locus III is an increasing curve in the (C,Y)-space. The curve cannot have a positive intercept with the Y-axis for $\beta > 0$. The curve either springs from the origin or has a positive intercept with the C-axis. Let us first consider the case that Locus III springs from the origin. Since $u'(0) = \infty$, it follows that $\lim_{C \to 0} dY/dC = \infty$. Furthermore, by L'Hospital's rule it follows that $\lim_{C \to Y/P} dY/dC = P$. Therefore, by continuity of Locus III it follows that Locus III is located strictly above the curve defined by $Y = PC$. Now consider the case that Locus III has a positive intercept with the C-axis. In this case, Locus III is located below the curve defined by $Y = PC$. It then cannot separate between non-donating church members and non-donating non-members because households on Locus III would have strictly negative private consumption. Instead, the curve defined by $Y = PC$ would separate between these two household types. However, this case is only of minor relevance as households on the curve defined by $Y = PC$ have zero private consumption.

Locus IV

Locus IV separates non-donating church members from donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = 0$ and $G_n > 0$, that is,

$$u(Y - PC) + v(C) + \beta = u(Y - PG_n) + v(G_n).$$

Implicit differentiation of Locus IV yields

$$\frac{dY}{dC} = \frac{-Pu'(Y - PC) + v'(C)}{-u'(Y - PC) + u'(Y - PG_n)} > 0.$$

The numerator again is negative. The denominator is also negative. This is because G_n is smaller than C if the household as a non-member is a donor and as a church member is not a donor. If G_n was larger than C, the household as a church member would be a donor and, thus, could not be located on Locus IV. Thus, also Locus IV is an increasing curve in the (C,Y)-space. Locus IV is only defined above Locus I, because below Locus I the household as a non-member does not donate. Locus III and Locus IV intercept Locus I at

the same point and have the same slope in that point. This is because on Locus I, both condition (1) holds with equality for non-members and $G_n = 0$. If Locus III is located below the curve defined by $Y = PC$, than also Locus IV is located below that curve and cannot separate non-donating church members from donating non-members. In this case again the curve $Y = PC$ would separate between these two household types. The line of argument is similar to the one applied to Locus III. Whether Locus IV has an intercept with Locus II or not depends on the specification of u and v, and cannot be determined on a general level.

Appendix D: The Church Tax Regulations in the German Federal States

The following tables display the church tax regulations in the sixteen German federal states for the years 2001 to 2006. In the dataset, there are tax units with missing information on the federal state of residence and hence we only know whether they live in a Western state or an Eastern state, i.e. the former German Democratic Republic. For those individuals, we compute the church tax liability under the regulations that would have been valid for the majority of church members in a certain year in either the Western federal states or the Eastern federal states.

The information regarding the church tax regulations is collected from the Church Tax Laws of the federal states and the decrees of the various religious communities. Where this information could not be collected, the authors contacted the staff of the state ministries of finance and the staff of the churches.

Table D 1: Church tax in Baden-Wuerttemberg

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	8%	8%	8%	8%	8%	8%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 3.5%	Catholic, Protestant 3.5%	Catholic 3.5% Protestant 3%	Catholic 3.5% Protestant 3%	Catholic 3.5% Protestant 2.75%	Catholic 3.5% Protestant 2.75%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant

Table D 2: Church tax in Bavaria

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	8%	8%	8%	8%	8%	8%
Levying religious communities	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	---	---	---	---	---	---
Upon request or ex officio	---	---	---	---	---	---
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	no	no	no	Protestant	Protestant	Protestant

Table D 3: Church tax in Berlin

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of income tax to be assessed	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 4: Church tax in Brandenburg

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 5: Church tax in Bremen

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Catholic, Protestant

Table D 6: Church tax in Hamburg

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant, Jewish
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 €	3.60 €	3.60 €	3.60 €	3.60 €
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant, Jewish

Table D 7: Church tax in Hesse

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	3.60 DM	1.80 EUR	1.80 EUR	1.80 EUR	1.80 EUR	1.80 EUR
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish

Table D 8: Church tax in Lower Saxony

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 €	3.60 €	3.60 €	3.60 €	3.60 €
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Catholic, Protestant

Table D 9: Church tax in Mecklenburg-Western Pomerania

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	---	---	Catholic 3%	Catholic 3%	Catholic 3%	Catholic 3%
Upon request or ex officio	---	---	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 10: Church tax in North Rhine-Westphalia

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant, Jewish	Protestant, Jewish	Protestant, Jewish

Table D 11: Church tax in Rhineland-Palatinate

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 12: Church tax in Saarland

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%
Levying religious communities	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Protestant 4%	Protestant 4%	Protestant 4%	Protestant 3.75%	Protestant 3.5%	Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 13: Church tax in Saxony

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 14: Church tax in Saxony-Anhalt

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 15: Church tax in Schleswig-Holstein

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 €	3.60 €	3.60 €	3.60 €	3.60 €
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income	Overall income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 16: Church tax in Thuringia

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 17: Church tax regulations valid for the majority of church members in the Western federal states

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant

Table D 18: Church tax regulations valid for the majority of church members in the Eastern federal states

	Year of assessment					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table D 19: Church fee in interreligious marriage in 2001

Fictitious taxable income in DM	Church fee in DM
60,000 – 74,999	180
75,000 – 99,999	300
100,000 – 124,999	540
125,000 – 149,999	780
150,000 – 174,999	1,080
175,000 – 199,999	1,380
200,000 – 249,999	1,680
250,000 – 299,999	2,400
300,000 – 349,999	3,120
350,000 – 399,999	3,720
400,000 – 499,999	4,440
500,000 – 599,999	5,880
600,000 and more	7,200

Computation of the church tax liability in inter-denominational and interreligious marriage

This appendix shows how the church tax liability is computed in case of inter-denominational and interreligious marriage.

In an inter-denominational marriage, both partners belong to a religious community which raises church tax in the federal state of residence. The assessment base for the church tax liability of each partner is half the joint fictitious income tax:

$$church\ tax = fictitious\ income\ tax \times 0.5 \times church\ tax\ rate$$

It may be, however, that the religious community of – for example – the husband foresees a ceiling for the church tax while the religious community of the wife does not. In this case, the upper limit of the church tax liability is computed as follows:

$$church\ tax\ ceiling_{husband} = joint\ fictitious\ taxable\ income \times 0.5 \times ceiling\ rate$$

In an interreligious marriage, only one partner is member of a religious community which raises church tax in the federal state of residence. In this case, the church tax liability of this partner is computed as in the following example for the year 2006:

	Husband	Wife	Total
Total income revised by partial exempt income	50,000 €	20,000 €	70,000 €
Income tax liability on total income in case of single assessment	13,096.25 €	2,850.06 €	15,946.31 €
Share of total income tax liability	82.1 %	17.9 %	

$$church\ tax_{husband} = fictitious\ income\ tax \times 0.821 \times church\ tax\ rate$$

The upper limit of the church tax of the husband would be determined as follows:

	Husband	Wife	Total
Total income revised by partial exempt income	50,000 €	20,000 €	70,000 €
Share of total income	71.4 %	28.6 %	

$$church\ tax\ ceiling_{husband} = joint\ fictitious\ taxable\ income \times 0.714 \times ceiling\ rate$$

Appendix E: Tables and Figures for the Laboratory Experiment

Table E 1: Socio-demographic characteristics of participants – Part I

Variable	State	Frequency abs.	Frequency in %
Gender	Male	103	46.19
	Female	119	53.36
	No answer	1	0.45
Age	18 – 29	73	32.74
	30 – 44	60	26.91
	45 – 59	54	24.22
	60 – 75	34	15.25
	No answer	2	0.90
Family Status	Single	139	62.33
	Married	45	20.18
	Divorced	31	13.90
	Widowed	6	2.69
	No answer	2	0.90
Children	Yes	34	15.25
	No	189	84.75
Household size	1	102	45.74
	2	82	36.77
	3	21	9.42
	4 or more	17	7.62
	No answer	1	0.45
Education	University	88	39.46
	Gymnasium (13 years of education)	58	26.01
	Realschule (10 years of education)	35	15.70
	Hauptschule (9 years of education)	23	10.31
	Other	17	7.62
	No graduation	2	0.90
Nationality	German	192	86.10
	Turkish	2	0.90
	Italian	3	1.35
	Polish	2	0.90
	Other	23	10.31
	No answer	1	0.45
	Σ	223	100.00

Table E 2: Socio-demographic characteristics of participants – Part II

Variable	State	Frequency abs.	Frequency in %
Household net income	< 1,000 €	51	22.87
	1,000 – 2,000 €	85	38.12
	2,000 – 3,000 €	44	19.73
	3,000 – 4,000 €	13	5.83
	4,000 – 5,000 €	8	3.59
	> 5,000 €	8	3.59
	No Answer	14	6.28
Religion	Catholic	70	31.39
	Protestant	71	31.84
	Muslim	5	2.24
	Other	10	4.48
	No religion	67	30.04
Voting behavior	The Christian Democratic / Christian Social Union	43	19.28
	The Social Democratic Party	49	21.97
	The Greens	42	18.83
	The Free Democratic Party	25	11.21
	The Left Party	17	7.62
	Other	9	4.04
	Nonvoter	17	7.62
	No answer	21	9.42
	Σ	223	100.00

Table E 3: Charitable giving habits of participants

Variable	State	Frequency abs.	Frequency in %
Donated before	Yes	189	84.75
	No	34	15.25
Modal charitable cause[1]	Child or disabled care	46	20.63
	Emergency aid	12	5.38
	Medical research	13	5.83
	Church and religious purposes	11	4.93
	Environment or animal protection	32	14.35
	Development aid	39	17.49
	General (e.g. Red Cross, charitable lotteries)	20	8.97
	Culture	3	1.35
	Politics	2	0.90
	Local welfare services, homeless persons, poverty	8	3.59
	No answer (incl. 34 subjects who did not donate before)	37	16.59
Contribution receipt received	Always	60	26.91
	Mostly	36	16.14
	Sometimes	42	18.83
	Never	49	21.97
	No answer (incl. 34 subjects who did not donate before)	36	16.14
Donated in 2009[2]	Yes	67	30.04
	No	156	69.96
	Σ	223	100.00

1) If subjects stated that they have donated before they were asked to which charity they donated most frequently. If subjects gave more than one answer the charity named first was included.
2) The average donation of the 2009 donors is 130.65 Euros.

Table E 4: Attitudes of participants towards society and government responsibilities

Question / Statement	Answer	Frequency abs.	Frequency in %
Compared with how others live in Germany: Do you think you get your fair share, more than your fair share, somewhat less or very much less than your fair share?	Very much less	20	8.97
	Somewhat less	61	27.36
	Fair share	104	46.64
	More than fair share	19	8.52
	Don't know	19	8.52
All in all, I think the social differences in this country are just.	Completely agree	14	6.28
	Tend to agree	65	29.15
	Tend to disagree	90	40.36
	Completely disagree	50	22.42
	Don't know	4	1.79
It is the responsibility of the state to meet everyone's needs, even in case of sickness, poverty, unemployment and old age.	Completely agree	74	33.18
	Tend to agree	104	46.64
	Tend to disagree	35	15.70
	Completely disagree	4	1.79
	Don't know	6	2.69
It is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes.	Strongly agree	32	14.35
	Agree	73	32.74
	Neither agree nor disagree	39	17.49
	Disagree	48	21.52
	Strongly disagree	17	7.62
	Can't choose, don't know	14	6.28
	$\sum$	223	100.00

Figure E 1: Proceedings of the experiment

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┌─────────────────────────────────────────────────────┐
│        1. Distribution of instructions              │
└─────────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────────┐
│           2. Drawing of ID numbers                  │
└─────────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────────┐
│   3. Oral presentation of important instruction details │
└─────────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────────────────┐
│                  4. Donation decision                       │
└─────────────────────────────────────────────────────────────┘
          ╱                              ╲
         ▼                                ▼
┌──────────────────────┐    ┌──────────────────────────────────────┐
│ Without information   │    │ With information                     │
│  • Disabled care      │    │  • Disabled care (low or high revenues) │
│  • Development aid     │    │  • Development aid (low or high revenues) │
│  • Medical research    │    │  • Medical research (low or high revenues) │
│  • Animal protection   │    │  • Animal protection (low or high revenues) │
└──────────────────────┘    └──────────────────────────────────────┘
          ╲                              ╱
           ▼                            ▼
┌─────────────────────────────────────────────────────────────┐
│               5. Collection of donations                    │
└─────────────────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────────────────┐
│                  6. Questionnaire                           │
└─────────────────────────────────────────────────────────────┘
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Note: The treatments with information are identical to the treatments without information except for the fact that in the donation stage subjects could choose between a small organization (with revenues between €40,000 and €300,000) and a large organization (with revenues between €5 million and €11 million) for each charitable purpose.

Appendix F: Experimental Instructions (translated from German)

Welcome!

Thank you very much for participating in our study for the analysis of consumer behavior. Enclosed in this folder, you find information which you need during this event. You may return to pages which you have already gone through at any time. Please turn pages only up to the next "stop-sign". You will be asked to turn to the next page. Please read only the respective text and do not act until you receive specific instructions to follow the assignment.

Please follow the instructions carefully. We also would like to ask you not to talk to other participants.

We want to emphasize that all information which we gain from today's event will only be used to draw a comparison between the groups of participants. No individual data about the participants will be published or passed on.

Shortly, we will come up to your seat and you will draw a piece of paper with a number on it. This number will serve as your personal identification number (ID) throughout the study. Please state your ID whenever you are asked to do so during the study. The ID ensures anonymity, as neither other participants nor we know your name or the ID that belongs to it.

-- STOP sign : Please do not turn the page until we ask you to! --

Part 1

For your participation in the study, you will receive 40 Euros. Shortly, we will hand out the money in an envelope. Then we ask you to confirm the receipt. Afterwards, you will get the opportunity to donate any preferred amount of money to a charitable cause.

There is a charitable organization behind every charitable cause. The money which you, if any, will donate, will be **completely** transferred to the respective charity. We guarantee that this will happen lawfully and will have the transfer supervised and verified by the director of the notary's office, Dr. xxx.

All selected charitable organizations hold the "donation seal" by the state-approved German Central Institute for Social Issues (Deutsches Zentralinstitut für soziale Fragen (DZI)). This assures that the organizations act autonomously and charitably and that the usage of their financial means is reviewable, economical and statutory. The names of the individual organizations will at this point – for scientific reasons – not be mentioned. We guarantee that all information you receive from us regarding the organizations is **true**. At the end of the experiment, we are happy to hand to you a list of all organizations upon request.

Following, we present to you four different charitable causes to which you can donate in the course of this study.

The four charitable causes are:

- Medical research

- Animal protection

- Disabled care

- Development aid

[*Additional part mentioned only in the Info Treatment*:

The organizations you can make a donation to do not only differ with regard to their charitable causes, but also their **revenues**, which these organizations have generated in 2006 from donations, membership fees and government grants. For each charitable cause, we offer you a charitable organization with relatively small revenues between 40,000 and 300,000 Euros and organizations with rather large revenues between 5 million Euros and 11 million Euros.

Therefore, we ask you, in the case you donate, to pick **one** of the following organizations:

a. Medical research   Revenues 2006: 40,000€ - 300,000€

b. Medical research   Revenues 2006: 5 Mio. € - 11 Mio. €

c. Animal protection   Revenues 2006: 40,000€ - 300,000€

d. Animal protection   Revenues 2006: 5 Mio. € - 11 Mio. €

e. Disabled care   Revenues 2006: 40,000€ - 300,000€

f. Disabled care   Revenues 2006: 5 Mio. € - 11 Mio. €

g. Development aid   Revenues 2006: 40,000€ - 300,000€

h. Development aid   Revenues 2006: 5 Mio. € - 11 Mio. €]

We now hand out to you an envelope with the money you receive for your participation in our study.

-- STOP sign : Please do not turn the page until we ask you to! --

In the envelope, you find:

- one white envelope

- one blue envelope

- 40 Euros, composed of two 10 Euro-bills, one 5 Euro-bill, six 2 Euro-coins and three 1 Euro-coins

- one receipt.

We now ask you to sign the receipt you find enclosed. By doing so, you confirm that you have received 40 Euros from ZEW for the participation in this study. We need the receipt for administrative purposes. Without a receipt we are not allowed to give you the money. Your data is still handled **confidentially** and **anonymized**. We will now collect the receipts, the study will continue hereafter.

-- STOP sign : Please do not turn the page until we ask you to! --

Now you can make a donation decision. You can decide **freely and anonymously** whether and how much money you want to give to one of the above-mentioned charitable organizations. The amount of money you put into the **blue** envelope will benefit a charitable cause and will be transferred **completely** to the respective charity after the experiment. You will keep the amount of money you put into the **white** envelope.

The study proceeds as follows:

1.) Make your donation decision.

In case of a donation, please tick the desired charitable organization on the **blue** envelope. Please note that you have to choose **one** of the four [*in the Info treatment*: eight] charities given. It is not possible to choose more than one charitable organization for your donation. Please tick only **one** organization if you wish to donate. If you tick more than one organization, unfortunately, we will not be able to transfer the donation. If you do not wish to donate, please do not tick any organization.

2.) Write down your ID-number into the predefined box on the **blue** envelope, irrespective of whether you wish to donate or not.

3.) Put the desired donation amount into the **blue** envelope.

4.) Put the amount of money you wish to keep into the **white** envelope.

Finally, you should have distributed 40 Euros completely to the two envelopes. Please note that any distribution in full amounts of Euros is possible. You may put any desired amount of money into both envelopes. It is also possible to put 40 Euros completely into one envelope.

5.) Seal up **both** envelopes.

When all participants have finished, we will come up to you and collect the **blue** envelope. When we do so, please put the **blue** envelope into the box. Please keep the white envelope. We guarantee that your donation will be transferred to the charitable organization lawfully and have the transfer supervised and verified by the director of the notary's office, Dr. xxx.

We will explain the most important items once again orally. Afterwards, please make your decision as described above.

-- STOP sign : Please do not turn the page until we ask you to! --

Part 2 – Questionnaire

Please answer the following questions by ticking or filling out.

If you have a question, please raise your hand. We will come up to you and answer your question. Please do **not** say your question out loud and please do not talk to other participants.

1. What is your ID-number?   _____

2. How can your marital status be described?

      O   unmarried

      O   married

      O   divorced

      O   widowed

3. Please state your gender:

      O   male

      O   female

4. What is your year of birth?   _____

5. How many people, including you, live in your household?

                    _____

6. How many children live in your household?

      O   0-3 years old   _____

      O   4-7 years old   _____

      O   8-12 years old   _____

      O   13-18 years old   _____

O   older than 18 years   _____

O   none

7. What is your religious affiliation?

O   Catholic

O   Protestant

O   Muslim

O   Jewish

O   Buddhist

O   other: _____

O   no religion

8. What is your highest educational achievement?

O   University/College

O   higher education entrance qualification

O   middle school

O   secondary modern school

O   other: _____

O   none

9. What is your original nationality?

O   German

O   Turkish

O   Italian

O   Polish

O   other: _____

10. What is your first language? _____

11. What are the monthly net earnings of <u>your household</u> (how much money per month is available for your household <u>altogether</u>?)

      O   below 1,000 Euros

      O   1,000 – 2,000 Euros

      O   2,000 – 3,000 Euros

      O   3,000 – 4,000 Euros

      O   4,000 – 5,000 Euros

      O   above 5,000 Euros

      O   not specified

12. Which party would you vote for if there were federal elections on the coming Sunday?

      O   CDU/CSU

      O   SPD

      O   Bündnis 90 / The Green Party

      O   FDP

      O   The Left

      O   Other

      O   I do not vote

      O   not specified

14. Have you made a donation to a charitable organization before?

      O   yes   O   no

15. To which purpose have you to date donated most often?

      _____

16. Have you already donated this year to a charitable organization?

      O   yes   O   no

17. If you answered question 16 with "yes", in which month have you donated last?

      _____

18. If you answered question 16 with "yes", how much have you donated this year altogether?

      _____ €

19. Have you ever received a donation receipt for your donation?

      O   always

      O   mostly

      O   occasionally

      O   never

20. Compared with how others live in Germany: Do you think you get your fair share, more than your fair share, somewhat less or very much less than your fair share?

      O   fair share

      O   more than fair share

      O   somewhat less than fair share

      O   very much less than fair share

      O   don't know

21. On the whole, I find the social differences in our country just.

      O   Completely agree.

O   Tend to agree.

O   Tend to disagree.

O   Completely disagree.

O   Don't know

22. The State must ensure that people can live a decent income even in illness, hardship, unemployment and old age.

O   Completely agree.

O   Tend to agree.

O   Tend to disagree.

O   Completely disagree.

O   Don't know

23. It is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes.

O   Agree strongly.

O   Agree.

O   Neither agree nor disagree.

O   Disagree.

O   Disagree strongly.

O   Can't choose.

-- STOP sign : Please do not turn the page until we ask you to! --

We would like to ask you to write down general comments regarding our study. You *may* also give reasons for your donation decision. [11 empty lines follow]

We would like to thank you for participating in our study and wish you a nice day! Please remember to take the white envelope with you.

Appendix G: Invitation Letter Used for Recruitment of Participants (translated from German)

The following writing was sent via private carriers to randomly selected households in the municipal area of Mannheim. The front page shows the logo of ZEW at the top of the letter, general contact information of the project manager and the following text:

Ref.: Invitation to a scientific study on consumer behavior

Dear Sir or dear Madam,

the Centre for European Economic Research (ZEW) Mannheim is a non-profit-making research institute, which is active in the field of applied economics. At present, ZEW is conducting a scientific study in the range of individual consumption decisions. In order to carry out our scientific study, we are looking for participants. For this reason, we would like to invite you.

For your participation in the study, which lasts about **60 minutes**, you will receive **40 Euros in cash**. With the money, you will be able to make consumption decisions during the study. The money spent will be subtracted from the 40 Euros you received. If you do not spend any money, you will be paid out 40 Euros without deductions. In doing so, your decisions will be **voluntary and anonymous** at all times. Only the ZEW researcher team will know your identity, your statements will be treated with the utmost discretion and according to the Data Protection Act.

Please consider the following requirements for the participation in the study:

- registration by phone,

- residence in Mannheim (verification with, for example, your identity card),

- very good knowledge of the German language,

- between 18 and 75 years old

- arriving on time on the selected date and presenting this letter

If you would like to take part in the study and meet the conditions mentioned above, please choose one of the dates listed on the next page and register by telephone. The selection of

participants is carried out according to scientific criteria. The event will be taking place at the ZEW. At the end of the event, you will receive 40 Euros in cash minus the amount which you have possibly spent for your personal consumption. Should you have any further questions, please do not hesitate to call us at 0621/1235-395 from June 29th to July 15th 2009, 4pm to 6pm.

We are looking forward to welcoming you as participants in our study.

Yours sincerely,

XXX (project manager)

The back page offers further information concerning the study:

Registration:

Please call from **June 29th to July 15th 2009** (Monday to Friday) between **4pm and 6pm** at the following number: 0621/1235-395. Please state the date (see below) that you want to participate at. For the registration, your name will be noted, however, as explained above, will not be published or given to a third party. Please take note that with the receipt of this letter, you do not have any claim to participate. The selection of participants will be carried out according to scientific criteria.

Dates (day, date, time):

Sat, July 18th 2009, 9-10am	Tue, July 21st 2009, 9-10am
Sat, July 18th 2009, 11-12am	Tue, July 21st 2009, 5-6pm
Sat, July 18th 2009, 2-3pm	Tue, July 21st 2009, 7-8pm
Mon, July 20th 2009, 9-10am	Wed, July 22nd 2009, 9-10am
Mon, July 20th 2009, 5-6pm	Wed, July 22nd 2009, 5-6pm
Mon, July 20th 2009, 7-8pm	Wed, July 22nd 2009, 7-8pm

It follows a map of the location of ZEW and general information about the ZEW taken from the homepage of ZEW, www.zew.de.

Eidesstattliche Erklärung

Ich versichere wahrheitsgemäß, die Dissertation bis auf die in der Abhandlung angegebene Hilfe selbständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und genau kenntlich gemacht zu haben, was aus Arbeiten anderer und aus eigenen Veröffentlichungen unverändert oder mit Abänderungen entnommen wurde.

Karlsruhe, 30.11.2011

_____

Sarah Borgloh