

The Long-Term Impact of Sales Promotions on Customer Equity

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Abstract Sales promotion is an instrument whose effectiveness for short-term sales is proven (Blattberg and Neslin, 1990). But for the long term, researchers have identified adverse effects without managing to actually determine its impact (Van Heerde et al, 2004). While most investigations analyze the effects of promotions on sales, it is important to consider the global impact, i.e. on the customer portfolio. Although several authors have taken up this issue (Fader and Hardie, 2010; Abe, 2009b), no contribution has integrated the entire portfolio development: customer acquisition, activity of existing customers and churn.

This research, therefore, contributes by establishing a long-term vision of the impact of sales promotions on the value of the customer portfolio (customer equity), not just on sales. We combine explanatory and stochastic approaches via the integration of explanatory variables. The second contribution is the application of these models to fast moving consumer goods, a sector that has thus far been over-looked by existing research.

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1 Conceptual Framework and Hypotheses

The customer portfolio is the central concept on which the customer relationship management strategy and the assessment of the marketing efficiency are based. The total asset value of this portfolio is the customer equity. The switch from individual customer analysis to customer portfolio analysis must result in the integration of the global risk (Gupta et al, 2006). A desirable customer, therefore, is a customer who decreases the risk and not just a customer with a strong profitability potential.

Since the 2000s, there appears to be a consensus on the long-term harmlessness of promotions but without clear results (Slotegraaf and Pauwels, 2008). Several authors essentially analyze the effects of promotions on sales in a way that makes it impossible to determine whether the promotion ultimately creates or destroys value. Therefore, the use of a global metric, customer equity, is recommended (Van Heerde et al, 2004). Our hypotheses are the following:

- H1 Acquisition via monetary promotions reduces the new customer equity.
- H2 Customer acquisition via non-monetary promotions increases the new customer equity.
- H3 Monetary promotions reduce the global brand's customer equity.
- H4 Non-monetary promotions increase the global brand's customer equity.
- H5 Monetary and non-monetary promotions have a stronger impact on the global customer equity of brands with strong brand equity.

2 Methodology

The data is derived from the coffee category of the French *BehaviorScan* panel. The initial file includes 6,284 households that belong to the same cohort.

Two types of non-monetary promotion are characterized in the form of a dichotomous variable: aisle end display promotions and leaflet promotions. We consider a price reduction equal to or higher than 5% from one week to the next, until the prices go up again, as a promotion (Helsen and

Schmittlein, 1992). Our analysis is restricted to two EAN (European Article Numbering) codes: the best-selling national brand product and the best-selling private label brand product.

The Customer Equity (CE) modeling process must take into account four phenomena: a) the acquisition of a new customer, b) the customer activity and c) residual transaction, d) the average expenditures.

- a) *Acquisition*. The probability of becoming a customer is given by a Cox proportional hazards model.
- b) *Customer activity residual transaction*. The beta-geometric / negative binomial distribution (BG/NBD) model is the easiest and the most efficient formulation (Abe, 2009a; Fader et al, 2005b). In order to take into account explanatory variables, we follow the method advocated by Fader and Hardie (2007) as well as Castéran et al (2007).
- c) *Expenditures per transaction*. The average expenditures per transaction are estimated by the gamma-gamma model (Fader et al, 2005a).

We introduced explanatory variables in the gamma-gamma model. We measure the effect of promotions via a 50% increase in the number of promotions, after which we observe the difference between the forecasts of the models associated with this increase and those of constant promotion models. The forecast period is set at 5 years. We set the discount rate at 1.5% per annum, which is similar to the opportunity costs used to evaluate investment projects.

3 Results

For customer acquisition models, the adjustment quality of these models is more than satisfactory. The BG/NBD model with explanatory variables is considerably more efficient than the one without explanatory variables. Concerning the monetary model, the Bayesian Information Criterion (BIC) improves significantly with explanatory variables. This criterion should be preferred to the Akaike Information Criterion (AIC) because it clearly reduces the risk of overfitting. It should be noted that this impact measures, in relation to a non-promotion situation, the evolutions of customer equity following a 50% increase in promotions.

H1 is validated: acquisition via monetary promotions reduces the new customer equity for national brands (-12%) or has no significant im-

Table 1 Impact of a 50% increase in monetary & non-monetary promotions

Evolutions	Price	Leaflet	Aisle end display
National Brand			
Portfolio risk	-17%	+2%	+27%
Customer equity of new customers	-12%	+2%	+7%
Global customer equity	+4.1%	+0.8%	-10.6%
Private label brand			
Portfolio risk	-1%	0%	+1%
Customer equity of new customers	0%	+1%	0%
Global customer equity	+0.7%	+0.2%	-0.9%

impact on private label brands. H2 is validated too essentially for national brands (impact of non-monetary promotions on new CE between +2% and +7%) but even for private label brands (impact between 0% and +1%). H3 is rejected: monetary promotions increase the global CE (+0.7%). H4 (positive impact of non-monetary promotions on global CE) is validated for leaflets and rejected for aisle end displays. H5 is validated: promotions have a stronger impact on the global CE of brands with strong brand equity.

4 Discussion, implications and research directions

Our conclusions on the efficiency of promotions are slightly different from existing literature. Firstly, monetary promotions are overall very positive in the long term (i.e. on the CE), contrary to a large portion of literature (Jedidi et al, 1999; Mela et al, 1997). Conversely, the role of non-monetary promotions is questioned, which is not the dominant conclusion of existing literature (Sriram et al, 2007). Non-monetary promotions degrade the products' sign value, at least in the case of aisle end displays. In any case, their positive impact remains limited. This rejection is as strong as the brand is strong, which is in keeping with the theory.

The methodological contribution of this article lies in a shift from measuring the effects on sales to long-term evaluation through customer equity. The introduction of explanatory variables in purely stochastic models marks a technical and conceptual improvement. From a conceptual

point of view, the introduction of explanatory variables allows to make possible the estimation of a behavioral impact of marketing actions. In managerial terms, our research showed that the most complex models could be implemented on panel data widely used by managers. All marketing actions must be evaluated as part of a customer portfolio in relation to profitability and risk.

Our research contains several limitations. Firstly, the external validity of our research is limited: only two brands, the retail sector and no competitors' reactions. Secondly, the magnitude of the monetary promotions is not illustrated by our definition. Finally, the informational prerequisites of NBD models mean that explanatory variables lack a dynamic perspective.

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