

**CHANGING PERCEPTIONS AND CHANGING BEHAVIOR IN CUSTOMER
RELATIONSHIPS**

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Changing Perceptions and Changing Behavior in Customer Relationships

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Abstract

We formulate a theoretical model in which we postulate that if a customer's behavior is perceived as not optimal, customers will adjust this behavior based on their current satisfaction and payment equity. Furthermore, customers will also include new experiences. In our empirical study we particularly investigate customer referrals and the amount of services purchased. Our results show positive effects of current satisfaction and payment equity on referrals, while also changes in satisfaction and payment equity affect customer referrals. With respect to the amount of services purchased, our estimation results reveal a positive significant effect of only changes in satisfaction.

Key-words: Dynamic Modeling, Satisfaction, Customer Relationships, Preference Updating

INTRODUCTION

In the satisfaction literature several studies have investigated the effect of satisfaction over time. These studies related satisfaction scores at different points in time with purchase intention scores at different points in time (Mazursky and Geva, 1989; Mittal, Kumar and Tsiros, 1999). Conclusions of these studies are that the effect of satisfaction decays rapidly (Mazursky and Geva, 1989) and that the effect of satisfaction at t on intentions at $t+1$ is mediated by satisfaction at $t+1$ (Mittal, Kumar and Tsiros, 1999). Although satisfaction has been related to purchase intentions over time, apparently no studies have looked at the dynamic effect of satisfaction on purchase behavior over time. An exception is Verhoef, Franses and Hoekstra (1999), who relate satisfaction to purchase behavior in two subsequent time periods. However, as they do not have satisfaction scores at different points in time, they cannot provide a detailed insight into the dynamic effects of satisfaction over time.

Besides the effect of satisfaction, there is also an interest in the effect of the fairness of prices on customer behavior (Bolton and Lemon, 1999; Woodruff, 1997). Consumers are often attracted with low prices. These low prices may affect behavior in the short-run, but does it affect behavior in the long-run? This is an interesting topic as there is a trade-off between pricing decisions and investing in satisfaction. Literature on the short and long-run effect of prices show that price reductions have a large short-run effect on, for example, market shares. However, this effect dies out very quickly, see for example, Paap and Franses (2000). If this also holds for the effect of price perceptions, improving price perceptions by decreasing prices will only be effective in the short-run. Moreover, if there is a significant effect of satisfaction over time, this may perhaps imply that it is a better strategy to improve satisfaction than to improve price perceptions.

In this paper we specifically consider how satisfaction and payment equity, being the perceived fairness of prices, affect customer behavior over time. We consider two types of behavior, which are customer referrals and the amount of services purchased.

The structure of this paper is as follows. First, we put forward our theoretical model in section 1. Section 2 describes the applied research methodology. Subsequently, we describe the estimation results in section 3. Finally, we discuss our results in section 4 and our research limitations and directions for future research in section 5.

1. THEORETICAL MODEL

1.1 Theoretical Model

In this section we develop a theoretical model to understand changes in customer behavior over time. These changes are defined as:

$$\Delta\text{Behavior}_{t+1} = \text{Behavior}_{t+1} - \text{Behavior}_t, \quad (1)$$

where t is the time-index. In line with standard economic theory our model is based on the assumption that customers strive to maximize their utility or value. This value depends on behavior and on perceptions of the relationship. When a customer has favorable perceptions, s/he will choose to purchase more from a supplier than when s/he has unfavorable perceptions. More formally, the customer aims to behave in such a way that her or his value is maximized, where this value is a function of behavior and perceptions, that is,

$$\text{Max Value}(\text{Behavior}, \text{Perceptions}_t). \quad (2)$$

Consequently, optimal utility maximizing behavior is a function (f) of the perceptions the customer has at time t. We can therefore write

$$\text{Optimal Behavior}_t = f(\text{Perceptions}_t). \quad (3)$$

A further assumption in economics is that customers have full knowledge about their value function. In practice this assumption is questionable, as customers might have problems imagining how they feel in new situations. Moreover, inertia effects, switching costs or a tendency to stay at the 'status quo' might result in behavior that does not completely maximize utility (Dick and Basu, 1994; Burnham, Frels and Mahajan, 2001). We therefore assume that customers maximize an approximation of their true value function, so

$$\text{Max Value}_t^* (\text{Behavior}, \text{Perceptions}_t), \quad (4)$$

where Value_t^* is an approximation of the true value function, which was denoted by Value in (2) given information and experience at time t. We assume that observed behavior is based on equation (4). However, still customers strive to maximize their true value and not the approximation. In order to do so customers will improve the approximation and consequently will adapt their behavior in the next time period based on their current perceptions.

As customers improve an approximation of their value function, their behavior also can get closer to optimal. The resulting change in behavior depends on the difference between their behavior (based on Value_t^*) and their truly optimal behavior (based on Value), which is defined in (3). Thus, the change in behavior ($\Delta\text{Behavior}_{t+1}$) depends on

$$\text{Behavior}_t = f(\text{Perceptions}_t) \quad (5)$$

As individuals tend to use current perceptions to predict future perceptions, our model can also be interpreted as a reduced form model, in which customers maximize their subjective expected future value of a service portfolio based on their current perceptions (Bolton, 1998). Moreover, customer's perceptions will be rather stable, because people strive to have cognitive and attitudinal consistency (Festinger, 1957). However, customers will also have new experiences, leading them to adjust their perceptions to avoid cognitive dissonance. In that respect the belief-updating paradigm (Bolton, 1998; Hogarth and Einhorn, 1992, Mittal, Kumar and Tsikos, 1999) theorizes that consumers form perceptions at a given time by updating prior perceptions. It is theorized and empirically shown that this updating affects behavior (Bolton, 1998). The total adjustment in perceptions during a time period is reflected by the change in perceptions, that is,

$$\Delta \text{Perceptions}_{t+1} = \text{Perceptions}_{t+1} - \text{Perceptions}_t \quad (6)$$

Summarizing, our theoretical model predicts that a customer changes his behavior for two reasons. First, customers adapt the approximation of their true value function in the previous period, resulting in a change in behavior that depends on $(\text{Behavior}_t = f(\text{Perceptions}_t))$, where $f(\text{Perceptions}_t)$ represents the truly optimal behavior given the perceptions in period t . Second, the perceptions of the relationship could have changed, which might also lead to a change in behavior. Consequently, $\Delta \text{Perceptions}_{t+1}$ will also affect the change in observed behavior (Bolton, 1998). This effect can also be considered as disconfirmation as current satisfaction will affect future expectations (Boulding et al., 1993).

In our empirical specification of this model below, we assume that for truly optimal behavior it holds that:

$$f(\text{Perceptions}_t) = \alpha \text{Perceptions}_t. \quad (7)$$

Thus, optimal behavior is described by a function of the customers' perceptions. Moreover, we assume that changes in perceptions affect behavior, so the effect of changes in perceptions in behavior is described by $\beta \Delta \text{Perceptions}_{t+1}$. The resulting model that describes changes in observed behavior then becomes

$$\Delta \text{Behavior}_{t+1} = \delta + \beta \Delta \text{Perceptions}_{t+1} + \gamma (\text{Behavior}_t - \alpha \text{Perceptions}_t) + \varepsilon_{t+1}. \quad (8)$$

The error term ε_{t+1} is included to allow for other, possibly unobserved, effects. In this model the parameter β measures the updating effect resulting from the change in perceptions, while the parameter α reflects the effect of perceptions on optimal behavior. Finally, the parameter γ measures how fast deviations from truly optimal behavior are corrected. Equation (8) is also known as the equilibrium correction model, which is used to distinguish between the effect of initial adjustments and long-run equilibrium effects in time-series analysis (Hendry, Pagan and Sargan, 1984; Paap and Franses, 2000).

2 RESEARCH METHODOLOGY

We use panel data of customers of a financial service provider in the Netherlands to estimate equation (8). These panel data include both self-reported perceptions and information on purchase behavior available from the firm's customer database.

2.1 Data Collection

Using a panel design we collected survey data on satisfaction and customer referrals of customers of a financial services company at two points in time (T_0 and T_1). At T_0 (October 1999) we collected data among 6525 customers of which 2300 were willing to cooperate. A year later the respondents who remained customer were again contacted at T_1 (October 2000). At T_1 1266 customers were willing to cooperate (response rate 59%). After excluding the respondents with too many missing values, 1108 respondents remained within the sample. We have checked for non-response biases between the two periods. If we control for the fact that customers have left the company in the first year, our results show that customers with a lengthy relationship, purchasing a health insurance at the supplier, having a collective contract, with a higher score on customer referrals and owning fewer cars, have a higher probability to respond to the questionnaire in the second time period. We note that we control for this non-response and customer defection in our empirical analysis.

2.2 Measurement

In both surveys the same questions on satisfaction, payment equity and customer referrals were asked (see Appendix for the exact questions). The means, standard deviations and coefficient alpha's of the scales at both points in time are reported in Table 1. According to the pairwise t-

test the means of satisfaction and customer referrals have not significantly changed between T_0 and T_1 . The average score of perceived payment equity has significantly decreased ($p < 0.01$). We note that despite the same average scores, there can be substantial deviations in scores over time across individuals. The coefficient alpha's reveal rather reliable scales at both T_0 and T_1 (Nunally, 1978). Moreover, they are approximately the same for both measurement points.

<Insert Table 1 about here>

The financial services company also provided us with data on purchase behavior of customers over time. These data cover three measurement moments. First, we have data on the purchase behavior at T_0 . These data include variables, such as relationship length, number of services purchased and the type of services purchased. Second, data are available on the purchase behavior at T_1 and finally we have data on the purchase behavior at T_2 . While the period between the first time points (T_0 and T_1) is one year, the period between T_1 and T_2 is only half a year. The latter period is shorter, because no further information was available at the moment of analyzing these data.

2.3 Models

As argued in section 1 we use the changes in perceptions and the deviation of truly optimal behavior as explanatory variables for customer behavior. In our particular case we have two relationships perceptions: satisfaction (Sat) and payment equity (Paym) measured at T_0 and T_1 , while we consider customer referrals and the amount of services purchased as dependent variables. Equation (8) then translates into

$$\Delta\text{Behavior}_{t+1} = \delta + \beta_1\Delta\text{Sat}_{t+1} + \beta_2\Delta\text{paym}_{t+1} + \gamma(\text{Behavior}_t - \alpha_1\text{Sat}_t - \alpha_2\text{Paym}_t) + \varepsilon_{t+1}. \quad (9)$$

This model is estimated using non-linear least squares. We control for the fact that customers have left the company and the dropout of customers in our panel by applying the Heckman (1976) procedure.

For our analysis on the effect of satisfaction and payment equity on the number of services purchased, we also consider the following model:

$$\Delta\text{Behavior}_{t+2} = \delta + \beta_1\Delta\text{Sat}_{t+1} + \beta_s\Delta\text{paym}_{t+1} + \gamma(\text{Behavior}_t - \alpha_1\text{Sat}_t - \alpha_2\text{Paym}_t) + \varepsilon_{t+1}, \quad (10)$$

where $\Delta\text{Behavior}_{t+2}$ is the difference in number of services purchase between T_2 and T_0 . The formulation of (10) is in line with satisfaction purchase behavior models (Bolton, 1998; Bolton and Lemon, 1999; Verhoef, Franses and Hoekstra, 1999). In these models it is assumed that purchase behavior between T_1 and T_0 is affected by satisfaction at T_0 . As we now have measured purchase behavior in three subsequent time periods and two measurements of satisfaction and payment equity model (9) translates into (10).

3 ESTIMATION RESULTS

In this section we discuss our estimation results. We start with describing the models for customer referrals. Subsequently, we discuss the estimation results for the models with the number of services purchased as the dependent variable.

3.1 Customer referrals

The estimation results of (9) for customer referrals are displayed in Table 2. The model explains approximately 41% of the variance. The estimation results show positive significant adjustment effects (β -parameters) of satisfaction and payment equity on customer referrals ($p < 0.01$). Hence, changes in satisfaction and payment equity affect changes in customer referrals positively. We also find a significant effect of satisfaction and payment equity on optimal behavior. Furthermore, our results show that behavior is adjusted towards the optimal behavior as γ is negative and significant ($p < 0.01$). The negative sign implies that too positive behavior is adjusted downwards, while too negative behavior is adjusted upwards. We also test whether the adjustment effect (β) and the effect of satisfaction and payment equity on optimal behavior (α) are significantly different from each other. We use a Wald-test, in which we restrict model (9) in such a way that β_1 equals α_1 and β_2 equals α_2 . The resulting Wald-test reveals a significant F-value (3.44; $p < 0.05$). Hence, we reject this restricted model and conclude that the two effects are different. Especially, for satisfaction the adjustment effect is smaller. Finally, we note that both Heckman's correction terms for non-response and customer defection are insignificant¹.

<Insert Table 2 about here>

2.2 Purchase Behavior

We first start with estimating (9) with the amount of purchases as a dependent variable². The model explains approximately 8% of the variance, which is not much but it is comparable with other studies on the link between satisfaction and purchase behavior (Mittal and Kamakura, 2001, Verhoef, Franses and Hoekstra, 1999). The estimation results are displayed in Table 3. According

to the estimation results, the adjustment in satisfaction affects changes in purchase behavior positively ($p < 0.01$). However, there is no effect of satisfaction on optimal behavior, as α_1 is not significant ($p > 0.10$). For payment equity, we do not find an adjustment effect and an effect on optimal behavior. In both cases the respective parameters β_2 and α_2 are not significant ($p > 0.10$). Our estimations reveal a negative significant equilibrium correction term γ ($p < 0.01$). Finally, the model results show a significant effect of the Heckman correction term for customer retention ($p < 0.05$).

We also estimate the parameters with equation (10). The estimation results are given in the last two columns of Table 3. The estimation results are almost the same as the results of (9). Again we only find a significant adjustment effect for satisfaction and a negative equilibrium correction term.

<Insert Table 3 about here>

Although, the absence of an effect of satisfaction on optimal purchase behavior matches with the empirical literature (e.g. Mazursky and Geva, 1989), this absence is to some extent disappointing. In the literature on the effect of satisfaction on actual behavior, it is shown that this effect might be moderated by relationship length. Customers with longer relationships usually have more confidence in their opinion and, thus, they will more heavily take their satisfaction judgement into account (Bolton, 1998; Rust et al., 1999). Moreover, as these customers have had more experiences with their supplier, they will have a more stable judgement. Thus, for customers with lengthy relationships recent experiences might be less important, and hence there might be an effect of satisfaction on optimal behavior. On the other hand, these customers will perhaps have

had so many experiences, that their behavior is almost optimal. For customers with short relationships the opposite might be true. For them, recent experiences are perhaps more important, because they did not have many experiences with the company. However, it might also be true that for this group of customers there is a larger gap between actual behavior and optimal behavior.

In order to explore the above effect we have estimated separate coefficients for customers with short and lengthy relationships. The estimation results show that the fit of the model, in which we allow for different parameters α , β and γ , does not change significantly. However, if we use a Wald-test to test whether parameters are different between the two groups, we find some interesting results. First, we can not find evidence for the fact that customers with short relationship rely more heavily on their adjustments in perceptions than customers with short relationships, as the Wald-test does not show a significant difference between these parameters ($p>0.10$). However, our exploratory analysis reveals a significant difference between the two groups with respect to the equilibrium correction parameter γ ($p<0.01$). These results show that γ is twice as large for customers with short relationships than for customers with long relationships, which seems to suggest that adjustment patterns differ with experience.

4 CONCLUSION AND DISCUSSION

In this paper we investigated the effect of satisfaction and payment equity on customer behavior over time. We developed a theoretical model in which we assumed that customers try to behave optimal, but are not capable of doing so. Moreover, they adjust their behavior based on new experiences with the supplier. In the empirical analysis we considered two types of behavior, that is customer referrals and the amount of services purchased.

With respect to customer referrals we find both an effect of changes in satisfaction and payment equity. Furthermore, we find strong effects of current satisfaction and payment equity. For satisfaction this effect is larger than the adjustment effect. This implies that a change in satisfaction levels affects customer referrals in the first period, but the effect of this change is important in subsequent time periods. The initial adjustment is not large enough to attain the optimal level. One reason for this could be that customers want to be sure about the change in satisfaction before they communicate it to others. They want their communication to be consistent over time, resulting in a relatively small initial reaction to changes. Managerially, this implies that a decrease in the level of satisfaction has stronger consequences in the long-run than in the short-run. For payment equity the opposite is true. Here the adjustment effect is somewhat smaller than the effect of current payment equity.

Our results on the effects of satisfaction and payment equity on purchasing behavior reveal no effect of satisfaction and payment equity on optimal behavior. We only find an effect of changes in satisfaction. This implies that firms can affect purchase behavior by improving customer satisfaction only in the short-run. The absence of an effect of satisfaction and payment equity is to some extent disappointing. Moreover, it contrasts with our results on customer referrals. We have the following possible explanations for this result. First, in the marketing literature the link between satisfaction and actual behavior is not beyond doubt (see for example, Jones and Sasser, 1995). Thus, the absence of an effect of current satisfaction may not be very surprising. Second, in contrast with purchasing behavior, customer referrals are measured as an attitude. The desire to maintain cognitive and attitudinal consistency to reduce dissonance or maintain balance in mental representations will therefore more apply to customer referrals than to purchase behavior. The following practical example can explain this further. Let's consider a customer being enthusiastic about a service provider to other consumers. S/he would not be

trusted if s/he will be negative about this company in subsequent meetings with the same consumers. Thus, despite some recent negative experiences there is a need for this customer to remain consistent in his referring behavior.

Finally, our results indicate some evidence for different effects between customers with short and long relationships. We especially find some preliminary evidence that the equilibrium correction parameter is larger for customers with short relationships. This might be due to the fact that the behavior of these customers is less optimal, creating a need for faster adjustment.

5 RESEARCH LIMITATIONS AND FUTURE RESEARCH

This research has the following limitations. First, it only concerns customers of one financial service company in the Netherlands. Future research could study other industries. Second, we only included two time periods in our analysis. In order to gain further insight into the short-run and long-run effects of customer perceptions more time periods are needed. Future research could construct panels in which more time periods are considered. In these studies researchers can gain insight into the short-run and long-run effects of satisfaction and payment equity (DeKimpe et al., 1999; Mela, Gupta and Lehmann, 1997). Third, we only studied purchase behavior at one supplier and customer referrals. Studies are needed that focus on other variables, such as purchase intentions and customer share. We note that customer referrals are sometimes used as a proxy to measure purchase intentions (Mittal, Kumar and, Tsiros, 1999; Zeithaml, Berry and Parasuraman, 1996). In line with our utility framework researchers could consider relative satisfaction instead of absolute satisfaction. Finally, models could be developed that take customer heterogeneity into account (see Paap and Franses, 2000).

Appendix: Items of scales

Satisfaction	Source
How satisfied are you about (1=very dissatisfied, 5= very satisfied)	Singh (1990)
...the personal attention of XYZ*	Singh (1990)
...the willingness of XYZ to explain procedures	Singh (1990)
...the service quality of XYZ	Singh (1990)
...the response to claims	New
...the expertise of the employees of XYZ	New
...your relationship with XYZ	New
...the alertness of XYZ	New
Payment Equity	
How satisfied are you about the insurance premium of XYZ? (1=very dissatisfied, 5= very satisfied)	Bolton and Lemon (1999), Singh (1990)
Do you think the insurance premium of your insurance at XYZ is - Too high, High, Normal, Low, Too low?	New
Customer Referrals	
I say positive things about XYZ to persons in my environment	Zeithaml et al. (1996)
If somebody seeks for advice with regard to a good insurance company, I recommend XYZ	Zeithaml et al. (1996)
I encourage relatives and friends to do business with XYZ	Zeithaml et al. (1996)

Table 1: Means, standard deviations (sd.) and coefficient alpha's for scales at T₀ and T₁ (n=1108).

Variable	Mean T₀ (sd.)	Mean T₁ (sd.)	Coefficient Alpha T₀	Coefficient Alpha T₁
Satisfaction	3.77 (0.45)	3.80 (0.46)	0.83	0.84
Payment Equity	3.43 (0.54)	3.32 (0.61)	0.66	0.66
Customer Referrals	3.53 (0.59)	3.51 (0.63)	0.71	0.75

Table 2: Estimation results of (8) with Customer Referrals as Dependent Variable (N=1108)

Parameter	Unstandardized	
	Coefficients	t-value
Constant (δ)	0.06	0.35
β parameters		
Satisfaction (β_1)	0.57	15.43
Payment equity (β_2)	0.12	4.09
γ parameters		
Equilibrium Correction (γ)	-0.68	19.09
α parameters		
Satisfaction (α_1)	0.72	10.67
Payment Equity (α_2)	0.05	2.87
Heckman Correction		
Inverse Mills Ratio Retention	0.02	1.22
Inverse Mills Ratio Response	0.15	0.82
R^2	0.41	
Adjusted R^2	0.41	

Table 3: Estimation Results of (9) and (10) with Amount of Services Purchased as Dependent Variable

Parameter	Equation (9)		Equation (10)	
	Unstandardized Coefficients	t-value	Unstandardized Coefficients	t-value
Constant (δ)	-0.56	-2.65	-0.48	-1.92
β parameters				
Satisfaction (β_1)	0.09	2.26	0.09	1.90
Payment equity (β_2)	-0.01	-0.15	0.02	0.60
γ parameters				
Equilibrium Correction (γ)	-0.10	-2.83	-0.10	-3.18
α parameters				
Satisfaction (α_1)	0.19	0.40	0.45	0.80
Payment Equity (α_2)	0.29	0.75	0.32	0.70
Heckman Correction				
Inverse Mills Ratio Retention	0.37	2.51	0.23	1.38
Inverse Mills Ratio Response	0.10	1.77	0.08	1.58
Third Party Insurance	0.16	2.08	0.21	2.57
Cancellation Insurance	-0.11	-0.27	0.74	1.76
Incapacity Insurance	-0.04	-0.18	-0.99	-4.14
Boat Insurance	0.22	1.81	0.05	0.38
Accident Insurance	0.28	1.97	0.16	0.93
Travel Insurance	-1.02	-4.13	-0.98	-3.36
Obsequies Insurance	0.22	2.23	0.29	2.58
R ²	0.08		0.06	
Adjusted R ²	0.07		0.05	

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Notes

¹ We included the Inverse Mills Ratio (see Heckman, 1976; Franses and Paap, 2001).

² In this model we also controlled for some product related effects.

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