# CHANGING PERCEPTIONS AND CHANGING BEHAVIOR IN CUSTOMER RELATIONSHIPS

PETER C. VERHOEF, PHILIP HANS FRANSES, BAS DONKERS



| ERIM REPORT SERIES *RESEARCH IN MANAGEMENT* | |
|---|---|
| ERIM Report Series reference number | ERS-2001-31-MKT |
| Publication | May 2001 |
| Number of pages | 23 |
| Email address corresponding author | Verhoef@few.eur.nl |
| URL (electronic version) | http://www.eur.nl/WebDOC/doc/erim/erimrs20010613142236.pdf |
| Address | Erasmus Research Institute of Management (ERIM)<br>Rotterdam School of Management / Faculteit Bedrijfskunde<br>Erasmus Universiteit Rotterdam<br>P.O. Box 1738<br>3000 DR Rotterdam, The Netherlands<br>Phone: +31 10 408 1182<br>Fax: +31 10 408 9640<br>Email: info@erim.eur.nl<br>Internet: www.erim.eur.nl |

Bibliographic data and classifications of all the ERIM reports are also available on the ERIM website: www.erim.eur.nl

**E**RASMUS **R**ESEARCH **I**NSTITUTE OF **M**ANAGEMENT

REPORT SERIES

*RESEARCH IN MANAGEMENT*

| BIBLIOGRAPHIC DATA AND CLASSIFICATIONS | | |
|---|---|---|
| Abstract | We formulate a theoretical model in which we postulate that if a customers' 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 alsc 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. | |
| Library of Congress Classification (LCC) | 5001-6182 | Business |
| | 5410-5417.5 | Marketing |
| | HF 5415.32 | Consumer Behavior: Marketing Research |
| Journal of Economic Literature (JEL) | M | Business Administration and Business Economics |
| | M 31<br>C 44 | Marketing<br>Statistical Decision Theory |
| | M 31 | Marketing |
| European Business Schools Library Group (EBSLG) | 85 A | Business General |
| | 280 G<br>255 A | Managing the marketing function<br>Decision theory (general) |
| | 280 N | Consumer Behavior |
| Gemeenschappelijke Onderwerpsontsluiting (GOO) | | |
| Classification GOO | 85.00 | Bedrijfskunde, Organisatiekunde: algemeen |
| | 85.40<br>85.03 | Marketing<br>Methoden en technieken, operations research |
| | 85.40 | Marketing |
| Keywords GOO | Bedrijfskunde / Bedrijfseconomie | |
| | Marketing / Besliskunde | |
| | Consumentengedrag, Relatiemarketing, Dynamische modellen | |
| Free keywords | Dynamic Modeling, Satisfaction, Customer Relationships, Preference Updating | |
| Other information | | |

# Changing Perceptions and Changing Behavior in Customer Relationships

Peter C. Verhoef [1]

Department of Marketing and Organization

School of Economics

Erasmus University Rotterdam

Philip Hans Franses

Department of Marketing and Organization

School of Economics

Erasmus University Rotterdam

Bas Donkers

Department of Marketing and Organization

School of Economics

Erasmus University Rotterdam

[1] Address for Correspondence: Peter C. Verhoef, Erasmus University Rotterdam, School of Economics, Department of Marketing and Organization, Office H15-12, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands; Tel. +31 10 408 2809, Fax +31 10 408 9169, E-mail: Verhoef@few.eur.nl

# Changing Perceptions and Changing Behavior in Customer Relationships

**Abstract**

We formulate a theoretical model in which we postulate that if a customers' 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:

$$\Delta Behavior_{t+1} = Behavior_{t+1} - Behavior_t, \quad (1)$$

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,

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

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

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

where $\text{Value}_t^*$ 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 $\text{Value}_t^*$) 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

$$Behavior_t\text{-}f(Perceptions_t) \quad (5)$$

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 Tsiros, 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,

$$\Delta Perceptions_{t+1} = Perceptions_{t+1} - Perceptions_t \quad (6)$$

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 ($Behavior_t$-$f(Perceptions_t)$), where $f(Perceptions_t)$ 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, $\Delta Perceptions_{t+1}$ will also affect the change in observed behavior (Bolton, 1998). This effect can also be considered as disconformation 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 $\varepsilon_{t+1}$ is included to allow for other, possibly unobserved, effects. In this model the parameter $\beta$ measures the updating effect resulting from the change in perceptions, while the parameter $\alpha$ reflects the effect of perceptions on optimal behavior. Finally, the parameter $\gamma$ 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

$$\Delta Behavior_{t+1} = \delta + \beta_1 \Delta Sat_{t+1} + \beta_2 \Delta paym_{t+1} + \gamma(Behavior_t - \alpha_1 Sat_t - \alpha_2 Paym_t) + \varepsilon_{t+1}. \quad (9)$$

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:

$$\Delta Behavior_{t+2} = \delta + \beta_1 \Delta Sat_{t+1} + \beta_s \Delta paym_{t+1} + \gamma(Behavior_t - \alpha_1 Sat_t - \alpha_2 Paym_t) + \varepsilon_{t+1}, \quad (10)$$

where $\Delta Behavior_{t+2}$ 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 $\gamma$ 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 ($\beta$) and the effect of satisfaction and payment equity on optimal behavior ($\alpha$) are significantly different from each other. We use a Wald-test, in which we restrict model (9) in such a way that $\beta_1$ equals $\alpha_1$ and $\beta_2$ equals $\alpha_2$. 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 insignificant[1].

<Insert Table 2 about here>

### 2.2 Purchase Behavior

We first start with estimating (9) with the amount of purchases as a dependent variable[2]. 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 $\alpha_1$ 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 $\beta_2$ and $\alpha_2$ are not significant ($p>0.10$). Our estimations reveal a negative significant equilibrium correction term $\gamma$ ($p<0.01$). 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 $\alpha$, $\beta$ and $\gamma$, 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 $\gamma$ ($p<0.01$). These results show that $\gamma$ 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<br>- 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 $T_0$ and $T_1$ (n=1108).**

| Variable | Mean $T_0$ (sd.) | Mean $T_1$ (sd.) | Coefficient Alpha $T_0$ | Coefficient Alpha $T_1$ |
|---|---|---|---|---|
| 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 ($\delta$) | 0.06 | 0.35 |
| **$\beta$ parameters** | | |
| Satisfaction ($\beta_1$) | 0.57 | 15.43 |
| Payment equity ($\beta_2$) | 0.12 | 4.09 |
| **$\gamma$ parameters** | | |
| Equilibrium Correction ($\gamma$) | -0.68 | 19.09 |
| **$\alpha$ parameters** | | |
| Satisfaction ($\alpha_1$) | 0.72 | 10.67 |
| Payment Equity ($\alpha_2$) | 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**

| | Equation (9) | | Equation (10) | |
|---|---|---|---|---|
| **Parameter** | **Unstandardized Coefficients** | **t-value** | **Unstandardized Coefficients** | **t-value** |
| Constant ($\delta$) | -0.56 | -2.65 | -0.48 | -1.92 |
| **$\beta$ parameters** | | | | |
| Satisfaction ($\beta_1$) | 0.09 | 2.26 | 0.09 | 1.90 |
| Payment equity ($\beta_2$) | -0.01 | -0.15 | 0.02 | 0.60 |
| **$\gamma$ parameters** | | | | |
| Equilibrium Correction ($\gamma$) | -0.10 | -2.83 | -0.10 | -3.18 |
| **$\alpha$ parameters** | | | | |
| Satisfaction ($\alpha_1$) | 0.19 | 0.40 | 0.45 | 0.80 |
| Payment Equity ($\alpha_2$) | 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 | -.36 |
| Obsequies Insurance | 0.22 | 2.23 | 0.29 | 2.58 |
| $R^2$ | 0.08 | | 0.06 | |
| Adjusted $R^2$ | 0.07 | | 0.05 | |

## REFERENCES


Anderson, Eugene W. and Mary W. Sullivan (1993), "The Antecedents and Consequences of Customer Satisfaction for Firms", Marketing Science 12 (2), 125-43

Bolton, Ruth (1998), "A Dynamic Model of the Duration of the Customer's Relationship with a Continuous Service Provider: The Role of Satisfaction", Marketing Science 17 (1), 45-65

Bolton, Ruth and Katherine N. Lemon (1999), "A Dynamic Model of Customers' Usage of Services: Usage as an Antecedent and Consequence of Satisfaction", Journal of Marketing Research 36 (2), 171-186

Boulding, William, Ajay Kalra, Richard Staelin and Valarie A. Zeithaml (1993), "A Dynamic Process Model of Service Quality: From Expectations to Behavioral Intentions", Journal of Marketing Research 30 (1), 7-27

Burnham, Thomas A., Judy K. Frels and Vijay Mahajan (2001), "The Antecedents and Consequences of Consumer Switching Costs", Working Paper, University of Texas at Austin

DeKimpe, Marnik G., Dominique M. Hansens and Jorge M. Silva Russo (1999), "Long-run Effects of Price Promotions in Scanner Markets", Journal of Econometrics 89 (1/2), 269-91

Dick, Allan S. and Kunal Basu (1994), "Customer Loyalty: Toward an Integrated Conceptual Framework", Journal of the Academy of Marketing Science 22 (2), 99-113

Festinger, Leon (1957), A Theory of Cognitive Dissonance. Stanford. CA: Standford University Press

Heckman, James J. (1976), "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models", Annals of Economic and Social Measurement 5, 475-92

Hendry, David F., Adrian R. Pagan and J. Denis Sargan (1984), "Dynamic Specification", in Z. Griliches and M.D. Intriligator (Eds), Handbook of Econometrics, Vol. 2, Chap. 18, North-Holland, Amsterdam, 1023-1100

Hogarth, Robin M. and Hillel J. Einhorn (1992), "Order Effects in Belief Updating: The Belief Adjustment Model", Cognitive Psychology 24 (1), 1-55

Jones, Thomas W. and Earl W. Jr. Sasser (1995), "Why Satisfied Customers Defect?", Harvard Business Review 73 (6), 88-90

Mazursky, David and Aviva Geva (1989), "Temporal Decay in Satisfaction – Purchase Intention Relationship", Psychology and Marketing 6 (3), 211-27

Mela, Carl F., Sunil Gupta and Donald R. Lehmann (1997), "The Long-Term Impact of Promotion and Advertising on Consumer Brand Choice", Journal of Marketing Research 34 (2), 248-61

Mittal, Vikas, Pankaj Kumar and Michael Tsiros (1999), "Attribute-Level Performance, Satisfaction, and Behavioral Intentions over Time: A Consumption System Approach", Journal of Marketing 63 (2), 88-101

Mittal, Vikas and Wagner A. Kamakura (2001), "Satisfaction, Repurchase Intent, and Repurchase Behavior: Investigating the Moderating Effect of Customer Characteristics", Journal of Marketing Research 38 (1), 131-42

Nunnally, Jun C. (1978). Psychometric Theory. New York: McGraw-Hill.

Paap, Richard and Philip Hans Franses (2000), "A Dynamic Multinomial Probit Model for Brand Choice with Different Long-Run and Short-Run Effects of Marketing-Mix Variables", Journal of Applied Econometrics 15, 714-44

Rust, Roland T., Jeffrey Inman, Jianmin Jia and Anthony Zahorik (1999), "What You Don't Know about Customer Perceived Quality: The Role of Customer Expectation Distributions", Marketing Science 18 (1), 77-92

Singh, Jagdip (1990), "Voice, Exit and Negative Word-of-Mouth Behaviors: An Investigation across three Service Categories", Journal of the Academy of Marketing Science 18 (1), 1-15

Verhoef, Peter C., Philip Hans Franses and Janny C. Hoekstra (1999), "The Impact of Satisfaction on the Breadth of the Relationship", Ribes Working Paper, Erasmus University Rotterdam

Woodruff, Robert B. (1997), "Customer Value: The Next Source for Competitive Advantage", Journal of the Academy of Marketing Science 25 (2), 139-53

Zeithaml, Valerie A., Leonard L. Berry and A. Parasuraman (1996), "The Behavioral Consequences of Service Quality", Journal of Marketing 60 (2), 31-46

## 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.

# Publications in the Report Series Research* in Management

**ERIM Research Program: "Marketing"**

**2001**

*Predicting Customer Potential Value. An application in the insurance industry*
Peter C. Verhoef & Bas Donkers
ERS-2001-01-MKT

*Modeling Potenitally Time-Varying Effects of Promotions on Sales*
Philip Hans Franses, Richard Paap & Philip A. Sijthoff
ERS-2001-05-MKT

*Modeling Consideration Sets and Brand Choice Using Artificial Neural Networks*
Björn Vroomen, Philip Hans Franses & Erjen van Nierop
ERS-2001-10-MKT

*Firm Size and Export Intensity: A Transaction Costs and Resource-Based Perspective*
Ernst Verwaal & Bas Donkers
ERS-2001-12-MKT

*Customs-Related Transaction Costs, Firm Size and International Trade Intensity*
Ernst Verwaal & Bas Donkers
ERS-2001-13-MKT

*The Effectiveness of Different Mechanisms for Integrating Marketing and R & D*
Mark A.A.M. Leenders & Berend Wierenga
ERS-2001-20-MKT

*Intra-Firm Adoption Decisions: Departmental Adoption of the Common European Currency*
Yvonne M. van Everdingen & Berend Wierenga
ERS-2001-21-MKT

*Econometric Analysis of the Market Share Attraction Model*
Dennis Fok, Philip Hans Franses & Richard Paap
ERS-2001-25-MKT

*Buying High Tech Products: An Embeddedness Perspective*
Stefan Wuyts, Stefan Stremersch & Philip Hans Franses
ERS-2001-27-MKT

*Changing Perceptions and Changing Behavior in Customer Relationships*
Peter C. Verhoef, Philip Hans Franses & Bas Donkers
ERS-2001-31-MKT

*How and Why Decision Models Influence Marketing Resource Allocations*
Gary L. Lilien, Arvind Rangaswamy, Katrin Starke & Gerrit H. van Bruggen
ERS-2001-33-MKT

---

* A complete overview of the ERIM Report Series Research in Management: http://www.ers.erim.eur.nl

ERIM Research Programs:
LIS Business Processes, Logistics and Information Systems
ORG Organizing for Performance
MKT Marketing
F&A Finance and Accounting
STR Strategy and Entrepreneurship

*An Equilibrium-Correction Model for Dynamic Network Data*
David Dekker, Philip Hans Franses & David Krackhardt
ERS-2001-39-MKT

**2000**
*Impact of the Employee Communication and Perceived External Prestige on Organizational Identification*
Ale Smidts, Cees B.M. van Riel & Ad Th.H. Pruyn
ERS-2000-01-MKT

*Forecasting Market Shares from Models for Sales*
Dennis Fok & Philip Hans Franses
ERS-2000-03-MKT

*The Effect of Relational Constructs on Relationship Performance: Does Duration Matter?*
Peter C. Verhoef, Philip Hans Franses & Janny C. Hoekstra
ERS-2000-08-MKT

*Informants in Organizational Marketing Research: How Many, Who, and How to Aggregate Response?*
Gerrit H. van Bruggen, Gary L. Lilien & Manish Kacker
ERS-2000-32-MKT

*The Powerful Triangle of Marketing Data, Managerial Judgment, and Marketing Management Support Systems*
Gerrit H. van Bruggen, Ale Smidts & Berend Wierenga
ERS-2000-33-MKT

*Consumer Perception and Evaluation of Waiting Time: A Field Experiment*
Gerrit Antonides, Peter C. Verhoef & Marcel van Aalst
ERS-2000-35-MKT

*Broker Positions in Task-Specific Knowledge Networks: Effects on Perceived Performance and Role Stressors in an Account Management System*
David Dekker, Frans Stokman & Philip Hans Franses
ERS-2000-37-MKT

*Modeling Unobserved Consideration Sets for Household Panel Data*
Erjen van Nierop, Richard Paap, Bart Bronnenberg, Philip Hans Franses & Michel Wedel
ERS-2000-42-MKT

*A Managerial Perspective on the Logic of Increasing Returns*
Erik den Hartigh, Fred Langerak & Harry Commandeur
ERS-2000-48-MKT

*The Mediating Effect of NPD-Activities and NPD-Performance on the Relationship between Market Orientation and Organizational Performance*
Fred Langerak, Erik Jan Hultink & Henry S.J. Robben
ERS-2000-50-MKT

*Sensemaking from actions: Deriving organization members' means and ends from their day-to-day behavior*
Johan van Rekom, Cees B.M. van Riel & Berend Wierenga
ERS-2000-52-MKT