Customer and Employee Satisfaction Effects on Cross-buying

Albert Valenti
IESE Business School
Gokhan Yildirim
Imperial College London
Shuba Srinivasan
Boston University, Questrom School of Business

Paper presented at the 48th Annual EMAC Conference, Hamburg, May 24-27, 2019.

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Abstract:

In the retail industry, where customers interact with employees during the purchase process, the satisfaction of both stakeholders plays an important role in determining customer spending. The service-profit chain framework states that employee satisfaction (ES) influences customer spending through customer satisfaction (CS), leading one to expect that CS and ES do not have simultaneous effects. However, whether CS and ES have simultaneous effects remains an open question.

We jointly model the effects of CS and ES on cross-buying probability, controlling for customer heterogeneity and time effects, and accounting for nonlinearity and asymmetries. Our results based on an empirical analysis with data from a leading car rental company have novel implications for theory and practice. CS and ES have simultaneous effects on cross-buying. However, the relationship is concave non-monotonic. For low satisfaction levels, an increase in satisfaction leads to higher cross-buying; while for high satisfaction, an increase leads to lower cross-buying.

1. Introduction

Customers and employees form the backbone of businesses. The importance of having both sets of stakeholders satisfied to improve business performance is well established both in academia and in practice (e.g., Maxham, Netemeyer, and Lichtenstein, 2008; Rucci, Kirn, and Quinn, 1998). As a result, companies invest substantial resources to monitor and improve customer and employee satisfaction (Morgan, Anderson, and Mittal, 2005; Reichheld, 2003). This effort is particularly critical in the retail industry, where the level of customer spending is largely determined at the customer-employee encounter. For example, when checking in at a hotel, the staff at the counter might offer to the customer extra services such as a romantic dinner at the restaurant. The customer likelihood to purchase any of these additional services is likely determined by her satisfaction with previous experiences at the hotel and by the staff satisfaction.

Studying the simultaneous effects of customer satisfaction (CS) and employee satisfaction (ES) is important for theory and practice. Moorman and Day (2016), in their review on marketing organization, call for research on the influence of customer and frontline employee interaction on business outcomes. To this end, it is not clear whether ES would have an effect on customer spending once the effect of CS is accounted for. The service-profit chain framework states that ES influences customer spending through CS (e.g., Anderson & Mittal, 2000; Hogreve et al., 2017), leading one to expect that CS and ES do not have simultaneous effects. However, whether CS and ES have simultaneous effects remains an open question. Furthermore, the impact of CS could depend on the level of ES. If a positive interaction exists, an increase of CS would have a stronger effect when coupled with an increase of ES (i.e. there is positive synergy). On the contrary, a negative interaction effect would mean that CS and ES work as substitutes instead of complements (i.e. there is negative synergy). Overall, if CS and ES have an interaction effect, not accounting for this interaction would fail to capture their full effect.

From a managerial perspective, understanding the joint effects of CS and ES has resource allocation implications. Managers need to quantify the returns on investment from satisfaction improvement policies. Therefore, they need to know the relative impact of improvements in CS with respect to the impact of improvements in ES. Moreover, if interaction effects are significant, retailers could take into account CS and ES when making staff allocation decisions. Retailers could segment customers based on CS and assign segments to employees that are more likely to

obtain a more profitable transaction. Finally, Morgan, Anderson, and Mittal (2005) make a call for studies that help companies obtain more value from their satisfaction surveys.

The main objective of this paper is to quantify the simultaneous effects of CS and ES on cross-buying in the retail industry. Cross-buying is fundamental for managers because it helps maximize the return from current customers (Gupta & Zeithaml, 2006). Yet, cross-buying has received little attention and inconclusive findings in the satisfaction literature (Bolton, Lemon, and Verhoef, 2004). Cross-buying is particularly relevant in the retail context because it occurs during the service encounter between customers and sales agents. While other measures of customer spending such as total sales or share of wallet are determined by a myriad of external factors, cross-buying is a clearer consequence of the interaction between customer and employee.

Therefore, we pose three main research questions. First, do CS and ES have simultaneous effects on cross-buying? Second, what are the relative magnitudes of the effects of CS and ES on cross-buying? Third, do the effects of CS and ES on cross-buying have interaction effects?

We address these research questions by jointly modeling the effects of CS and ES on cross-buying probability, controlling for customer heterogeneity and time effects. The model accounts for nonlinear and asymmetric effects of CS and ES. Moreover, we examine whether the effects of CS and ES on cross-buying are non-monotonic. The functional form of the effect of satisfaction has important implications for managers because it influences investment decisions. For example, a linear relationship implies a constant return on investment; a concave monotonic relationship implies a decrease in returns on investment; and a concave non-monotonic relationship implies a negative return after a certain threshold.

For our empirical analysis, we employ panel datasets on transactions and satisfaction at individual customer level and employee satisfaction at store level of a leading car rental company. The car rental industry offers an ideal setting to explore the research questions. The customer-employee interaction at the rental encounter provides customers the opportunity to cross-buy additional services, for example prepaid refuel or road assistance insurance. The identification of the effects comes from observing changes in CS, ES and cross-buying across customers, stores, and time. An additional feature of this data is that customers perform transactions at different rental stores. As a result, customers interact with different employees, which introduces more variation in the data.

2. Contribution

This paper differs from previous research both from substantive and application perspectives. First, the extensive empirical research that examines CS and ES has overlooked their simultaneous effects. Previous literature either examines separately the influence of CS and ES on customer spending or considers that the effect of ES is mediated by CS. Moreover, by examining simultaneously CS and ES, we compare the relative magnitude of their effects and explore whether they have an interaction effect. Second, we examine the impact of these effects on the outcome measure of cross-buying. Cross-buying is a key measure of customer spending in the retail context because it is an outcome of the interaction between customer and employee. Nevertheless, the few studies in the satisfaction literature that have examined cross-buying provide contradicting results. Third, we quantify the simultaneous effects of CS and ES on cross-buying at different levels of satisfaction. Considering the functional form of the relationships has theoretical and managerial implications. Finally, unlike most studies that quantify the effects of satisfaction, we employ panel data to control for customer heterogeneity and time effects. The effects identification results from observing changes in CS, ES and cross-buying across customers, stores, and time. Hence, this study makes a step forward with respect to previous research in the identification of causal effects of satisfaction.

3. Modeling and Estimation Approach

We develop a model that captures the simultaneous effects of CS and ES on cross-buying probability. Empirically, we examine for each transaction whether the customer cross-buys or not. Given the binary nature of the dependent variable and the panel structure of the data, we specify a panel logit model at the customer-transaction level with time fixed effects. The model controls for customer heterogeneity and time effects, which would lead to biased and inconsistent estimates if present and not accounted for (Hsiao, 2014).

Using a panel logit specification, we express the probability that customer i at transaction j cross-buys ($CROSS_{ij} = 1$) as:

$$\Pr\left(CROSS_{ij} = 1 \mid \alpha, \beta, X, \gamma, CONTROLS\right)$$
$$= \frac{\exp(\alpha_i + \beta X_{i,j-1} + \gamma_{ij} + CONTROLS)}{1 + \exp(\alpha_i + \beta X_{i,j-1} + \gamma_{ij} + CONTROLS)} \tag{1}.$$

The customer-specific intercepts, α_i, capture customer heterogeneity in their propensity to cross-buy due to time-invariant customer unobserved characteristics. $\beta X_{i,j-1}$ captures the effects of the main variables, CS and ES. γ_{ij} is a categorical variable at the week level to control for time trends that have the same influence on all. Finally, *CONTROLS* is a set of control variables.

The logit model has been applied to capture nonlinear effects of CS on different business performance outcomes (e.g., Anderson & Mittal, 2000; Rust & Zahorik, 1993). While linear models impose the same effect size across all the range of satisfaction, the S-shaped curve of the logit imposes a larger effect size for intermediate values of satisfaction compared to low and high values. Moreover, in nonlinear models the effect of the variables in the model depends on the values of all the other variables (Karaca-Mandic, Norton, and Dowd, 2012). Hence, even without a multiplicative term between CS and ES, the effect of CS (ES) on cross-buying depends on the level of ES (CS). Hence, we specify $\beta X_{i,j-1}$ for Model 1 as:

$$\beta X_{i,j-1} = \beta_1 CS_{i,j-1} + \beta_2 ES_{i,j-1} \qquad (2)$$

where $CS_{i,j-1}$ and $ES_{i,j-1}$ are customer and employee satisfaction, respectively. We examine whether ES and CS before the transaction influences the decision to cross-buy in the current transaction. We use the satisfaction before the transaction to avoid endogeneity due to reverse causality between satisfaction and cross-buying. Hence, *ES* and *CS* have a *j-1* subscript because they are measured before the transaction.

We specify four more models (Model 2 to Model 5) that include quadratic terms of CS and ES to capture potential additional nonlinearities and that add a multiplicative term between CS and ES. To choose among Model 1 to Model 5, we use log-likelihood ratio tests. The five models capture different functional forms of the relationship between satisfaction and cross-buying, which lead to diverse investment decisions.

We estimate the model with conditional maximum likelihood. Conditional logit has been applied in marketing to evaluate brand choice (e.g., Lambert-Pandraud & Laurent, 2010; Louviere et al., 2013; Tellis, 1988). Conditional logit obtains consistent estimates by making the likelihood function independent of the fixed effects. The approach consists of conditioning the likelihood function on sufficient statistics independent of the panel fixed effects. Therefore, time-invariant variables at customer-level are not estimated.

Given the within-individual estimator used by the conditional logit estimation, all time-invariant customer characteristics are excluded from the estimation. We include as controls in the model factors that are likely to influence cross-buying decision. $TENURE_{i,j-1}$ represents the number of years of experience in the company. $MANAGER_{i,j-1}$ represents the proportion of managers over total number of employees in the store. $UPGRADE_{ij}$ is a dummy variable that takes value of 1 if the customer receives a free car upgrade. CAR_{ij} is a categorical variable for the tier of car reserved. $LENGTH_{ij}$ is the rental length in number of days. $BILL_{ij}$ is the value of the rental transaction in dollars. DAY_{ij} is a categorical variable for the day of the week the car is picked up. Marketing-mix variables effects are captured by the time fixed effects and control variables. Competitive and own marketing-mix effects are omitted from the model specification because they are not in the scope of the study and because of limited data availability.

4. Data Description

We use a rich dataset of a world leading car rental company granted by Wharton Customer Analytics Initiative. The dataset contains all the rental transactions of the company in the USA and Canada for a period of 25 months between 2010 and 2012. The dataset also contains the CS surveys associated with those rentals, and five waves of ES surveys. We restrict the analysis to the loyalty program members because their transactions and satisfaction can be tracked over time.

5. Estimation Results

Model 2, which includes quadratic terms of CS and ES but has no multiplicative term between the two, provides the best fit to the data. The selected model indicates that the effects of CS and ES on cross-buying have important nonlinearities but their interaction effect is not significant (Table 1 presents the estimates). A back-of-the-envelope calculation shows that the thresholds are around 4.6 for CS and 3.3 for ES, which are at intermediate levels of the variables. Hence, the *functional form between satisfaction and cross-buying is concave non-monotonic*.

	Coef.	SE	p > |z|
CS	0.060	0.034	0.076
CS²	-0.006	0.003	0.029
ES	0.479	0.250	0.055
ES²	-0.071	0.035	0.041
TENURE	0.015	0.008	0.072
MANAGER	-0.287	0.192	0.135
UPGRADE	0.322	0.034	0.000
LENGTH	-0.012	0.008	0.108
BILL	0.000	0.000	0.105
Day of week FE	Yes		
Car FE	Yes		
Time FE	Yes		
Number of Observations	25,548		
Log-likelihood	-8,391.7		
AIC	17,041		
BIC	18,093		

Table 1. Main Model Estimates

We quantify the effects of CS and ES on cross-buying probability with marginal effects. An average transaction has mean values for all the other variables (employee tenure and all fixed effects). To ease comparison, Panel 1 (Panel 2) of Figure 1 graphs the effect of CS (ES) at three different levels of ES (CS).
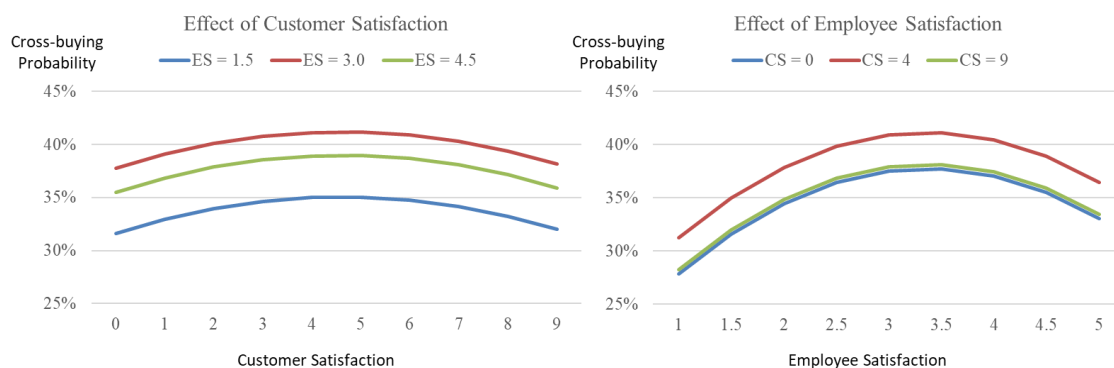

Figure 1. Effect of Customer and Employee Satisfaction on Cross-Buying

The effect of ES on cross-buying is 2.7 times larger than the effect of CS. Increasing ES from the lowest level of 1 to a medium level of 3 increases cross-buying probability by 9.5 percentage points (p.p.), while increasing CS from 0 to 5 increases cross-buying probability by 3.5 p.p. (please remember that ES has a range from 1 to 5, and CS a range from 0 to 9). The highest cross-buying occurs for medium levels of CS and ES (CS between 4 and 5, and ES around 3.5). This relative strength of ES with respect to CS can also be observed comparing the degree of concavity of the curves in Figure 1.

The dependence between the effects of CS and ES is negligible. The effect of increasing CS is nearly the same for all ES levels. At ES of 1.5, increasing CS from 0 to 5 raises cross-buying probability by 3.49 p.p., while at ES of 3 the same increase raises cross-buying probability by 3.49 p.p. Likewise, the effect of increasing ES is nearly the same for all CS levels.

Although both CS and ES have a concave effect on cross-buying probability, the shapes are different. *CS has a nearly symmetric effect*, with extremely satisfied customers (score of 9) having a similar probability to cross-buy than extremely dissatisfied (score of 0). On the other hand, *the effect of ES is not symmetric*. The lowest cross-buying occurs for extremely dissatisfied employees (score of 1). While extremely satisfied employees (score of 5) have the same cross-buying probability of intermediate-low satisfied employees (score around 2).

A comparison between the magnitudes of the effects of the different variables highlights the strength of the effect of satisfaction: *the effect on cross-buying probability of improving ES from the lowest to the medium level is the same of increasing employee tenure by 26 years*.

6. Managerial Implications

These findings have several implications for retail managers. First, the relative effect sizes of CS and ES guide resource allocation decisions. The largest returns on satisfaction improvements are for increases in ES at the low levels. Improving ES from a level of 1 over 5 (lowest level) to a level of 3 (mid-level) increases cross-buying probability by around 9.5 p.p., and from 2 to 3 increases cross-buying probability by around 3.0 p.p. Given that 15.1% and 10.3% of the employees have a satisfaction level of 1 and 2, respectively; that the average transaction value is $170.3; and assuming an average cross-buying value of $31.3 (according to website listed prices); the company would lift revenues by 0.32% with a policy that improved ES

to the medium level of 3 for employees with a lower level. Furthermore, the profit impact would be larger because the margin of complementary products is higher than the margin of the car rental (Gupta & Zeithaml, 2006).

Second, the negative effect of satisfaction on cross-buying at high satisfaction levels suggests that companies should avoid salesforce commission schemes that disproportionally incentivize cross-selling efforts. Since extremely satisfied customers are less likely to acquire additional services, employees should not be extremely insistent in their selling efforts. Taking this result together with previous research that shows that customer loyalty increases with CS (Verhoef, Franses, and Hoekstra, 2002), employees should not be rewarded to increase spending in the current transaction by pushing cross-buying of high satisfied customers.

Third, the negligible interaction effect between CS and ES implies that managers do not need to take into account satisfaction levels for customer-employee matching purposes. There is no financial gain from assigning satisfied employees to customers of specific satisfaction levels. The increase in cross-buying probability by assigning a more satisfied employee to serve the customer is practically the same at all CS levels.

7. Robustness Checks

We perform three types of additional analyses to assess the robustness of the results. We compare the conditional logit estimation with a random effects panel estimation and fixed effects linear estimation. We compare our choices of variable measurement with five measurement alternatives and levels of aggregation. We examine the robustness to variable exclusion. All results confirm the main results in terms of direction and significance.

8. Conclusion

In the retail industry, where customers interact with employees during the purchase process, the satisfaction of both stakeholders plays an important role in determining customer spending. Cross-buying is a behavioral metric that is a clear result of this interaction. Therefore, retailers must understand how CS and ES simultaneously influence cross-buying. Our empirical results have novel implications for theory and practice. CS and ES have simultaneous effects on cross-buying. However, CS and ES do not have an interaction effect on cross-buying. Furthermore, the relationship between satisfaction and cross-buying is concave non-monotonic.

References

Anderson, E. W., & Mittal, V. (2000). Strengthening the satisfaction-profit chain. *Journal of Service Research*, 3(2), 107-120.

Bolton, R. N., Lemon, K. N., & Verhoef, P. C. (2004). The theoretical underpinnings of customer asset management: A framework and propositions for future research. *Journal of the Academy of Marketing Science*, 32(3), 271-292.

Gupta, S., & Zeithaml, V. (2006). Customer metrics and their impact on financial performance. *Marketing Science*, 25(6), 718-739.

Hsiao, C. (2014). *Analysis of panel data (No. 54)*. Cambridge University Press.

Hogreve, J., Iseke, A., Derfuss, K., & Eller, T. (2017). The service–profit chain: A meta-analytic test of a comprehensive theoretical framework. *Journal of Marketing*, 81(3), 41-61.

Karaca-Mandic, P., Norton, E. C., & Dowd, B. (2012). Interaction terms in nonlinear models. *Health Services Research*, 47(1pt1), 255-274.

Louviere, J., Lings, I., Islam, T., Gudergan, S., & Flynn, T. (2013). An introduction to the application of (case 1) best–worst scaling in marketing research. *International Journal of Research in Marketing*, 30(3), 292-303.

Maxham III, J. G., Netemeyer, R. G., & Lichtenstein, D. R. (2008). The retail value chain: linking employee perceptions to employee performance, customer evaluations, and store performance. *Marketing Science*, 27(2), 147-167.

Morgan, N. A., Anderson, E. W., & Mittal, V. (2005). Understanding firms' customer satisfaction information usage. *Journal of Marketing*, 69(3), 131-151.

Moorman, C., & Day, G. S. (2016). Organizing for marketing excellence. *Journal of Marketing*, 80(6), 6-35.

Reichheld, F. F. (2003). The one number you need to grow. *Harvard Business Review*, 81(12).

Rucci, A. J., Kirn, S. P., & Quinn, R. T. (1998). The employee-customer-profit chain at Sears. *Harvard Business Review*, 76, 82-98.

Rust, R. T., & Zahorik, A. J. (1993). Customer satisfaction, customer retention, and market share. *Journal of Retailing*, 69(2), 193-215.

Tellis, G. J. (1988). The price elasticity of selective demand: A meta-analysis of econometric models of sales. *Journal of Marketing Research*, 331-341.

Verhoef, P. C., Franses, P. H., & Hoekstra, J. C. (2002). The effect of relational constructs on customer referrals and number of services purchased from a multiservice provider: does age of relationship matter? *Journal of the Academy of Marketing Science*, 30(3), 202-21.