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Are Self-Service Customers Satisfied or Stuck?

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Abstract

This paper investigates the impact of self-service technology on customer satisfaction and retention. Specifically, we disentangle the distinct effects of satisfaction and switching costs as drivers of retention among self-service customers. Our empirical analysis examines 26,924 multi-channel customers of a nationwide retail bank. For each customer, we track channel usage, overall satisfaction and actual retention over a one-year period. We find that relative to face-to-face service, customers who use self-service channels for a greater proportion of their transactions are no more or less satisfied with the service they receive. However, we also find that these same customers are predictably less likely to defect to a competitor if they are heavily reliant on self-service channels characterized by high switching costs. Through a mediation model, we demonstrate that when self-service promotes retention, it does so in a way that is consistent with switching costs rather than via increased satisfaction.

1. Introduction

This paper investigates how satisfaction and switching costs contribute to retention among self-service technology (SST) customers, and more broadly, the overall impact of self-service on customer satisfaction and retention. A number of studies in the services literature have suggested that self-service customers are more loyal than their full-service counterparts (Campbell & Frei, 2006; Hitt & Frei, 2002; Marzocchi & Zammit, 2006; Mols, 1998; Wallace et al., 2004; Yen & Gwinner, 2003). There are two competing explanations for why this might be the case. One explanation is that self-service offers benefits over full-service offerings that improve customer satisfaction, and by extension, loyalty. The alternative explanation is that self-service increases switching costs, which improves retention by making it more difficult for customers to defect to competitors.

It has been well established in the literature that a satisfied customer is more likely to remain loyal to a firm than a dissatisfied one (Anderson, 1994; Bowen & Chen, 2001; Heskett et al., 1997; LaBarbera & Mazursky, 1983; Newman & Werbel, 1973; Oliver, 1980). However, a customer who finds it difficult to switch to a competitor as a result of learning costs, psychological effects, transaction costs, or contractual obligations, may also remain loyal, despite dissatisfaction (Farrell & Klemperer, 2007).

Understanding what motivates self-service customers to remain loyal has significant implications for service organizations. Dissatisfied customers held captive by switching costs spend less money and are notoriously difficult and expensive to serve (Coyles & Gokey, 2005; Jones & Sasser, 1995; Xue & Harker, 2002). Moreover, they will defect from a firm over time if switching costs fall (Evans & Wurster, 1997). Consequently, if switching costs are found to be the driver of increased loyalty among self-service customers, then managers face a crucial

expected value calculation: weighing the near-term cost benefits of self-service technologies against the potential reduction in customer lifetime value from those who defect, seeking superior service experiences elsewhere.

Our paper broadens the existing services literature in two ways. First, the overall impact of self-service on satisfaction and retention remains unresolved in the literature. While a significant number of prior studies have examined these relationships, their results have conflicted over the direction of the impact. In general, studies that have found that self-service increases satisfaction, have also found that it increases retention (Marzocchi & Zammit, 2006; Mols, 1998; Wallace et al., 2004; Yen & Gwinner, 2003). In contrast, those that have found that it decreases satisfaction have also found that it decreases retention (Carmel & Scott, 2007; Meuter et al., 2003; Price & Arnould, 1999). The multi-channel nature of the personal banking industry affords a unique opportunity to analyze the incremental impact of self-service channel usage on overall customer satisfaction and retention relative to the use of full-service channels. We use actual transaction data to categorize individual customers by channel. This approach provides greater clarity into the relationships between self-service, satisfaction and retention. Specifically, it lets us examine the relationship between satisfaction and retention in self-service channels that have varying amounts of switching costs associated with them.

Second, we have disentangled the relative impact of self-service satisfaction and switching costs on actual customer retention, rather than on stated intention to stay with a firm. By combining customer surveys to assess satisfaction with longitudinal observations of customers to gauge retention, we provide evidence on the relationship between satisfaction and actual retention in a multi-channel setting. Previous studies examining the impact of self-service have tended to rely on customer surveys or observational analyses, but not a mix of the two. Studies

examining the link between self-service and satisfaction have addressed retention by inquiring about customers' future intentions to remain with the firm (Marzocchi & Zammit, 2006; Mols, 1998; Wallace et al., 2004; Yen & Gwinner, 2003). It has been demonstrated that self-reported retention measures overstate switching behavior (Garland, 2002). In contrast, studies focusing specifically on retention that have been observational in nature have not had access to satisfaction data (Chen & Hitt, 2002; Xue & Harker, 2002).

This study does not employ a direct, customer-reported measure of switching costs. Instead, we infer the relative level of switching costs in various channels by examining gains to retention, controlling for satisfaction and other customer-specific characteristics. This approach is consistent with a number of previous studies (Anderson & Sullivan, 1993; Fornell, 1992; Klemperer, 1995). We employ a mediation model to analyze satisfaction survey data and lagged observational data on retention, controlling for proportional channel use. With this approach, we isolate satisfaction effects from switching costs and provide a more detailed picture of how the implementation of self-service technology impacts customer behavior.

The remainder of the paper proceeds as follows. A review of the relevant literature and our hypotheses development are provided in Section 2. Our methodological approach is described in Section 3. Section 4 provides a description of our research site and data collection. Results are discussed in Section 5. Managerial implications of our findings are discussed in Section 6. Section 7 concludes the paper.

2. Literature review and hypothesis development

A growing number of firms are augmenting traditional face-to-face service strategies with self-service technology. In part, these firms implement SSTs with the intentions of improving

satisfaction and loyalty through increased efficiency, convenience and perceived control for the customer (Hitt et al., 1999; Meuter et al., 2000; Yen, 2005). Yet, the interrelationships between self-service, retention, switching costs and satisfaction remain unresolved in the literature. This section reviews the literature that shapes our understanding of these interrelationships, and motivates a number of relevant hypotheses. Due to conflicting findings among a portion of the relevant studies we cite, we have adopted the convention of stating non-directional hypotheses in null form and directional hypotheses in alternative form.

Our review is divided into three streams. First, we focus on the literature investigating the *overall link between self-service and retention*. Numerous studies have explored this relationship in a wide-array of settings, but their findings have often conflicted. Second, we highlight two potential sources of this conflict: *switching costs* and *satisfaction effects*. We review a number of theoretical and empirical analyses that have focused on these effects in various self-service settings. Finally, we argue that considering either effect on its own provides an incomplete picture of the link between self-service and retention.

The impact of self-service on retention

Despite the increasing prevalence of self-service technologies, the link between self-service and retention remains ambiguous in the literature. Several studies have found a positive relationship, noting that self-service and online customers have higher repurchase ratios than their full-service and offline counterparts (Hitt & Frei, 2002; Mols, 1998; Xue & Harker, 2002). Moreover, to the extent that online channels increase transaction frequency, they have been shown to increase customer retention (Chen & Hitt, 2002). Conversely, going from personal service to self-service has been shown to have a negative effect on bonding and loyalty with low

complexity transactions and relationships (Selnes & Hansen, 2001). Furthermore, customer delight in online self-service has been shown not to lead to loyalty (Herington & Weaven, 2007). Based on these conflicting findings, we hypothesize that in aggregate, self-service usage has an ambiguous impact on retention. This non-directional hypothesis is stated in null form:

Hypothesis 1 (H1): There is not a significant relationship between self-service channel usage and retention.

The impact of switching costs and satisfaction effects

In cases where self-service has been found to promote customer retention, there has been conflict in the literature about whether it is driven by switching costs or satisfaction effects. For example, among supermarket customers, self-service checkout has been shown to promote overall satisfaction, which in turn has been shown to drive intention to re-patronize a store (Marzocchi & Zammit, 2006). However, a number of studies have suggested that switching costs are the dominant determinants of retention in both full and self-service contexts (Bell et al., 2005; Jones et al., 2000; Mols, 1998; Ruyter et al., 1998).

Switching costs:

A portion of the ambiguous relationship between self-service and retention can be explained by varying levels of switching costs. Consumers face switching costs when investments specific to their current providers must be duplicated for new providers (Farrell & Klemperer, 2007). Two types of switching costs seem particularly relevant in self-service banking environments: start-up costs and learning costs. Start-up costs exist in channels where customers must setup a

product for its initial use (Burnham et al., 2003; Klemperer, 1995). For example, in retail banking, online bill pay imposes start-up costs by requiring up-front manual data entry by its users. Learning costs include the time and effort required to acquire the necessary skills to use a service effectively (Burnham et al., 2003; Farrell & Klemperer, 2007; Guiltinan, 1989; Klemperer, 1995). Online banking systems impose learning costs, as customers must familiarize themselves with the bank's proprietary web interface in order to make efficient use of the service. After start-up and learning costs have been expended, switching to a competitor requires duplicated effort elsewhere, thereby creating a barrier to defection.

While online bill pay and online banking impose switching costs on customers, other channels like ATM and phone banking, which are basically standardized between firms and require no significant start-up investment, are not likely to impose such switching costs. To the extent that high switching cost channels complicate the process of changing banks, ceteris paribus, we would expect customers in low switching cost channels to defect with greater frequency than customers in high switching cost channels. However, switching costs only represent one part of the equation that connects self-service to customer retention. Understanding the *net* impact of self-service also requires exploration of the connection between self-service and retention driven through *satisfaction effects*. Consequently, we hypothesize that self-service, without accounting for satisfaction effects, will be ambiguously associated with retention in both high and low switching cost channels. The following non-directional hypotheses are stated in null form:

Hypothesis 2 (H2): *In high switching cost channels, self-service has no association with customer retention.*

Hypothesis 3 (H3): *In low switching cost channels, self-service has no association with customer retention.*

Satisfaction effects:

Self-service technology has been found to promote customer satisfaction in a number of settings, including retail banking (Mols, 1998), supermarkets (Marzocchi & Zammit, 2006), online commerce (Szymanski & Hise, 2000; Zviran et al., 2006) and travel (Yen, 2005). In one study, 68% of those satisfied with self-service technologies reported that their satisfaction was driven by benefits that go beyond full-service offerings (Meuter et al., 2000). In another, self-service customers were found to be both more efficient and more satisfied than their full-service counterparts (Xue & Harker, 2002). Ease of use, service performance, perceived control and convenience have been shown to be significant drivers of satisfaction in online self-service settings (Yen, 2005). Moreover, multiple channel interaction, including self-service, has been shown to lead to positive disconfirmation, which in turn was found to lead to increased satisfaction and loyalty (Wallace et al., 2004).

On the other hand, with the wrong model, outsourcing work to customers through self-service technology can leave them feeling frustrated and annoyed (Moon & Frei, 2000). Some customers in self-service settings have been found to report technology failures, service design problems, process failures, technology design problems and customer driven failures as sources of dissatisfaction (Meuter et al., 2000). Customers with technology anxiety are less likely to have a positive self-service technology experience, even when things go well (Meuter et al., 2003). Furthermore, while negative feelings towards specific employees diminish a customer's global opinion of the brand, they also have been shown to increase self-service technology usage, which suggests an adverse selection effect may exist among self-service customers (Curran et al., 2003).

In order to examine the links between self-service and retention driven through satisfaction effects, we test the following non-directional hypothesis, which is stated in null form:

Hypothesis 4 (H4): *There is not a significant relationship between self-service channel usage and satisfaction.*

Disentangling switching costs from satisfaction effects:

If switching costs and satisfaction effects jointly influence the relationship between self-service channels and customer retention, then both elements must be considered in order to understand a channel's net impact on retention **(Figure 1)**. Figure 1 illustrates the interplay of these factors. In the first quadrant, negative retention is predicted, due to the absence of switching barriers and negative satisfaction effects. In quadrant two, positive satisfaction effects counterbalance the absence of switching barriers, leading to a net impact on retention that is contingent upon the drivers' relative effects. In the third quadrant, the outcome is also contingent on the relative strength of each effect, as high switching barriers endeavor to overcome negative satisfaction effects. Finally, in quadrant four, switching costs and satisfaction effects reinforce one another, leading to a positive net impact on retention.

Satisfaction
Effects

		Negative	Positive
Switching Costs	Low	Negative retention effect	Retention effect contingent on relative strength of switching costs and satisfaction effects
	High	Retention effect contingent on relative strength of switching costs and satisfaction effects	Positive retention effect

Figure 1: Drivers of retention in self-service channels.

Figure 1 elucidates both the importance and the challenge of disentangling the impact of self-service satisfaction effects and switching costs on customer retention. As we have described above, to a certain extent, the direction of a self-service channel's impact on switching costs is knowable from an ex-ante perspective due to inherent characteristics of the channel (e.g. start-up costs are present in online bill pay and largely absent in the automated phone channel). However, a specific channel's impact on satisfaction may be more difficult to foresee. By examining the impact of self-service channel usage on retention controlling for satisfaction, we can isolate the portion of retention that is attributable to non-satisfaction effects. In congruence with prior studies, we argue that these non-satisfaction effects are synonymous with switching costs (Anderson & Sullivan, 1993; Fornell, 1992; Klemperer, 1995). As such, we expect that high switching cost channels will exhibit positive retention net of satisfaction, while low switching cost channels will exhibit insignificant or negative retention effects net of satisfaction. The following directional hypotheses are stated in alternative form:

Hypothesis 5: (H5): *Controlling for satisfaction, self-service customers who transact in high switching cost channels are more likely to remain loyal to a firm than full-service customers.*

Hypothesis 6: (H6): *Controlling for satisfaction, self-service customers who transact in low switching cost channels are less likely to remain loyal to a firm than full-service customers.*

By controlling for satisfaction effects, these hypotheses resolve the directional ambiguity in hypotheses 2 and 3. Moreover, using full-service channels as their baseline creates a conservative test of switching costs, as it has been argued in the literature that face-to-face interactions create relational (psychological) switching barriers (Farrell & Klemperer, 2007; Jones et al., 2000).

3. Methodological approach

We conduct our study in the context of the retail banking industry. There are several reasons that retail banking is the ideal setting in which to disentangle the impact of switching costs and satisfaction effects on self-service customer retention. First, retail banks employ multiple channels to serve their customers. These channels range from full-service teller interactions to completely automated self-service channels such as online banking and ATMs. As described above, these channels vary in terms of the level and types of switching costs each imposes. Second, retail banking customers are a diverse group, with varying needs, preferences and experiences. This variability creates a rich environment in which to analyze the impact of operational decisions on consumer behavior. Moreover, the diverse customer base is common to a wide variety of consumer service firms, broadening the relevance of our analysis. Finally, retail banks capture and store a considerable amount of data about their customers, for both strategic

and regulatory purposes. We were able to tap into this resource to conduct our empirical analysis.

This study diverges methodologically from past work by analyzing the complete profile of transactions across all channels of service between a bank and a randomly selected sample of its customers. Our observational dataset includes counts of the number of transactions a random sample of customers conducted through each channel over a one-year period. Many of the previous analyses have treated self-service as a binary variable, but a precedent exists in the literature for characterizing multi-channel customers based on the proportion of overall transactions conducted through specific channels (Montoya-Weiss et al., 2003). We follow this precedent by characterizing customers based on their proportional channel mix.

We couple this information with customer-level satisfaction data, gathered through surveys, and customer-level retention information, provided by the bank one year following our period of observation, to analyze the incremental impact of channel mix on customer satisfaction and retention. We examine the impact of channel mix on three levels. First, we compare self-service channel mix to full-service channel mix on an aggregated level. This approach serves as our tests of hypotheses 1 and 4, enabling us to broadly understand if customer involvement in the production of service influences satisfaction and retention. Second, we aggregate transactions conducted in the high and low switching cost self-service channels we identified earlier based on ex-ante characteristics. We compare the effects of the use of each type of channel on retention to test hypotheses 2 and 3, learning if the level of switching costs in a self-service channel differentially drives retention. Third, we analyze the impact of each channel separately, to test hypotheses 5 and 6, and better understand if all channels are created equally with regard to switching costs, satisfaction and retention.

Disentangling the relationships between satisfaction effects, switching costs, and retention in a self-service setting requires analysis of retention controlling for satisfaction. No such study has yet been conducted. Prior studies exploring these relationships have relied on customer surveys or observational analyses, but not both at the same time. Studies examining the link between self-service and satisfaction have, by necessity, been survey-based, and when these studies have addressed the question of retention, they've asked customers if they intended to continue patronizing the firm (Marzocchi & Zammit, 2006; Mols, 1998; Wallace et al., 2004; Yen & Gwinner, 2003). Furthermore, a number of observational studies have been conducted focusing on retention, but they did not consider satisfaction in their models (Chen & Hitt, 2002; Xue & Harker, 2002). A general model illustrating these approaches is given by the following equations.

$$\alpha_1 + \alpha_2 \left(\text{self service} \right) + \alpha_3 \left(\text{controls} \right) = \text{satisfaction}$$
$$\beta_1 + \beta_2 \left(\text{self service} \right) + \beta_3 \left(\text{controls} \right) = \text{retention (or intention to repurchase)}$$

While these studies have provided scholars and practitioners with significant insights about the net effects of self-service as well as other antecedents on each variable, they are limited by an inability to disentangle the impact of *satisfaction effects* and *switching costs* on customer retention. For this study, we employ a mediation model that enables us to tease apart these two effects, as well as understand the ultimate impact of self-service use on satisfaction and retention. We use the following model for our analyses:

$$\chi_1 + \chi_2 \left(\text{self service} \right) + \chi_3 \left(\text{controls} \right) = \text{satisfaction}$$
$$\delta_1 + \delta_2 \left(\text{self service} \right) + \delta_3 \left(\text{controls} \right) = \text{retention}$$
$$\varepsilon_1 + \varepsilon_2 \left(\text{self service} \right) + \varepsilon_3 \left(\text{satisfaction} \right) + \varepsilon_4 \left(\text{controls} \right) = \text{retention}$$

In contrast to previous studies, which tend to measure self-service as a binary variable, we measure self-service disaggregated by channel, based on the relative use of those channels. We

estimate all equations through OLS regression.[1] This allows for straightforward interpretation of the coefficients in terms of switching costs and satisfaction effects. In particular, this enables us to assess the direct impact of each channel's use on satisfaction, characterized by χ_2, and retention, characterized by δ_2, our model enables us to understand the relative impact of satisfaction effects and switching costs for each channel. In our model, we define switching costs as gains to retention earned by a channel after controlling for overall satisfaction. This approach is consistent with previous theoretical and empirical treatments of switching costs in several non-service contexts (Anderson & Sullivan, 1993; Fornell, 1992; Klemperer, 1995). Hence, if $\varepsilon_2 > 0$ for any particular channel, then switching costs exist in that channel. χ_2 represents the impact a particular channel's use has on overall satisfaction relative to face-to-face teller transactions, and ε_3 represents overall satisfaction's impact on customer retention. Therefore, the direct effect of satisfaction on retention (satisfaction effect) for a particular channel is given by $\chi_2 \varepsilon_3$. Comparing ε_2 and $\chi_2 \varepsilon_3$ enables us to understand the relative impact of switching costs and satisfaction effects on retention for each channel. Moreover, the sum of switching costs and satisfaction effects for each channel equals the total effect of each self-service channel's usage on customer retention, $\varepsilon_2 + (\chi_2 \varepsilon_3) = \delta_2$.

In circumstances where $\varepsilon_2 > 0$ and $\chi_2 \varepsilon_3 > 0$ for a particular channel, use of the channel drives retention both by increasing customer switching costs and improving customer satisfaction. On the other hand, when $\chi_2 \varepsilon_3 < 0$ for a particular channel, use of the channel dissatisfies customers,

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[1] We acknowledge that OLS is not the most appropriate methodology for analyzing binary dependent variables. For ease of interpreting coefficients in terms of direct switching cost effects and indirect satisfaction effects of self-service on retention we use OLS regression to estimate the customer retention equation. However, we note that our results are substantively similar when coefficients are measured using marginal effects logit estimation.

increasing the likelihood of their departure from the firm. Similarly, when $\varepsilon_2 < 0$ for any channel, use of the channel facilitates customer departure from the firm, irrespective of customer satisfaction. Understanding the direction of satisfaction effects and switching costs for each channel has significant implications for a company's choice of service strategy. For example, channels characterized by $\chi_2\varepsilon_3 < 0 < \varepsilon_2$, where $|\varepsilon_2| > |\chi_2\varepsilon_3|$ are net destroyers of customer satisfaction, but have a positive overall impact on retention since $\delta_2 > 0$. Companies serving customers through such channels may find themselves in a tenuous position if technology advances and switching costs fall, as dissatisfied customers held hostage by switching costs would be liberated to seek service elsewhere.

4. Research setting and data

For this study, we observe the behavior of 26,924 randomly selected customers performing a transaction in the branch network of a nationwide U.S. retail bank. **(Tables 1 and 2)** This bank is one of the largest diversified financial services firms in the U.S., and is both highly regarded for its customer service, as well as respected as an industry leader for its initiatives to provide easy-to-use self-service options for its customers. It serves millions of account holders through its network of over 3,000 branches and nearly 7,000 ATM machines located in more than 20 states. Our dataset includes the number of transactions each customer initiated in each of the bank's channels for a one-year period during 2003, as well as demographic and account information, customer satisfaction data, and lagged customer retention data for each customer.

Self-service: During our period of observation, the bank conducted all of its transactions with customers through six channels, including automated teller machines (ATM), online bill

payment, online banking, interactive voice response (IVR), phone agent interactions, and face-to-face teller transactions. We consider ATMs, online bill payment, online banking and IVR to be self-service channels. Phone agent and teller transactions are considered full-service channels. For each customer, we sum the transaction counts across self-service channels, and divide by the total number of transactions to create an aggregated self-service mix variable. We also create channel proportion variables for each channel by dividing the annual transaction count in the channel by the customer's total transaction count. When we regress these variables, we control for total transaction count to eliminate frequency-of-use and experience effects.

Customer retention: Retention was measured on the last day of 2004, one year after the initial observation period. Customers who still held accounts with the bank at that time were counted as retained, and those who had closed all of their accounts for any reason were deemed to have defected. By this definition, over the period in question, the bank experienced a customer defection rate of roughly 6%, representing the loss of hundreds of thousands of customers across the country. We introduce customer retention into our regressions as a binary, dependent variable.

Customer satisfaction: Randomly selected customers were contacted via phone to complete a survey within 24 hours of personally visiting a branch to conduct a transaction. To gauge overall satisfaction, customers were asked, "Taking into account all the products and services you receive from [it], how satisfied are you with [the bank] overall?" Customers rated their overall satisfaction on a Likert scale of 1-5, with a score of 5 representing complete satisfaction. The average satisfaction rating reported was 4.15. In this study, we have chosen to focus on overall satisfaction rather than channel-specific satisfaction because we believe it more directly relates to a customer's decision to remain loyal to the firm.

Control variables: The customer demographic and account information factored into our analysis includes customer age, the length of the customer's relationship with the bank, the numbers of different types of accounts the customer had (deposit, loan and investment), the aggregate balances for each customer by account type (in thousands of dollars), and whether or not the customer had signed-up for direct deposit service. The inclusion of these control variables helps us avoid omitted variable bias, as several of them have explanatory power and are correlated with the variables of interest. **(Table 1)** Customer ages in our sample are roughly normally distributed (skewness = .168, kurtosis = 2.64), with a mean of 46.58, and the average customer had a 10.41-year relationship with the bank. Roughly half of all customers sampled used online banking and direct deposit. Nearly 12% used online bill payment.

5. Results

The impact of self-service on customer retention: We begin by testing the overall impact of self-service usage on customer retention. **(Table 4)** In column 1, our analysis reveals that the aggregate proportion of a customer's total transactions conducted through self-service channels has a statistically insignificant impact on customer retention (.008732, p=.104; two-tailed). This finding is consistent with hypothesis 1.

In column 2, we examine how the proportional usage of high and low switching cost self-service channels impacts customer retention. We find that customers who increase the proportion of their transactions in high switching cost self-service channels are retained with statistical significance (.032670, p<.01; two-tailed), while those who increase the proportion of their transactions in low switching cost self-service channels are no more or less likely to be retained (-0.001468, p=.798; two-tailed). Consistently, a test on the joint null hypotheses that the

coefficients on online bill payment and online session usage in column 3 are both zero yielded a significant F-statistic: $F_{(2, 26908)}=7.10$; $p<.01$, while the same test conducted on ATM and IVR usage yielded an insignificant F statistic: $F_{(2, 26908)}=.6830$; $p=.6830$. These findings do not support hypothesis 2, but are consistent with hypothesis 3.

The impact of self-service on customer satisfaction: Our next set of tests addresses the impact of self-service usage on customer satisfaction. In column 4, we do not find that aggregated self-service usage impacts satisfaction (-.028028, $p=.196$; two-sided). These findings support hypothesis 4. Moreover, in column 5, we see that there are not systematic differences in the impact of high and low switching cost self-service channels on satisfaction (high switching cost channels: -.012483, $p=.666$; two-sided, and low switching cost channels: -.034652, $p=.135$ two-sided). Column 6 reveals the association between individual channels and customer satisfaction. We find that the ATM channel is the only self-service channel that exhibits a marginally significant impact on customer satisfaction relative to face-to-face teller transactions (-.043757, $p<.10$; two-sided). Customers who utilized phone agent channels, were also statistically significantly less satisfied (-.773604, $p<.01$; two-sided). Phone interviews with executives at the bank suggested that customers may systematically choose to interact with the bank through the phone agent channel to communicate when there is a problem. This factor likely explains the statistically significant relationship between phone agent transactions and dissatisfaction. Customers who used the other channels we analyzed were neither more nor less satisfied than full-service customers.

The impact of self-service switching barriers on customer retention: To disentangle the impact of satisfaction effects and switching costs on customer retention, we analyze the impact of channel usage on customer retention, controlling for satisfaction. In this series of regressions,

the coefficients on channel mix variables indicate the level of customer retention that is unexplained by differences in customer satisfaction. Channels with positive retention net of satisfaction exhibit characteristics consistent with switching costs. In column 7, we find that on an aggregate basis, self-service has a marginally positive impact on retention net of satisfaction (.009191, p<.10; two-tailed). Column 8 illustrates that customers in high switching cost channels are retained with an intensity greater than that explained by their satisfaction (.032874, p<.01; one-sided), while those transacting in low switching cost channels do not exhibit the same pattern (-.000902, p=.4375; one-sided). These findings offer support for hypotheses 5 and 6. Column 9 shows retention net of satisfaction on a channel-by-channel basis. Usage of online bill payment (.049099, p<.01; one-sided) and online banking (.018541, p<.05; one-sided) corresponds with statistically significant retention net of satisfaction, while usage of other self-service channels does not.

Additional factors driving satisfaction and retention: The significant coefficients on a number of the control variables in our regressions are consistent with previous studies examining customer behavior in the financial services sector (Hitt & Frei, 2002). We find that age, direct deposit participation and the number of deposit and loan accounts a customer has are all positively associated with satisfaction and retention. We also observe that customer tenure is negatively associated with overall satisfaction, but positively associated with retention. Consistent with prior studies, these results suggest that tenure imposes switching barriers on experienced customers that can override marginal declines in satisfaction.

Channel enthusiasm: a robustness check:

It has long been understood that customer tastes differ when choosing between service channels. In an early study, some customers reported preferring self-service to full-service even when it wasn't cheaper or quicker (Bateson, 1985). Subsequent studies found that customers' understanding of their roles in the service, their perceptions of the benefits and features received through the channel, and their beliefs about their own capabilities and technology readiness are significant drivers of individual channel adoption (Curran et al., 2003; Dabholkar & Bagozzi, 2002; Meuter et al., 2005; Meuter et al., 2003; Parasuraman, 2000).

Additional studies have highlighted customer efficiency, perception of control, and service confidence as antecedents of satisfaction and loyalty among self-service customers (Xue & Harker, 2002; Yen & Gwinner, 2003). Therefore, it is possible that the intensity of these antecedents is influenced by the customer's level of experience conducting transactions through specific channels. Customers who *specialize,* concentrating transactions over one or two specific channels, may be more likely to become efficient and feel confident and in control of the service they are receiving, than customers who diversify interactions across a greater number of channels. Moreover, customers who are highly satisfied with the service they receive through a specific channel may decide to conduct as great a proportion of transactions as possible through that channel. Consequently, failure to consider channel enthusiasm might dampen our ability to understand the relationships between self-service channel usage and customer satisfaction and retention for more mainstream customers.

In other words, contrary to the results reported above, channel enthusiasts, who choose to concentrate their transactions through specific self-service channels, might systematically experience higher satisfaction with the bank's service and correspondingly elevated levels of

loyalty, relative to more mainstream customers. Hence, as a robustness check, we investigate whether a difference exists between customers who choose to use specific channels for an uncommonly high proportion of their interactions with the firm and customers who exhibit more diversified channel usage patterns. For the purpose of this analysis, any customer whose proportional use of a specific channel is at or above the 95th percentile in our sample is considered to be a *channel enthusiast* for that particular channel.

We chose to use the 95th percentile threshold for two reasons. First, using a restrictive cutoff poses a conservative test of the theory that a channel's most devoted users are more loyal to the firm due to their heightened satisfaction with the service they are receiving. We would expect that the customers who find particular channels to be the most valuable and satisfying would systematically elect to conduct the greatest proportion of their transactions through those channels. In other words, these channel enthusiasts should be the channel's most satisfied users, and should therefore be the most likely to remain loyal to the firm due to increased service satisfaction. Consequently, if channel enthusiasts exhibit the pattern of results reported in the previous section, then we should feel confident that our findings are robust across customers. Second, we chose a high threshold to minimize the incidence of consumers who qualify as enthusiasts in multiple channels. With the 95th percentile definition, 25.2% of the customers in our sample qualified as enthusiasts in at least one channel, while only .84% qualified as enthusiasts in more than one channel. The 95th percentile for each channel is listed with the summary statistics in Table 3.

Customer satisfaction: Table 5 summarizes our examination of the association between channel enthusiasm and customer satisfaction. We begin by comparing customers who qualify as an enthusiast in any channel with those who do not. In column 1, the positive and significant

coefficient on the dummy variable representing customers who are channel enthusiasts in any channel suggests that customers who qualify as enthusiasts in one or more channels are more satisfied overall than those who do not (.052719, p<.01; two-sided). Column 2 shows a similar pattern for the 20.4% of customers who are enthusiasts in at least one self-service channel (.051178, p<.01, two-sided). Columns 3 through 12 show the relationship between channel usage and customer satisfaction among channel enthusiasts and non-enthusiasts for specific channels. The results suggest that while the satisfaction of channel enthusiasts is unaffected by proportionally increasing the use of their preferred channels, the satisfaction of non-enthusiasts drops with statistical significance with each interaction through a non-preferred channel.

Customer retention and switching costs: We examine the impact of channel enthusiasm on customer retention and switching costs in Table 6. Column 1 shows the statistically insignificant relationship between self-service channel enthusiasm and customer retention (.006122, p=.112, two-sided). However, column 2 shows that customers who are enthusiasts for high switching cost self-service channels are retained with greater frequency (.017523, p<.01; two-sided), while customers who are enthusiasts for low switching cost self-service channels are retained with less frequency (-.013564. p<.01; two-sided). These findings are consistent with our earlier results. Over the period of observation, low switching cost self-service channel enthusiasts had a 91.80% retention rate, while high switching cost self-service channel enthusiasts had a 94.78% retention rate. This difference in retention is statistically significant (t=4.5574; p<.01 two-sided). Column 3 breaks down the impact of channel enthusiasm on retention by channel, demonstrating that the only customer enthusiasts who are retained with greater frequency are those who are enthusiasts in high switching cost self-service channels. All other channel enthusiasts are more likely to defect than diversified customers.

Columns 4 through 6 repeat the analysis above, controlling for satisfaction. By examining retention, net of satisfaction, we can explore the impact of switching costs on channel enthusiasts. The results parallel those described in the preceding paragraph, with the exception that in column 6, customers who are enthusiasts in the online session channel are neither more nor less likely to remain loyal to the bank (.009747, p=.128; two-sided). This finding may suggest that learning based switching costs are not as powerful among customers who choose to conduct the majority of their transactions in online channels. By virtue of their own technology readiness and belief in their own technical capabilities, learning-based switching barriers may be less of a factor for these customers.

In summary, these findings suggest that even among channel enthusiasts, self-service has a positive impact on retention, *only in cases where it increases the switching costs for customers.* In our analysis, this was the case with online bill payment transactions and online banking. Conversely, among channel enthusiasts, we found that self-service has a significant negative impact on retention for channels with low switching costs. These findings are consistent with the results reported in the previous section.

6. Managerial implications

In this paper, we have illustrated that different service channels engender varying levels of satisfaction effects and switching costs among customers. We have also shown that satisfaction effects and switching costs are important drivers of customer retention. Understanding the relative magnitude of each driver exuded by specific channels enables managers to better understand the nature of their customers' loyalty to the firm. Moreover, it empowers them to

tailor service offerings in a manner that reinforces customer loyalty in a more predictable way. This section highlights several managerial implications of our results.

Loyal self-service customers in high switching cost channels may be stuck, not satisfied:

From a managerial perspective, customer loyalty is problematic because it is the product of an ongoing, internal dialogue, which remains private to each individual customer. It can only be quantified ex-post by observing attrition, and by the time the firm observes exit behavior, it is too late to react for that particular customer. Moreover, a firm cannot necessarily project retention forward, because the drivers of an individual's retention are opaque to managers. One retained group of customers may be so delighted with the portfolio of services they receive from a firm, that they choose not to seek superior service experiences elsewhere. Another group of equally loyal customers might be dissatisfied with the service they are receiving, but find it difficult to transition to a competitor due to switching costs.

Preceding empirical analyses have identified instances where self-service offerings concurrently increase or decrease satisfaction and retention, but our results suggest that the two do not necessarily move in tandem. In our sample, switching costs dominate satisfaction effects as the primary driver of self-service retention. Consequently, retained self-service customers may be stuck, not satisfied as previously suggested. Dissatisfied customers held captive by switching costs spend less money than satisfied customers and are notoriously difficult and expensive to serve (Coyles & Gokey, 2005; Jones & Sasser, 1995; Xue & Harker, 2002).

Moreover, there may be reason to believe that switching cost-imposed "stickiness" will not be indefinitely sustainable. It has been predicted that over time switching barriers will drop and companies will have to develop new methods for generating customer loyalty. Common

standards for exchanging and processing information as well as the growing number of people accessing networks have been noted as catalysts for this change (Evans & Wurster, 1997). Additionally, as customers become more technologically adept and companies invest in improving the ease of use of their systems and reducing barriers to self-service technology adoption, it stands to reason that switching costs will fall even further.

If switching costs fall, customer satisfaction will become increasingly important. The link between satisfaction and retention is well established in the literature (Anderson, 1994; Johnson et al., 1995; Meuter et al., 2000; Price et al., 1995). In contexts where switching costs are high, the impact of core-service satisfaction on retention has been shown to diminish, but the positive relationship between customer satisfaction and retention strengthens as switching barriers are eliminated (Jones et al., 2000). Moreover, it has been documented that a 5% reduction in attrition can boost profits by 25-85%, a statistic, which when considered in reverse, foreshadows the devastating repercussions for companies that fail to retain their customers (Reichheld & Sasser, 1990).

Self-service channels should remain available and optional:

Despite the potentially negative long-term implications of switching cost driven retention, we do not intend to suggest that firms should abandon self-service offerings. On the contrary, numerous studies including this one support the idea that self-service technologies enhance the satisfaction of certain customers (Bateson, 1985; Marzocchi & Zammit, 2006; Meuter et al., 2003; Yen, 2005). Our examination of channel enthusiasts suggests that those who choose to conduct the lion's share of their transactions in self-service channels are more satisfied than full-service, face-to-face customers. **(Table 5, Column 2)** In contrast, those who choose to

deemphasize these channels (non-enthusiasts) exhibited incremental dissatisfaction from each experience. These findings are consistent with the idea that customers tend to optimize channel selection to maximize their own satisfaction. Hence, self-service offerings should remain available, but customers should not be forced to use them.

Many airlines, technical support operations, banks and investment management firms outwardly encourage customers to transition from personalized channels to lower cost, automated alternatives. They do this by offering rewards such as fee-free checking accounts and interest rate premiums for online account users, and by charging premiums to customers who use higher cost channels. American Airlines for example, charges more to upgrade a reservation over the phone than to upgrade the same reservation through a self-service channel. Hewlett Packard charges $25-30 per incident for phone support, but offers free access to its online knowledge base. Bank One charges $1-3 for each customer support phone call, and Charles Schwab charges twice as much for a phone trade as it does for an online trade (Stellin, 2003). Consequently, these firms and others like them may be sacrificing future profitability through customer retention in order to achieve short term cost reduction targets. Such strategies may ultimately backfire if switching costs fall, and customers presently held captive by them are freed to seek superior service experiences elsewhere.

Switching costs and satisfaction effects as levers of managerial influence:

We have argued that customer retention is driven by the interaction of switching costs and satisfaction effects. Hence, managers seeking to design retention into their firm's service offerings can incorporate both levers of control into their strategies.

Our analysis reveals that switching costs are one potent driver of customer retention. Switching barriers include learning costs, psychological effects, transaction costs, and contractual obligations (Farrell & Klemperer, 2007). In a banking context, it's easy to think about how switching costs might manifest themselves. Customers intending to transition from one bank to another must undergo a series of time-consuming and often inconvenient steps, which include opening and funding their new account, switching direct deposits and automatic payments, updating checking account information for any linked services, waiting for old checks to clear, emptying safe deposit boxes, and more. Evidence from our study suggests that customers who engage in services that create additional barriers are systematically retained with greater frequency than those who do not.

For example, in our analysis, we found that use of online banking and online bill payment channels impose switching costs that enhance customer retention **(Table 4)**. Similarly, after controlling for satisfaction, we observed that customer characteristics like the presence of direct deposit service, loans and mortgages, multiple deposit accounts, high transaction frequency, and advanced customer age and tenure are positively associated with retention. In this light, one clearly efficacious strategy for retaining customers is to focus on aspects of the relationship that promote and intensify switching barriers.

However, it is important to consider that just as banks endeavor to entwine themselves in their customers' financial lives in such a way as to complicate defection, competitors are simultaneously working to reduce barriers to adoption of services. For instance, some banks now employ consultants to help new customers transition from other institutions. Others offer "switch kits," which facilitate the process of moving from one bank to another. Competitors will continue

to innovate on opposite ends of the relationship, working to both complicate and simplify the process of defection.

Customer satisfaction is the second retention lever for managers. In the context of our analysis, self-service channels did not promote satisfaction relative to face-to-face transactions, but previous studies have provided counterexamples in different contexts (Mols, 1998; Wallace et al., 2004; Xue & Harker, 2002; Yen & Gwinner, 2003) and have suggested attributes of self-service that contribute to satisfaction. Commonly cited attributes include successful completion of the service task, ease of use and convenience of time and place (Meuter et al., 2000). By focusing on these attributes of automated channels, managers may be able to convert customers who are stuck into customers who are satisfied and promote sustainable retention, while benefiting from service cost reductions.

7. Conclusions, limitations, and opportunities for future research

Our analysis distinguishes the relative effects of satisfaction and switching costs on customer retention. We interpret our findings to suggest that relative to those who use full-service channels, self-service customers may exhibit retention due to switching costs rather than satisfaction effects. One potential limitation of this study is its focus on customers at a single nationwide bank. While the usage of self-service channels at this firm was not associated with increased satisfaction, it would be careless to generalize that such is the case for all self-service offerings in all domains. Nevertheless, given the dominant design features prevalent among many retail bank offerings, we feel this study offers a relevant perspective for this important class of services. Moreover, it challenges the notion that self-service retention necessarily follows satisfaction.

Another potential limitation of this study is the convenience sample we used to define our dataset. Customers interviewed for the satisfaction survey were selected at random and were called on the phone from a pool of customers who had recently visited a bank branch. This sampling mechanism could conceivably under-represent self-service customers who rarely visit the branch. However, if this were the case, then we might expect to find that enthusiasts in automated channels express diminished satisfaction due to the anomaly that drove them to break from their routine and visit a branch. On the contrary, our results show that enthusiasts in automated service channels report higher levels of satisfaction than non-enthusiasts, who might more regularly frequent the branch. Moreover, previous studies have found that self-service customers tend to be active in full service channels as well (Campbell and Frei 2006). Nevertheless, data limitations in customer satisfaction measurement practices at our research site preclude us from analyzing a random sample of the bank's full population of customers.

It is also worth noting that although we observed statistically significant relationships between the proportional use of specific channels and customer satisfaction and retention, a considerable portion of the variation in a customer's satisfaction and retention remains unexplained by factors accounted for in our model[2]. This is evidenced by the low R-squared values reported in our regressions in tables 4-6. While a significant portion of the dependent variable variance remains unexplained by our models, the considerable sample size and statistically significant results produced by our study gives us confidence that the effects we observe are genuine. We also note that low R-squared values are common among empirical studies using customer level data in the financial services industry (e.g. see Hitt and Frei 2002).

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[2] Confirming the notion that customer behavior in business to consumer settings is highly heterogeneous, the explanatory power of our models while relatively low, is generally consistent with prior studies investigating customer level performance metrics (Hitt & Frei, 2002; Ittner & Larcker, 1998; Verhoef, 2003).

Consistent with a number of other studies conducted in this area, we do not employ a direct, quantitative measure of switching costs (Bernheim & Whinston, 1990). Instead, we calculate switching costs by measuring customer retention controlling for satisfaction. While this approach is consistent with prior literature (Anderson & Sullivan, 1993; Fornell, 1992; Klemperer, 1995), we acknowledge that non-satisfaction related channel effects on retention could have alternative explanations to switching costs. However, we note that in this study, non-satisfaction related channel effects seem consistent with switching costs, as they systematically manifest themselves in channels where switching costs are predicted to exist and are absent in those where it is not. Identifying more direct measures of switching costs appears to be a fruitful avenue for future research.

Due to limitations of our data, we were unable to explore the ramifications of self-service customers held captive by switching costs on current firm profitability. Past studies have shown that dissatisfied customers retained by switching costs tend to spend less and consume more resources than satisfied customers (Heskett et al., 1997; Jones & Sasser, 1995). However, it would be enlightening to explore user-level economics in a self-service context to understand how a self-service customer retained by switching costs compares to a satisfied full-service customer. Research has shown for example, that online customers tend to spend more than offline ones (Hitt & Frei, 2002) and has documented the cost savings brought about by service automation (Andreu et al., 2004; Moon & Frei, 2000). Understanding the relative impact of these factors would be strategically important for practitioners and would deepen our understanding of the overall implications of self-service on profitability. As a further extension, it would be worthwhile to compare the customer lifetime value self-service and full-service enthusiasts.

Perhaps for self-service enthusiasts, the losses from defection are offset by gains from cost-savings.

Future research can also shed light on the complexity of the retention decision in a multi-channel environment caused by the interactions between channels. In order to simplify our analysis, we focused on proportional channel usage as our primary set of independent variables. However, in some cases this may be an oversimplification. For example, it is possible that a customer who conducts the majority of his transactions through the ATM channel could have his satisfaction with the bank poisoned by one negative experience with a rude telephone representative. Our methodology would disproportionately assign his dissatisfaction to the ATM channel, given his channel usage behavior. However, we have no reason to believe that there would be a systematic relationship between negative experiences in one channel and use of another channel. Therefore, we do not believe the exclusion of interaction terms introduces systematic biases.

Finally, it is difficult to make precise predictions about the sustainability of switching costs as a customer retention strategy. It has been theorized that switching costs will fall over time (Evans & Wurster, 1997), but this phenomenon has not been demonstrated empirically. A longitudinal analysis, exploring the strength of technology-initiated switching costs over time would broaden our view of the strategic landscape in which modern service firms compete.

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Table 1: Customer variable correlations for the 2003 observation period

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Overall satisfaction	1.00																
2. Customer retention	0.07	1.00															
3. ATM percentage	-0.01	-0.02	1.00														
4. Online bill payment percentage	0.00	0.03	-0.07	1.00													
5. Online session percentage	-0.01	-0.01	-0.11	0.08	1.00												
6. IVR percentage	-0.02	-0.04	-0.10	-0.11	-0.22	1.00											
7. Phone agent percentage	-0.06	-0.06	-0.08	-0.06	-0.09	0.11	1.00										
8. Customer age	0.05	0.09	-0.14	-0.02	-0.24	-0.05	0.02	1.00									
9. Length of relationship	-0.01	0.12	-0.08	0.00	-0.18	-0.07	-0.01	0.46	1.00								
10. Direct deposit indicator	0.02	0.09	0.07	0.09	0.08	0.10	0.01	0.25	0.17	1.00							
11. Loan accounts	0.03	0.08	-0.05	0.08	-0.08	-0.09	0.00	0.11	0.19	0.04	1.00						
12. Investment accounts	0.02	0.03	-0.04	0.04	-0.03	-0.05	0.00	0.10	0.12	0.05	0.10	1.00					
13. Deposit accounts	0.02	0.10	-0.03	0.07	-0.03	-0.08	0.02	0.15	0.20	0.07	0.17	0.13	1.00				
14. Deposit balance	0.02	0.05	-0.07	0.04	-0.06	-0.08	0.02	0.18	0.15	0.03	0.05	0.11	0.30	1.00			
15. Investment balance	0.02	0.02	-0.02	0.02	-0.02	-0.02	0.00	0.07	0.08	0.03	0.05	0.51	0.05	0.14	1.00		
16. Loan balance	0.00	0.03	-0.02	0.06	-0.02	-0.04	0.03	0.05	0.05	0.01	0.44	0.06	0.06	0.02	0.04	1.00	
17. Total transactions	-0.03	-0.03	0.12	0.19	0.29	0.33	-0.00	-0.15	-0.12	0.12	-0.07	-0.05	0.08	-0.07	-0.02	0.00	1.00

Table 2: Customer population summary statistics for the 2003 observation period

	Mean	Median	Standard Deviation	Minimum	Maximum
Length of Relationship (years)	10.41124	8	9.735154	0	104
Customer age	46.58873	46	16.46443	0	100
Online customer indicator	0.5061564	1	0.4999711	0	1
Online bill payment indicator	0.1161288	0	0.3203851	0	1
Direct deposit indicator	0.5493772	1	0.4975649	0	1
Number of deposit accounts	1.710916	2	1.06328	0	11
Number of investment accounts	0.169365	0	0.9093959	0	18
Number of loan accounts	0.6185519	0	0.9084044	0	10
Deposit account balance	$15,688.42	$2,203.62	$ 64,602.99	$(4,876.51)	$3,722,305.00
Investment account balance	$ 3,686.33	0	$ 48,247.16	0	$3,740,464.00
Loan account balance	$ 5,370.48	0	$ 26,427.97	0	$ 784,165.40
Online bill payment count	1.571275	0	7.574593	0	144
Online session count	6.996769	0	17.74455	0	465
Phone agent count	1.129806	0	2.874896	0	64
Phone IVR count	6.387694	0	17.21521	0	340
Teller transaction count	12.79962	10	11.6165	0	200
ATM transaction count	8.82704	3	14.96865	0	245
Overall satisfaction	4.153175	4	0.9570659	1	5
Customer retention	0.9385792	1	0.2401049	0	1

Table 3: Channel proportion summary statistics

	Mean	Median	Standard Deviation	95th Percentile
All self-service channels	.4585441	.505618	.3423323	.9375000
ATM	.203992	.0909091	.2543236	.7543859
Online bill payment	.0230494	0	.1025251	.1612903
Online banking sessions	.1245917	0	.217959	.6363636
IVR	.1069111	0	.1995215	.6000000
Phone agent transactions	.0300338	0	.0724643	.1555556
Teller transactions	.5114221	.4480185	.3448842	1.00000

Table 4: The associations between aggregated self-service, high and low switching cost self-service, and individual channels and customer retention, satisfaction and customer retention net of satisfaction

	Customer Retention			Satisfaction			Switching Costs		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Customer Retention	Customer Retention	Customer Retention	Overall Satisfaction	Overall Satisfaction	Overall Satisfaction	Customer Retention	Customer Retention	Customer Retention
ATM percentage			-0.00544			-0.043757*			-0.004762
			(0.383)			(0.083)			(0.444)
Online bill payment percentage			0.048091***			-0.065004			0.049099***
			(0.001)			(0.278)			(0.001)
Online session percentage			0.017844**			-0.044974			0.018541**
			(0.028)			(0.170)			(0.022)
IVR percentage			-0.002337			-0.052147			-0.001529
			(0.792)			(0.146)			(0.863)
Phone agent percentage			-0.202287***			-0.773604***			-0.190291***
			(0.000)			(0.000)			(0.000)
Customer age	0.000284***	0.000334***	0.000305***	0.003287***	0.003320***	0.003266***	0.000230**	0.000280***	0.000254**
	(0.007)	(0.002)	(0.004)	(0.000)	(0.000)	(0.000)	(0.029)	(0.008)	(0.017)
Customer length of relationship	0.001934***	0.001966***	0.001909***	-0.005219***	-0.005197***	-0.005394***	0.002019***	0.002051***	0.001992***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Direct deposit indicator	0.030663***	0.029932***	0.031075***	0.024348*	0.023874*	0.028631**	0.030264***	0.029542***	0.030631***
	(0.000)	(0.000)	(0.000)	(0.055)	(0.060)	(0.024)	(0.000)	(0.000)	(0.000)
Loan accounts	0.013461***	0.013266***	0.012651***	0.033802***	0.033675***	0.032297***	0.012908***	0.012716***	0.012150***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment accounts	0.001099	0.000805	0.000637	0.003507	0.003316	0.003114	0.001041	0.000751	0.000589
	(0.554)	(0.665)	(0.731)	(0.640)	(0.659)	(0.678)	(0.574)	(0.685)	(0.750)
Deposit accounts	0.018203***	0.017999***	0.018099***	0.013550**	0.013417**	0.014001***	0.017981***	0.017780***	0.017882***
	(0.000)	(0.000)	(0.000)	(0.034)	(0.036)	(0.029)	(0.000)	(0.000)	(0.000)
Deposit balance (in thousands)	0.000026	0.000022	0.000026	0.000045	0.000042	0.000065	0.000026	0.000021	0.000025
	(0.373)	(0.465)	(0.386)	(0.704)	(0.723)	(0.586)	(0.386)	(0.479)	(0.404)
Investment balance (in thousands)	-0.000021	-0.000019	-0.000019	0.000401***	0.000402***	0.000400***	-0.000027	-0.000026	-0.000025
	(0.590)	(0.616)	(0.613)	(0.009)	(0.009)	(0.009)	(0.476)	(0.499)	(0.503)
Loan balance (in thousands)	0.000031	0.000026	0.000048	-0.000466*	-0.000469*	-0.000376	0.000039	0.000034	0.000053
	(0.657)	(0.709)	(0.495)	(0.100)	(0.097)	(0.183)	(0.579)	(0.628)	(0.443)
Total transactions	-0.000255***	-0.000278***	-0.000262***	-0.000628***	-0.000643***	-0.000537***	-0.000245***	-0.000268***	-0.000254***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.008)	(0.000)	(0.000)	(0.000)
Low switching cost percentage		-0.001468			-0.034652			-0.000902	
		(0.798)			(0.135)			(0.875)	
High switching cost percentage		0.032670***			-0.012483			0.032874***	
		(0.000)			(0.666)			(0.000)	
Self-service percentage	0.008732			-0.028028			0.009191*		
	(0.104)			(0.196)			(0.086)		
Overall satisfaction							0.016371***	0.016333***	0.015506***
							(0.000)	(0.000)	(0.000)
Constant	0.853420***	0.852306***	0.861559***	4.033040***	4.033216***	4.061505***	0.787395***	0.786445***	0.798580***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	26924	26924	26924	26924	26924	26924	26924	26924	26924
R-squared	0.03	0.031	0.035	0.006	0.006	0.01	0.034	0.035	0.039

p values in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5: Comparitive effect of aggregated self-service and individual channels on the satisfaction of enthusiasts and non-enthusiasts

	All customers		ATM		Online bill payment		Online sessions		IVR		Phone agent	
						Customer enthusiasts by channel						
Population	All	All	Enthusiasts	Non-enthusiasts	Enthusiasts	Non-enthusiasts	Enthusiasts	Non-enthusiasts	Enthusiasts	Non-enthusiasts	Enthusiasts	Non-enthusiasts
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ATM percentage	-0.065022**	-0.065224**	-0.168288	-0.057451*	-0.498407**	-0.039509	-1.168960***	-0.036507	0.077337	-0.041974*	-0.158015	-0.035386
	(0.013)	(0.014)	(0.681)	(0.058)	(0.034)	(0.121)	(0.001)	(0.153)	(0.833)	(0.099)	(0.400)	(0.162)
Online bill payment percentage	-0.156148**	-0.153572**	1.765308	-0.060175	-0.155772	-0.861872*	0.184039	-0.052651	-15.042673	-0.06491	-2.756639	-0.065977
	(0.020)	(0.025)	(0.622)	(0.317)	(0.489)	(0.100)	(0.808)	(0.387)	(0.112)	(0.281)	(0.103)	(0.268)
Online session percentage	-0.077538**	-0.077460**	-0.09944	-0.039349	0.133368	-0.047867	-0.470498	-0.112856***	-1.016924	-0.044928	-0.573775*	-0.03385
	(0.025)	(0.026)	(0.896)	(0.236)	(0.565)	(0.152)	(0.174)	(0.006)	(0.279)	(0.177)	(0.056)	(0.302)
IVR percentage	-0.085147**	-0.087361**	-0.729564	-0.045565	1.208500**	-0.05901	-0.373844	-0.057784	0.260042	-0.089683*	0.117598	-0.030659
	(0.023)	(0.022)	(0.378)	(0.210)	(0.031)	(0.105)	(0.687)	(0.116)	(0.490)	(0.054)	(0.575)	(0.404)
Phone agent percentage	-0.880859***	-0.759035***	-2.868538***	-0.758224***	-2.974253***	-0.759242***	-2.745145**	-0.762829***	-0.531062	-0.765356***	-0.341651	-1.60029***
	(0.000)	(0.000)	(0.007)	(0.000)	(0.004)	(0.000)	(0.022)	(0.000)	(0.400)	(0.000)	(0.140)	(0.000)
Customer age	0.003196***	0.003203***	0.003004	0.003266***	0.00364	0.003278***	0.001954	0.003271***	0.004258**	0.003175***	0.001956	0.003292***
	(0.000)	(0.000)	(0.130)	(0.000)	(0.126)	(0.000)	(0.316)	(0.000)	(0.032)	(0.000)	(0.340)	(0.000)
Customer length of relationship	-0.005422***	-0.005420***	-0.004925	-0.005412***	-0.002474	-0.005480***	-0.002731	-0.005515***	-0.000024	-0.005599***	-0.003035	-0.005635***
	(0.000)	(0.000)	(0.147)	(0.000)	(0.427)	(0.000)	(0.514)	(0.000)	(0.995)	(0.000)	(0.362)	(0.000)
Direct deposit indicator	0.028726**	0.028606**	0.012157	0.029855*	0.132397**	0.025363*	-0.032893	0.033599**	-0.000662	0.029971**	0.104013	0.024552*
	(0.024)	(0.024)	(0.832)	(0.022)	(0.026)	(0.052)	(0.549)	(0.010)	(0.992)	(0.021)	(0.117)	(0.057)
Loan accounts	0.032947***	0.032780***	0.038175	0.032065***	0.02757	0.033728***	-0.008054	0.033969***	-0.034266	0.034498***	-0.029841	0.036626***
	(0.000)	(0.000)	(0.327)	(0.000)	(0.345)	(0.000)	(0.865)	(0.000)	(0.457)	(0.000)	(0.459)	(0.000)
Investment accounts	0.002831	0.002852	0.00368	0.002776	0.031648	0.000983	-0.071178*	0.004872	0.051645	0.00207	-0.008597	0.004367
	(0.706)	(0.704)	(0.936)	(0.715)	(0.193)	(0.901)	(0.069)	(0.526)	(0.372)	(0.784)	(0.853)	(0.567)
Deposit accounts	0.014351**	0.014459**	0.019779	0.013897**	0.042485*	0.012877*	-0.001036	0.014632**	0.023641	0.014162**	0.072448**	0.011504*
	(0.025)	(0.024)	(0.570)	(0.034)	(0.093)	(0.053)	(0.976)	(0.026)	(0.539)	(0.030)	(0.026)	(0.078)
Deposit balance (in thousands)	0.000059	0.000059	-0.000244	0.000068	-0.000331	0.000095	-0.002254*	0.000077	0.000052	0.000066	-0.000262	0.000084
	(0.619)	(0.623)	(0.791)	(0.571)	(0.517)	(0.440)	(0.080)	(0.520)	(0.963)	(0.584)	(0.641)	(0.489)
Investment balance (in thousands)	0.000403***	0.000402***	0.000089	0.000424***	0.000208	0.000405**	0.003324**	0.000365**	-0.000803	0.000413***	-0.000092	0.000401***
	(0.009)	(0.009)	(0.906)	(0.007)	(0.744)	(0.011)	(0.017)	(0.019)	(0.651)	(0.007)	(0.960)	(0.009)
Loan balance (in thousands)	-0.000386	-0.000383	-0.000248	-0.000391	0.001029	-0.000569*	0.001356	-0.000449	-0.001739	-0.000359	0.001164	-0.000502*
	(0.172)	(0.174)	(0.834)	(0.179)	(0.187)	(0.060)	(0.317)	(0.120)	(0.425)	(0.207)	(0.275)	(0.088)
Total transactions	-0.000551***	-0.000563***	0.000112	-0.000592***	-0.001346*	-0.000485**	-0.000686	-0.000501**	-0.000235	-0.000593***	0.000091	-0.000495**
	(0.006)	(0.005)	(0.884)	(0.005)	(0.064)	(0.022)	(0.201)	(0.022)	(0.672)	(0.007)	(0.943)	(0.015)
Customer enthusiasts in any channel	0.052719***											
	(0.003)											
Customer enthusiasts in any self-service channel		0.051178***										
		(0.007)										
Constant	4.069002***	4.068433***	4.197107***	4.062759***	4.000212***	4.064125***	4.676085***	4.058439***	3.772015***	4.068709***	3.888804***	4.072591***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	26924	26924	1354	25570	1357	25567	1363	25561	1365	25559	1346	25578
R-squared	0.01	0.01	0.01	0.01	0.028	0.01	0.022	0.01	0.013	0.01	0.017	0.01

p values in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: The impact of channel enthusiasm on customer retention and switching costs

	Retention, not controlling for satisfaction			Retention, controlling for satisfaction		
	(1)	(2)	(3)	(4)	(5)	(6)
Customer age	0.000225***	0.000244**	0.000276***	0.000167	0.000186*	0.000219**
	(0.028)	(0.018)	(0.007)	(0.102)	(0.069)	(0.033)
Customer length of relationship	0.001913***	0.001931***	0.001894***	0.001997***	0.002015***	0.001976***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Direct deposit indicator	0.032678***	0.032874***	0.032835***	0.032385***	0.032570***	0.032547***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Loan accounts	0.013574***	0.013268***	0.012632***	0.013014***	0.012711***	0.012101***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment accounts	0.000857	0.000659	0.000692	0.000791	0.000594	0.000627
	(0.645)	(0.723)	(0.709)	(0.670)	(0.749)	(0.735)
Deposit accounts	0.018806***	0.018354***	0.018353***	0.018546***	0.018099***	0.018088***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deposit balance (in thousands)	0.000026	0.000023	0.000029	0.000026	0.000023	0.000028
	(0.373)	(0.432)	(0.333)	(0.378)	(0.437)	(0.342)
Investment balance (in thousands)	-0.000018	-0.000017	-0.000018	-0.000024	-0.000023	-0.000025
	(0.640)	(0.660)	(0.632)	(0.520)	(0.537)	(0.517)
Loan balance (in thousands)	0.000032	0.000029	0.000049	0.000039	0.000036	0.000055
	(0.649)	(0.678)	(0.478)	(0.578)	(0.605)	(0.428)
Total transactions	-0.000226***	-0.000219***	-0.000232***	-0.000212***	-0.000205***	-0.000217***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ATM enthusiasts			-0.010778*			-0.010995*
			(0.088)			(0.081)
Online bill payment enthusiasts			0.018853***			0.018797***
			(0.003)			(0.003)
Online session enthusiasts			0.010669*			0.009747
			(0.096)			(0.128)
IVR enthusiasts			-0.021313***			-0.021507***
			(0.001)			(0.001)
Phone agent enthusiasts			-0.056197***			-0.053527***
			(0.000)			(0.000)
Enthusiast in any high switching cost self-service channel		0.017523***			0.016998***	
		(0.000)			(0.001)	
Enthusiast in any low switching cost self-service channel		-0.013564***			-0.013784***	
		(0.005)			(0.004)	
Enthusiast in any self-service channel	0.006122			0.005642		
	(0.112)			(0.142)		
Overall satisfaction				0.016502***	0.016492***	0.016020***
				(0.000)	(0.000)	(0.000)
Constant	0.855203***	0.855686***	0.858902***	0.789016***	0.789529***	0.794557***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	27075	27075	27075	27075	27075	27075
R-squared	0.03	0.031	0.034	0.035	0.035	0.038

p values in parentheses *** p<0.01, ** p<0.05, * p<0.1