

When Transparency Hurts: How Payment Methods Impact Subscription Retention

T.J. WEITEN

Abstract: While payment methods are well researched with regards to their dimensions, no existent literature has looked at how different payment methods can be used to leverage retention in a subscription-based business context. Using a monthly transaction-level dataset from a large, billion-dollar humanitarian aid organization, we execute a survival analysis model to elucidate the differences between one-time payment methods that require monthly action from the customer and automatically recurring payment methods that debit funds without action from the customer. Our findings suggest that the “folk wisdom” that automatically recurring payment methods are unilaterally better than one-time methods is misguided. Specifically, we illustrate that when customers transition from a one-time payment method to an automatically recurring payment method, the broken habit that was previously built by the process of repeating payment transactions can lead to decreased subscription retention under certain circumstances based on the customer’s degree of sales penetration and income. Theoretical and managerial implications are then given.

Introduction

Subscription-based business models have become increasingly prevalent in recent years. For example, Dollar Shave Club, a firm founded six years ago to provide a subscription-service for personal grooming products, made over \$150 million in revenue in 2015 alone, which led to a \$1 billion buyout from Unilever (Bhattacharyya, 2016). While past research has addressed topics such as how subscription-businesses should be valued (McCarthy, Fader, & Hardie, 2017) and how firms should price their offerings in subscription markets (Bala, 2012; Penmetsa, Gal-Or, & May, 2015), little empirical research has elucidated how the method of payment (e.g. credit card, check, electronic funds transfer) can be leveraged to maximize subscription retention.

General folk wisdom on the subject often suggests that automatically recurring payment methods (also sometimes referred to as pull-payment methods because of the firm's ability to automatically withdraw money from the customer's account) are the "end-all-be-all" payment method to maximize subscription retention. This belief is illustrated by a 2015 *Entrepreneur* article which states, "For starters, the most important criteria to assess global payment methods are push vs. pull and one-time vs. recurring payments... Pull-payment methods are better suited for subscription businesses since they allow the merchant to actively withdraw the money themselves" (Tzuo, 2015). To this end, subscription-based firms have begun to encourage customers who may be using one-time payment methods to switch to automatically recurring payment methods for the retention benefits they exhibit. However, to our knowledge, no empirical research has directly addressed this practice and it may not be beneficial for firms to assume this strategy to be universally effective. *Thus, our paper's primary purpose is to empirically study how payment*

methods and their characteristics can differentially impact subscription retention and isolate when automatically recurring payment methods exhibit lower retention than one-time methods.

We begin to understand how payment methods impact customer retention by first delving into past literature enumerating the differences between payment methods and their characteristics. Based on past literature, we find that payment methods vary on three dimensions: salience of form, salience of amount, and payment coupling (Soman, 2003). These three dimensions are often combined to represent a payment method's overall transparency (Soman, 2003). We consider automatically recurring payment methods to exhibit drastically lower degrees of transparency than one-time payment methods, which require direct action from the customer on a month-to-month basis. Because automatically recurring payment methods have lower degrees of transparency, we expect, overall, these forms of payment methods to be associated with longer subscription retention. However, when a customer transitions from a one-time payment method to an automatically recurring payment method, they break their habitual payment routine, which can cause them to feel a greater sense of cost and, thus, perhaps reduce subscription retention. We interact this transitional effect with the customer's degree of sales penetration, which represents how much the customer is paying monthly for their subscriptions, to show that, when a customer pays more, the effect of transitioning payment methods is more severe. However, this negative effect of sales penetration on payment method transition can be attenuated with increases in the customer's income, as the customer has greater financial resources available to them.

To address these issues, we utilize over 10-years of transaction-level data from an unnamed, multi-billion dollar subscription-based charitable organization in order to capture each customer's payment method, payment method transitions, income, and overall subscription retention. To test our hypotheses, we feed this dataset into a multiple-record, parametric survival-time model with random effects for each customer. The survival analysis model is a powerful tool in capturing the unique impact of each of our covariates of interest on the amount of time to the occurrence of an event (which, in our case, is the cancellation of a subscription). Thus, we believe we capture the differential impact of payment methods in a real-world scenario that accurately reflects managerial priorities for subscription-based firms.

Our first contribution to the literature relates to our growing understanding of payment methods. Specifically, we show that automatically-recurring payment methods are not unilaterally better than one-time payment methods in a subscription context. This effect varies based on the degree of sales penetration for a customer and the customer's income. When a customer transitions from a one-time payment method to an automatically recurring payment method, increased degrees of sales penetration can lead to steep reductions in that customer's subscription retention. However, as a customer's income increases, this negative effect of a payment method transition is attenuated. Overall, these findings suggest that managers should not attempt to transition all current customers who use one-time payment methods. Instead, managers should target customers for transitioning that have lower degrees of sales penetration or higher income. If managers target lower income customers with larger degrees of sales penetration, this can lead to overall lower subscription retention than if these customers were to be left alone. This

finding captures an empirical insight into payment methods that has yet to be addressed by the existent literature.

Our second contribution relates to new insights regarding subscription-based business models, or, more narrowly, our research addresses the various factors that impact a customer's overall subscription retention. Specifically, we find that the degree of sales penetration has a curvilinear impact on a customer's subscription retention. This curvilinear effect is made more pronounced by a customer's level of income, such that customers with low levels of income exhibit relatively flat rates of retention while customers with high degrees of income exhibit greater variances in their retention dependent on their degree of sales penetration. Hence, our findings suggest that there exists a maximal point where too much sales penetration comes at the cost of subscription retention. Thus, it would be misguided for managers of subscription-based firms to always target higher degrees of sales penetration without first understanding their customers.

Our final contribution relates to the importance of habit. Habit has been shown to be a powerful psychological mechanism that drives customers to exhibit repeat purchase behavior (Wood & Neal, 2007; Wood & Neal, 2009). Our findings suggest that, in a subscription based context, the use of one-time payment methods guides the formation of a habitual purchasing behaviors. Thus, when habit is broken, in our case by the transitioning to an automatically recurring payment method where no customer action is required and habit cannot be generated, customers can exhibit lower degrees of subscription retention than their new automatically recurring payment method would otherwise suggest. Thus, finally, we show it would be unwise for managers of subscription-based businesses to not

consider the underlying habit-generating processes that guide customers to build greater loyalty with the firm.

Literature Review

We first describe the past literature on two subjects, payment methods and habit, before constructing our conceptual model. We conducted a thorough review of the past literature elucidating the differences between various payment methods. Understanding the past literature on payment methods is important because it allows us to analyze why payment methods have a differential impact on subscription retention. From there, we also delve into the literature on habit, such that we can show how habit is formed and why the process of breaking habit may harm subscription retention. We conclude by providing a review table (Table 1) summarizing these streams of literature.

Review of Payment Method Literature

Properties of Payment Methods. The differences between payment methods are well documented, at least with respect to the advantages and disadvantages of credit cards and cash. Feinberg (1986) found through a series of experiments, that the mere presence of credit card stimuli spurred subjects to increase their probability of spending, to spend more money, and to spend it faster. Feinberg suggested two possible theories as to why this happens: classical conditioning and a “weapons effect.” In social psychology, a weapons effect occurs when the presence of a weapon exacerbates the aggressive behavior of an angry individual (Berkowitz & LePage, 1967). Feinberg posited that credit card stimuli elicit spending in the same way that weapon stimuli elicit aggression. Feinberg’s theoretical reasoning, however, was subject to scrutiny as neither theory was empirically tested. In fact, Shimp and Moody (2000) tested these two theories and found no evidence that

classical conditioning or the weapons effect could adequately explain the mechanism at work. Nonetheless, research on the (then) unique and novel results of purchases with a credit card, coined the “credit card effect,” started a stream of research analyzing the irrationality consumers exhibit in paying with varying monetary instruments.

Further research remained consistent in showing that paying by credit card had psychological effects on consumers’ decisions. One study found a sample of MBA students’ willingness-to-pay for sold-out tickets to a sporting event increased over 100% when instructed that they would have to pay with a credit card as opposed to when they could only use cash (Prelec & Simester, 2001). This effect seemed so large that the authors reasoned it could not be adequately explained solely to liquidity constraints. Soman (2001) refined this theoretical explanation by looking at the effects of payment method on spending behavior in terms of two dimensions: rehearsal and immediacy.

Rehearsal, or what we will call the *salience of amount*, refers to an action the consumer takes when using a particular payment instrument that makes salient the amount that they are spending for a good or service. For example, with a check, a consumer must physically write down the amount they are spending in two different forms (in Arabic numerals and words). This act of recitation makes the amount of money spent in a transaction highly salient. Similarly, a consumer paying by cash must take each individual bill out of their wallet and count up until they have covered at a minimum the purchase price of the good, similarly making the price of the purchase clearly salient. However, in the case of credit cards, mobile phone payments, or other payment methods with low aggregate transparency, no recitation occurs as it is usually the cashier or a screen that shows the price to the consumer.

Immediacy, or what we call *payment coupling*, refers to the temporal lag between a purchase and wealth depletion. With cash, wealth is depleted instantaneously as money is handed from the buyer to the seller. This scenario represents a tight coupling of purchase and wealth depletion. For credit cards, there is a long delay between when a consumer swipes or inputs their card and when money leaves their bank account. There are many theoretical reasons for this temporal delay to cause behavioral changes, such as delayed payments may be temporally discounted (Loewenstein & Prelec, 1992), people may be more sensitive to changes in their bank account levels than charges on their credit card statement, and credit card charges may be viewed as a future commitment to pay rather than an actual payment (Soman, 2001). Since other purchases are usually paid off together at the same time on a credit card statement, this temporal delay further amplifies the effect of payment coupling on consumer purchasing behaviors.

Following on his 2001 paper, Soman (2003) refined his theoretical framework with one new additional construct: *salience of form*. Salience of form refers to how easy it is to physically see that money is being spent. Cash has the highest salience of form as it is unmistakably used as a monetary instrument and one can roughly gauge the amount by sight. Similarly, checks are high in their salience of form because their purpose is unmistakable and physically clear. Credit cards are less salient on the dimension of form due to their lack of the same physical properties of cash, but still retain a high amount of salience as their primary use is still as a monetary instrument. Mobile payments or automatically recurring payments, however, have almost no salience of form, as they both essentially represent invisible monetary instruments.

In sum, payment methods vary on three primary dimensions: salience of form, salience of amount, and payment coupling. Frequently, these three dimensions are aggregated together to provide an overall transparency of a payment method (Soman, 2003). For the purposes of this paper, our attention is given to payment methods in use in a monthly subscription context. A consumer in a recurring payments context may choose to pay each month manually (one-time payment) or store their payment information with the firm and have money automatically deducted each month (automatically recurring payments). Therefore, we narrow our potential monetary instruments to checks, credit cards, and electronic fund transfers (EFT).

Differential Behavioral Effects of Payment Methods. The varying dimensions of payment methods also leads to a number of behavioral shifts in consumers. One of the most well-researched behavioral impacts of low transparency payment methods is their association with increases in the willingness-to-pay for a product, even with nothing more than the presence of credit card stimuli (Chatterjee & Rose, 2012; Raghurir & Srivastava, 2008). Simply being instructed to pay with a credit card (versus cash) for a product can even lead to a 100% increase in the willingness-to-pay, at least in specific circumstances (Prelec & Simester, 2001). This increase is so large, it cannot seemingly be addressed by the increased liquidity credit cards offer, but reflects an underlying psychological behavior difference invoked by the payment method.

But the impact of credit cards extends past the willingness-to-pay for a product. Additionally, those who have been exposed to credit card stimuli have been shown to make more recall errors regarding cost attributes, identify more words related to the benefits of a product, respond faster to words regarding the benefits of a product, and even choose

products based more on their benefits rather than their costs (Chatterjee & Rose, 2012). However, past research has suggested that paying by cash can result in stronger psychological perceptions of ownership of a product (Kamleitner & Erki, 2013). The reason this effect purportedly occurs is because of the greater “pain of payment” associated with cash. Though these effect can be attenuated by culture, where, for instance, credit cards are more associated with investment and debt (Kamleitner & Erki, 2013).

Insert Table 1 Near Here

Review of Habit Literature

Habit is defined as “the phenomenon of an actor’s memory-based tendency to perform a particular behavior given previous experience performing the behavior in similar contexts,” (Henderson, Beck, & Palmatier, 2011, p. 262). Habitual actions can lead to consumers make seemingly odd choices, such as consuming more stale popcorn at a theater simply because they had generated a habit of eating popcorn at that theater (Neal, Wood, Lally, & Wu, 2009). Past research on habit suggests that, over time, as an individual repeats the same behavior consistently and generates habit, they increasingly utilize more automated decision making processes, rather than more deliberative processes (Wood & Neal, 2007). This last point represents perhaps one of the most important effects of habit on consumer behavior. Specifically, the context-response links that form in the consumer’s mind lead to repeated habitual performance of an action because it represents “the path of least resistance” for the consumer (Wood & Neal, 2009).

In the context of payment methods, a repetitive action must be performed if the consumer is to generate habit related to paying for a service. Once the action is repeated a sufficient number of times under in stable context, the consumer will cease to process

information related to their payment as deliberately as they would otherwise (Wood & Neal, 2009). Thus, from the opposite perspective, the breaking of a habit, however the habit was broken, will lead to an increase in deliberative processing. In fact, when habit develops, consumers stop being able to recall their intentions behind the initial behavior. Supporting this idea is research by Tobias (2009) which suggests that once habit is formed, intention accessibility decays. As such, it is less likely that consumers who have formed habits will question their reasons for continually subscribing to a service.

Conceptual Model

The first construct we discuss in constructing our conceptual model is the degree of sales penetration, or how much the consumer is buying on their subscription. We propose two driving mechanisms behind the degree of sales penetration's effect on subscription retention. The first mechanism is that of customer loyalty. It intuitively makes sense that if a customer is purchasing more, then it is likely that they are receiving benefits from their subscriptions. Hence, as a customer has more subscriptions, we posit that they are more loyal to the firm and must be receiving sufficient benefits to warrant their higher degree of sales penetration. However, with increased sales penetration comes increased costs. Thus, the higher the cost, the higher percentage of the customer's wallet the subscriptions use up. As such, we posit that the pain of payment, or the cost effect, of higher degrees of sales penetration eventually begins to outweigh the loyalty effects associated with high sales penetration. We hypothesize that this tension between the positive loyalty effect and negative cost effect causes sales penetration to have an inverted-U shaped, curvilinear relationship with subscription retention.

H1: Sales penetration will have an inverse-U shaped relationship with subscription retention.

For validation purposes, and because it represents a key interaction further in our conceptual model, we posit that income has a positive effect on subscription retention. That is, it is an intuitive assumption that as a customer's income increases, they have greater financial resources available to them that allows them to, across all degrees of sales penetration, maintain longer subscription retention times.

H2: Income will have a positive relationship with subscription retention.

We then add to our model whether a customer is paying for their subscription with an automatically recurring payment method or a one-time payment method. While we believe that paying with an automatically recurring payment method exhibits a main effect on subscription retention, we do not hypothesize this directly. Instead, we interact paying with an automatically recurring payment method with the customer's degree of sales penetration, to find the differential effect that automated payment methods versus one-time payment methods have on the hypothesized curvilinear relationship exhibited by sales penetration. Specifically, we expect automated payment methods to enhance the relationship between sales penetration and subscription retention. To explain, we expect that automatically recurring payment methods, which are low in transparency, to exhibit a lower pain of payment than one-time payment methods. Thus, we expect that we should see greater gains in subscription retention from the positive loyalty effect, but see reduced negative impact on subscription retention from the cost effect.

H3: The use of an automatically recurring payment method (vs. a one-time payment method) will enhance the relationship between sales penetration and customer retention.

Further, when a customer transitions their payment method from a one-time payment method to an automatically recurring payment method, we posit that the habit formed by paying by hand repetitively is broken. Because automatically recurring payment methods do not require any interaction monthly on the part of the customer, they cannot form habit. One-time payment methods, however, must be processed and submitted manually with direct interaction from the customer. Since habit has been shown to generate customer loyalty, we posit that breaking habit by transitioning to a new payment method will suppress subscription retention. We interact this with the degree of sales penetration to gain a greater understanding of how the cost effect impacts habit on subscription retention. Specifically, we posit that after habit is broken, the impact of the loyalty effects from sales penetration is suppressed. Thus, as the degree of sales penetration increases, subscription retention should decrease lower than that of what would be expected if the customer originally chose an automatically recurring payment method.

H4: Transitioning from a one-time payment method to an automatically recurring payment method will suppress the impact of sales penetration on customer retention.

Income, however, is likely to differentially impact the relationship between a payment method transition and sales penetration. Parallel much to our hypothesis on income, as a customer's income increases so does their available financial resources. Thus,

transitioning from a one-time payment method to an automatically recurring payment method, while it breaks habit, likely means that the cost effect of sales penetration is reduced. Hence transitioning should be less damaging to those with high income than those with low income.

H5: The suppressing effect of transitioning from a one-time payment method to an automatically recurring payment method is reduced as income increases.

The overall conceptual model and its hypotheses are illustrated diagrammatically in Figure 1.

Insert Figure 1 Near Here

Methodology

Sample

Our data come from an unnamed multibillion-dollar revenue generating humanitarian aid organization. Customers of this company purchase subscriptions that directly aid a single individual that the customer may select themselves from a large database. These subscriptions are set to automatically recur each month or at longer intervals such as quarterly, semi-annually, or annually. The dataset contains 84,594 unique customers with 104,396 subscriptions. Since we're interested in income, we eliminated customers for whom we did not have that information leaving us with 64,230 customers and 78,434 subscriptions. Of these, 47,379 subscriptions (or about 60%) end in cancellation. The remaining 40% are right-censored.

Since the percentage of transactions made with each payment method is also of interest, we graph the quarterly average of transactions made with each payment method within our dataset in Figure 2. EFT begins its life in the first quarter of 2005 with only 0.4%

of transactions made in that quarter using it as a payment method. By 2015, however, EFT represents approximately 40% of all transactions made, with credit card taking about 46% and checks the remaining 14%.

Insert Figure 2 Near Here

Measures

We track the method of payment for each individual transaction. That is, for each transaction a customer has, we can know what method of payment was utilized for that transaction. We lump all transactions performed with credit card and EFT together as automatically recurring payment methods, otherwise, their method of payment was check which we consider as a one-time payment method. Payment method transitions are measured by detecting when a customer switches their subscription from a one-time payment method to an automatically payment method. After a customer makes the switch, all their following transactions are coded as transitioned. We split income into five categories: below \$30,000 a year, \$30,000 to \$59,999, \$60,000 to \$89,999, \$90,000 to \$125,000, and above \$125,000. To measure a customer's degree of sales penetration, we capture the number of subscriptions a customer has at the time of each transaction. Because we are interested in the possible curvilinear effect of sales penetration, we additionally square the number of subscriptions. Finally, our dependent variable, subscription retention, is formed by adding a cancellation dummy variable to their last transaction prior to their subscription cancellation date (that is, a customer may cancel midway between their monthly transaction, so we only capture their retention up until the transaction date of their last payment).

Estimation Model

While more frequently used within the domain of medicine and engineering, survival analysis has long been recommended as a methodological tool to measure customer retention (Li, 1995). Survival analysis, at its core, deals with the time to occurrence of an event. Using the traditional terminology of survival analysis in a marketing context, when a customer first signs up for a subscription service, they can be considered to have “contracted a disease” which will inevitably, given enough time, lead to their “death,” or the end of their subscription.

Although problems involving customer retention could theoretically be studied using an ordinary least-squares (OLS) linear regression, trying to fit an OLS model to this type of data has one critical flaw that makes it seldom used: the amount of time to an event is not normally distributed. OLS has proven itself to be robust to many violations of the assumption of normality, but OLS is not robust to time distributions that are almost certainly asymmetrical (Cleves, Gould, & Marchenko, 2016). Survival analysis allows us to fit a more reasonable distributional assumption to our model, which makes it the optimal method to analyze customer retention in this context.

Another advantage is that survival analysis handles the issue of “right-censoring,” which is to say it handles the situation where not enough time has elapsed for all subscriptions to have come to an end. Because many subjects in our dataset have not yet had their subscription cancelled, it would bias our results substantially to not analyze these customers and their levels of retention. While this issue does not require the use of survival analysis to fix (a censored-normal regression would be appropriate to handle this task), it is certainly a benefit of survival analysis as a tool with regards to analyzing customer retention.

To quantify the effects of payment method on customer retention time, we utilize a multiple-record, parametric survival-time model with random effects. Specifically, we use an accelerated failure time (AFT) model which assumes the effect of some covariate accelerates or decelerates the “life course” of a customer’s subscription by some constant. Each subscription is considered to be an independent “subject” within the analysis, with random effects added for each actual customer. In other words, we model the survival time of a single subscription with random effects that control for the variance in each customer. “Death” in our analysis occurs on the date of the last transaction for a subscription before or equal to the time that the customer canceled their subscription. To clarify, a customer can cancel their subscription in one of two ways: they can either attrite, where the customer cancels their subscription manually, or become delinquent, where the customer does not pay within a certain time frame. A subscription’s death occurs on the last date a successful payment was made for that subscription, before either delinquency or attrition. If a user has not cancelled their subscription before the final date of our analysis, they are said to be right-censored.

Mathematically, the AFT model utilizes the natural logarithm of survival time, denoted by $\ln t$, expressed in the form of a linear function of covariates. This yields a linear model with random effects

$$\ln t_{ij} = x_{ij}\beta + v_i + \epsilon_{ij} \quad (1)$$

such that x_{ij} is a vector of covariates, β is a vector of regression coefficients, v_i is the unobservable panel-level random effects, and ϵ_{ij} is the error term with a density function $\varphi(\cdot)$. Our choice of the density function $\varphi(\cdot)$ changes the results of the regression. The five most common models using the AFT parameterization are the exponential model, the

gamma model, the loglogistic model, the lognormal model, and the Weibull model. We use `xtstreg` in STATA to estimate this model. This command performs a maximum likelihood estimation. We also make use of Huber/White/sandwich VCE estimators to generate robust standard errors (Arellano, 2003).

Results

The complete view of the results of our analysis can be found in Table 2. We first run our survival analysis with only the linear terms in the model. As one might expect, the main effect of using an automatically recurring payment method was positive and significant (.496, $p < 0.001$) along with customer income (.265, $p < 0.001$) and transitioning to an autopayment method (.240, $p < 0.001$). The number of subscriptions was not significant (-.014, n.s.). However, when we add the number of subscriptions squared to the model, we find an inverted-U curvilinear relationship with a positive and significant linear term (.143, $p < 0.001$) and negative and significant squared term (-.017, $p < 0.001$). This finding suggests that sales penetration has a curvilinear inverted-U shape with subscription retention, supporting H1. The other variables in this model stay mostly constant.

We add to our model the two-way and three-way interactions necessary for testing H3, H4, and H5. The main effect of the number of subscriptions squared term loses its significance under this model (-.155, n.s.), while the main effect of the subscriptions linear term becomes negative and significant (-.155, $p < 0.05$). The main effect of an automatically recurring payment method drops, but remains significant (.345, $p < 0.001$). Customer income has a positive and significant impact on subscription retention, in support of H2 (.197, $p < 0.001$). The effect of transitioning to an automatically recurring payment from a one-time payment method becomes larger than in our previous model (.901, $p < 0.001$).

Further, we notice significant interactions with the number of subscriptions and paying with an automatically recurring payment method, specifically the linear interaction is positive and significant (.123, $p < 0.05$), while the squared interaction is negative and insignificant (-.003, n.s.). This result suggests that as the degree of sales penetration increases, using an automated payment method enhances the degree of subscription retention, in support of H3. The linear interaction between the number of subscriptions and transitioning from a one-time payment method to an automatically recurring payment method is significant (-.472, $p < 0.01$), suggesting that as sales penetration increases, transitioning to an automatically recurring payment method is harmful to subscription retention. This evidence lends support to our H4. Although not hypothesized, we also find that customer income has a curvilinear interaction with the number of subscriptions, with the linear term exhibiting a positive coefficient (.067, $p < 0.001$) and the square term exhibiting a negative coefficient (-.007, $p < 0.001$). As such, it seems that as a customer's income increases, they exhibit a greater loyalty effect from increased sales penetration, then a more painful cost effect as the number of subscriptions becomes greater. The interaction between income and transitioning to an automatically recurring payment method is insignificant (0.007, n.s.), but the three-way interaction between the number of subscriptions squared, customer income, and a transition to an automatically recurring payment method is positive and significant (.008, $p < 0.01$). In other words, as customer income increases, the cost effect of transitioning to an automatically recurring payment method with a greater degree of sales penetration diminishes, in support of H5. Because of the complexity of our interactions, we graphically show the results in Figure 3.

Insert Figure 3 Near Here

Discussion

Subscription-based business models are increasingly gaining traction as the global economy begins to shift further towards services. Over 80% of the U.S. economy is now considered services. Within those businesses, many firms offer subscriptions for their product offerings because subscriptions offer the ability to stably generate continual monthly revenues. As such, a thorough understanding of the factors that impact subscription retention is desirable.

In this article, we addressed how a consumer's choice of payment method may impact their retention behaviors. Using a combination of past literature on payment methods and habit, we conceptualize a model of subscription retention based on payment method that incorporates how much product a consumer is buying in their subscription (sales penetration) and what the consumer's income is. Using the transition from a one-time payment method, such as writing checks, to an automatically recurring payment method, such as credit cards and electronic funds transfer, we show that the "folk knowledge" that ubiquitously encouraging customers on one-time payment methods to switch to automatically recurring payment methods may sometimes backfire. That is, we isolate that for varying levels of a customer's income, there exists a switching point, based on the customer's degree of sales penetration, where transitioning a customer currently on a one-time payment method to an automatically recurring payment method will lead to lower overall subscription retention than if that customer did not switch their payment method. We believe this effect occurs because one-time payment methods are better able to generate habit, which includes continued input from the customer to maintain their subscription. When a customer switches from the habitual behavior of paying for their

subscription manually to the less noticeable automatically recurring method, they begin to process their payments towards the subscription more deliberately. This transition temporarily increases the salience of their costs after switching their payment method and increases early termination of their subscription.

Theoretical Implications

Our work makes several theoretical contributions to the literature. First, we contribute to our growing knowledge on payment methods. The effects of payment methods are well documented with regards to payment by cash and payment by credit card. That is, credit cards have largely been shown to offer several advantages over cash, such as a higher willingness-to-pay, a greater attunement towards the benefits of a product, and increasing the likelihood of purchasing (Chatterjee & Rose, 2012; Prelec & Simester, 2001). While cash has been shown to increase perceptions of ownership, its relation to use in a monthly subscription context is absent from the literature. Therefore, our contribution to the literature is showing how the two categories of payment methods in a recurring business, one-time payments and automatically recurring payments, differentially impact subscription retention.

Our second theoretical contribution relates to the domain of habit. Habit is the memory-based tendency to repeat behaviors consistently. Past research on habit has shown its effects on customer loyalty and how behaviors are processed within the consumer's mind (Henderson et al., 2011; Wood & Neal, 2009). Specifically, increases in habit are associated with decreases in the deliberative processing of information. Our results suggest that one-time payment methods have a greater ability to build customer habit than automatically recurring payment methods. As such, when a customer breaks

habit by transitioning from a one-time payment method to an automatically recurring payment method, they almost exclusively exhibit lower subscription retention than if they had naturally joined on an automatically recurring payment method. This decrease in retention is exacerbated by how much product a consumer is purchasing from the firm, because they deliberately begin to process the price once habit is broken. However, this effect is somewhat mitigated by increases in customers' income.

Our third theoretical contribution relates to past research on subscription business models. While past research has addressed topics such as pricing products in subscription models (Bala, 2012; Penmetsa et al., 2015) and how to value subscription businesses (McCarthy et al., 2017), scant literature addresses how to impact subscription retention. We show that a customer's degree of sales penetration has an inverted-U relationship with subscription retention. Thus, our overall conceptual model addresses the various factors that impact subscription retention for consumer-facing subscription businesses.

Managerial Implications

Our work includes multiple takeaways for managers of firms working with, or thinking about implementing, monthly subscription business models. Our results broadly back up the marketing principle that all customers are heterogeneous and should be treated differently. First, the common practice of encouraging customers on one-time payment methods to switch to automatically recurring payment methods should not occur without thought about customer-specific factors, such as how much product they currently are buying and their income. Specifically, we show that as a customer's income increases, the optimal point for not switching shifts further out in terms of their sales penetration. Rather than sending all customers on monthly check payments marketing materials encouraging

them to switch payment methods, managers should calculate the optimal switching point for their business based on each customer's degree of sales penetration and income. Thus, managers may sometimes want to let "sleeping dogs lie."

Second, our curvilinear result of sales penetration suggests that, at a certain point, purchasing too much product from the firm leads to faster attrition. Thus, managers should not always consider more sales to be unilaterally better. Instead, managers would benefit from running similar models on their customers and determining what the optimal maximal point of sales penetration is, perhaps for different customer groups. In doing so, managers may be better able to extract greater overall returns from their customers, even if they purchase less product.

Limitations and Future Research

Our research includes many limitations and avenues for future research. First and foremost, while we provide a theoretical explanation for the proposed effects we find, our research cannot be counted as a formal test of these mechanisms. That is, while theory supports our empirical results, we cannot be sure this theory is truly what is driving the effects that we find. As such, it would be recommended for future research to test these theoretical mechanisms in a more controlled environment.

Second, as a limitation of our data, we were unable to isolate "natural" payment method transitions and "marketing-driven" payment method transitions. That is, the firm that provided our dataset has sent marketing material to customers on one-time payment methods to encourage their transitioning to an automatically recurring payment method. However, we have no record of which customers these materials were sent to and what their response was. Thus, we cannot differentiate between a "natural" transition where the

customer switches of their own free-will without persuasion by the firm and a “marketing-driven” transition where the customer switches due to the marketing actions of the firm. It is entirely plausible that customers who transition naturally behave differently than those who transition in response to marketing actions. Future research would benefit from understanding how this feature impacts subscription retention and the breaking of habit.

Finally, our data cover only one firm, where the products are donations to humanitarian aid efforts. Because of this, one might question the generalizability of our results. We do not try to make claims about specific effect sizes in our research and believe that, regardless of the context, the proposed mechanisms behave in the same manner. However, we cannot empirically test this assertion. Hence, we are unsure about the generalizability of our findings.

TABLE 1
Selected Literature on Payment Method Characteristics

Study	Areas of Focus	Context	Key Findings
Chatterjee & Rose (2011)	Payment Method and Product Perceptions	Undergraduate Student Experimentations	Those primed with credit card stimuli made more recall errors regarding cost attributes, identified more words related to benefits, responded faster to benefits, expressed higher reservation prices, and affected their product choices.
Feinberg (1986)	Credit Cards as a Facilitating Stimuli	Field Study & Undergraduate Student Experiments	Credit card stimulus increased willingness-to-pay, response time, and probability of purchase. Suggested effect could be due to classical conditioning and a weapons effect.
Kamleitner & Erki (2013)	Effect of Payment Method Characteristics on Perceptions of Ownership	Longitudinal Exit Survey & Undergraduate Student Experiments	Cash payments result in stronger psychological perceptions of ownership due to an increase in the "perceived investment" in the good. Attenuated by Asian cultures where credit card payments are associated with investment and debt.
Prelec & Simester (2001)	Credit Card Effect on Willingness to Pay	MBA Student Quasi-Experimentations	Willingness-to-pay can be increased upwards of 100% when customers are instructed to pay with a credit card rather than cash. Effect size so large it appears to be unlikely due to liquidity constraints.
Raghubir & Srivastava (2008)	Effect of Coupling and Form on Spending Behavior	Undergraduate Student Experimentations	Credit card logo increases willingness-to-pay, but the credit card effect can be attenuated when people estimate their expenses using a decomposition strategy. The form of payment mechanism can also increase spending, but only if the salience of parting with money is kept low.
Shimp & Moody (2000)	Theoretical Explanation of the Credit Card Effect	Undergraduate Student Experimentations	Rejection of Feinberg's (1986) paper on the believed theoretical reasoning for the credit card effect. Found no evidence supporting either a classical conditioning theory or a weapons effect mechanism.
Soman (2001)	Effect of Coupling and Rehearsal on Purchase Intentions	Undergraduate Student Experimentations	Past payments strongly reduce purchase intention when the method of payment requires rehearsal (writing down the amount) and tight payment coupling (immediacy).
Soman (2003)	Salience of Form, Amount, and Coupling on Consumption	Field Study & Undergraduate Student Quasi-Experimentations	Payment methods with lower degrees of transparency result in increased consumption. This effect is weak though for products whose consumption rates are inflexible.

FIGURE 1

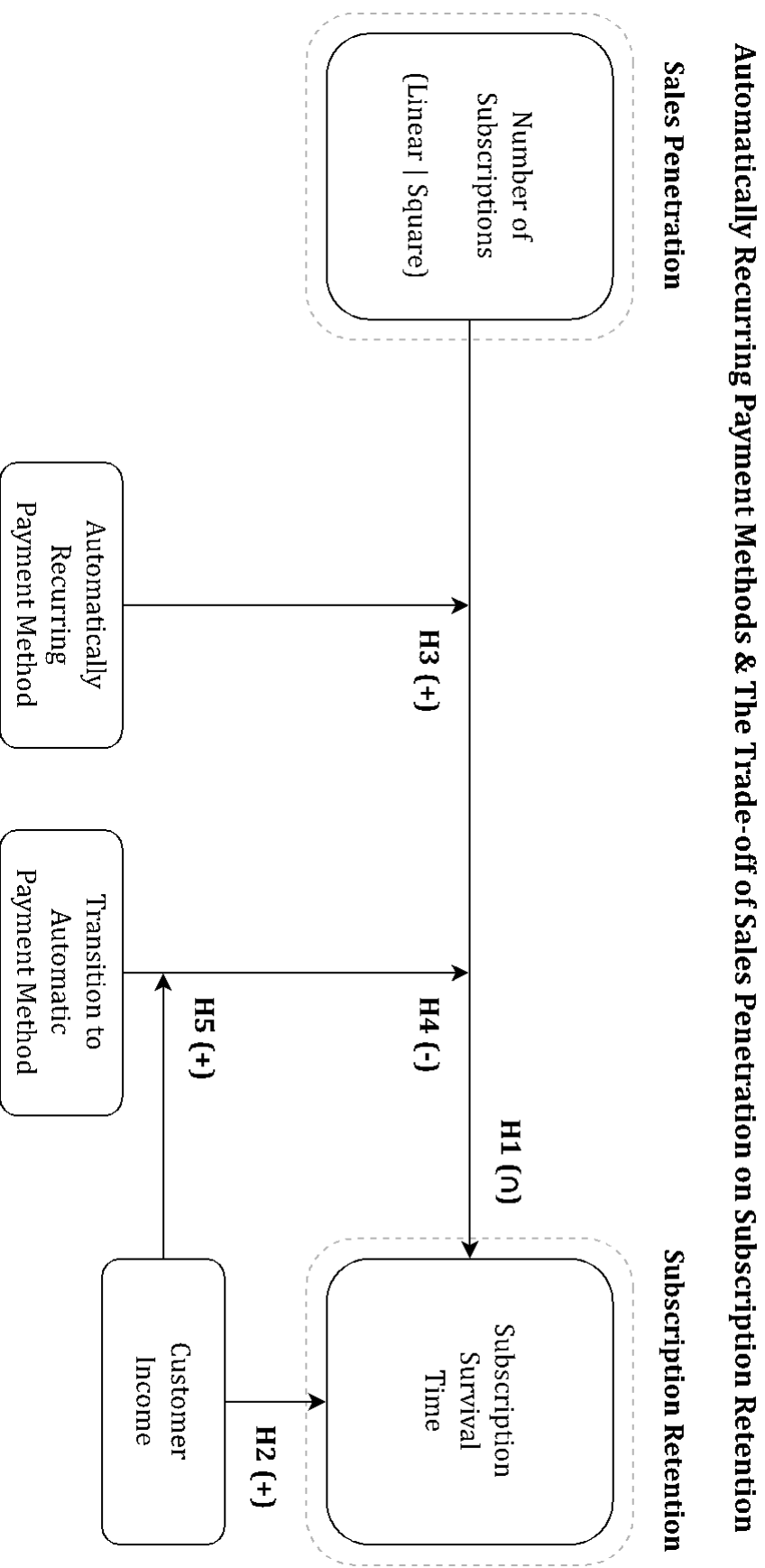


FIGURE 2
Payment Method Usage Over Time

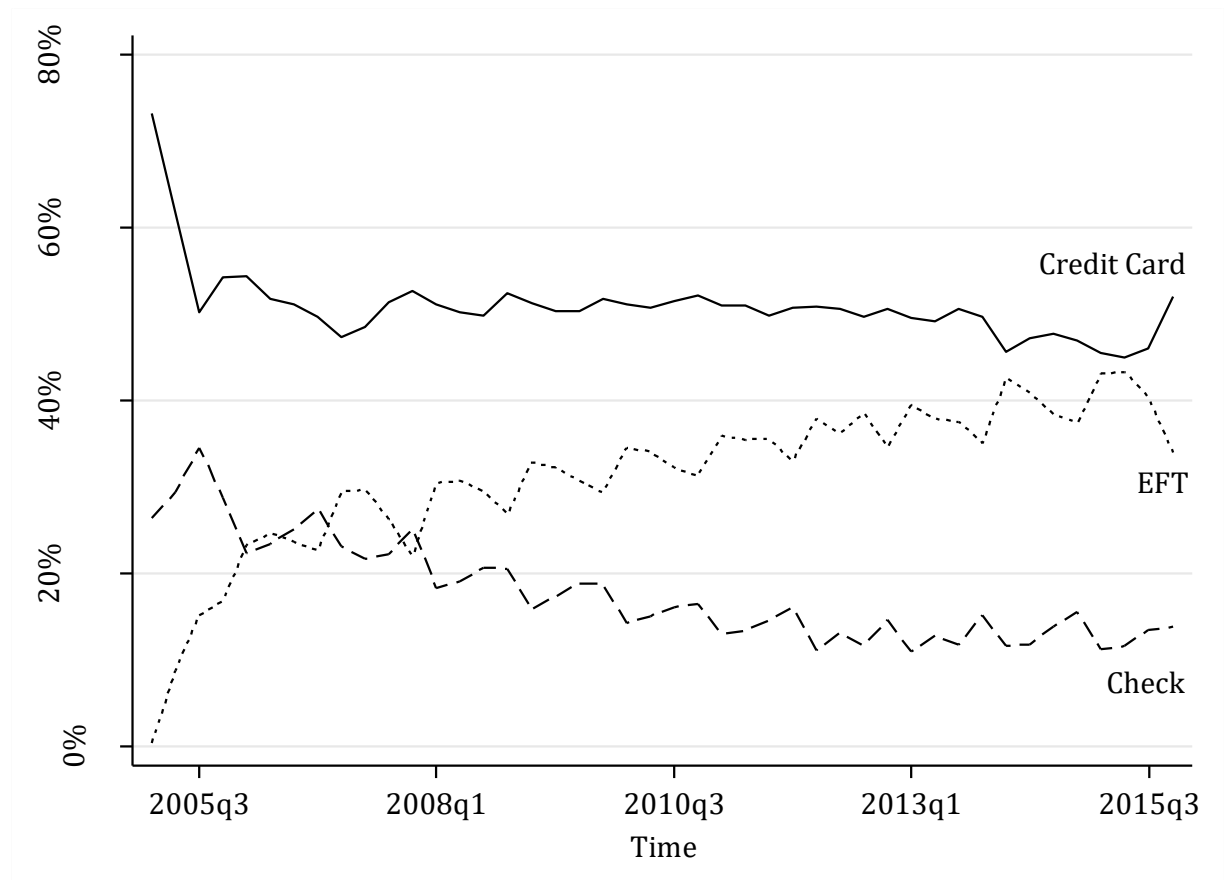
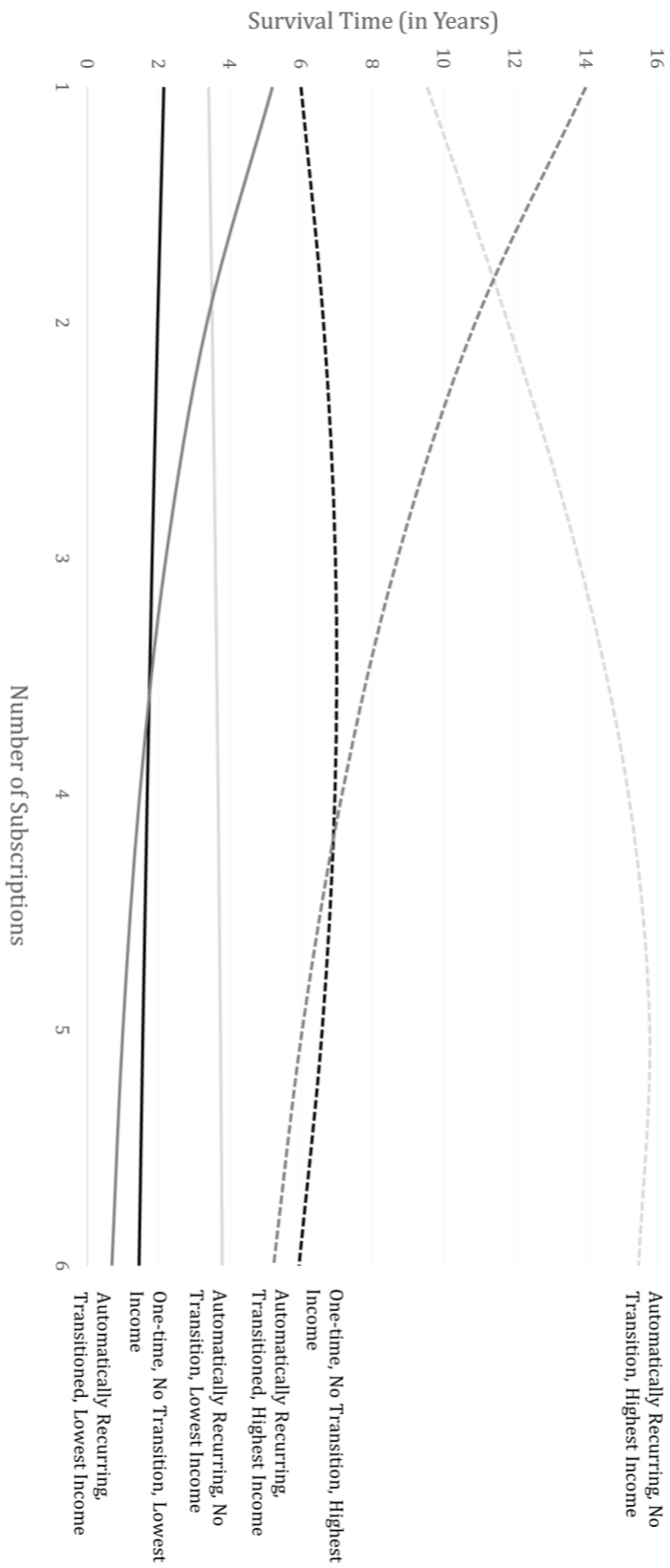


TABLE 2 Results of Accelerated Failure Time Survival Analysis Model							
Variables	Hypotheses	Model 1		Model 2		Model 3	
		Coefficients	Robust Std. Errors	Coefficients	Robust Std. Errors	Coefficients	Robust Std. Errors
Main Effects							
Number of Subscriptions	H1	-0.014	(0.017)	0.143***	(0.028)	-0.155*	(0.085)
Number of Subscriptions Squared	H1			-0.017***	(0.003)	0.008	(0.008)
Autopay Method		0.496***	(0.019)	0.489***	(0.018)	0.345***	(0.064)
Customer Income	H2	0.265***	(0.006)	0.263***	(0.006)	0.197***	(0.021)
Transition to Autopay Method		0.240***	(0.036)	0.243***	(0.036)	0.901***	(0.210)
Interaction Effects							
Number of Subscriptions × Autopay Method	H3					0.123*	(0.060)
Number of Subscriptions Squared × Autopay Method	H3					-0.003	(0.004)
Number of Subscriptions × Transition to Autopay	H4					-0.472**	(0.172)
Number of Subscriptions Squared × Transition to Autopay	H4					0.002	(0.009)
Number of Subscriptions × Income						0.067***	(0.020)
Number of Subscriptions Squared × Income						-0.007***	(0.002)
Transition to Autopay × Income						0.007	(0.059)
Transition to Autopay × Num. of Subs. × Income	H5					-0.024	(0.048)
Transition to Autopay × Num. of Subs. Sq. × Income	H5					0.008**	(0.003)
Controls							
Individual Random Effect Included ^a		Yes		Yes		Yes	
Distribution Function		Exponential		Exponential		Exponential	
Intercept		6.393 (.031)***		6.249 (.036)***		6.552 (.089)***	
Wald Chi-Square		2714.46		2721.69		5440.68	
N		3,155,916		3,155,916		3,155,916	

Note: Standard errors are reported in parentheses; * $p < .05$, ** $p < .01$, *** $p < .001$ (one-tailed hypothesis tests).

^a Individual random effects represent each customer in the dataset.

FIGURE 3
Graphical View of Interactions



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