Payment Card Rewards Programs and Consumer Payment Choice

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Abstract

Card payments have been growing very rapidly. To continue the growth, payment card networks keep adding new merchants and card issuers try to stimulate their existing customers' card usage by providing rewards. This paper seeks to analyze the effects of payment card rewards programs on consumer payment choice, by using consumer survey data. Specifically, we examine whether credit/debit reward receivers use credit/debit cards relatively more often than other consumers, if so how much more often, and which payment methods are replaced by reward card payments. Our results suggest that (i) consumers with credit card rewards use credit cards much more exclusively than those without credit card rewards; (ii) even among those who carry a credit card balance, consumers with credit card rewards use a credit card more often than those without rewards; (iii) among consumers who receive credit card rewards, those who receive credit card rewards as well as debit card rewards tend to use debit cards more often than those who receive credit card rewards only; and (iv) reward card transactions seem to replace not only paper-based transactions but also non-reward card transactions.

1. Introduction

Credit and debit card payments have been growing very rapidly. Debit card outpaced credit card in terms of number of transactions in 2003, while credit card annual transaction value was still twice as much as debit card annual transaction value in 2004. To continue the growth, payment card networks keep adding new merchants to their networks.[1] Penetrating new cardholders, on the other hand, is becoming difficult because most consumers have both credit and debit cards.[2] Payment card issuers, therefore, are trying to stimulate their existing customers' card usage by providing rewards.[3] It has been reported that many credit and debit card issuers that launched new rewards programs have seen increases in spending on their cards.[4] However, we are not aware of any reports telling the sources of these increases. It is unlikely that reward receivers simply increase their spending on their card without changing spending through other payment methods. Which payment methods are replaced by reward card transactions? Do reward card transactions replace transactions of other payment methods, such as cash, checks, and/or ACH? Or do they replace non-reward card transactions? To what extent do reward card transactions replace other forms of payment transactions?

The answers of above questions are important to policymakers. It is cost effective if reward card transactions replaced other types of transactions which are more costly than reward card transactions. It is not cost effective, however, if reward card transactions replaced non-reward card transactions. Operating a rewards program is not free—it uses some resources. Another concern is that rewards credit cards could potentially create inequality among

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[1] Credit and debit card adoption rates vary by industry. The rate is close to 100% in some industries.

[2] According to the 2001 Survey of Consumer Finance (SCF) conducted by the Federal Reserve, 75 percent of U.S. households hold at least one credit card. Statistics on debit card penetration is hard to obtain, but many large banks reported that 80 to 100 percent of their checking account holders hold a debit card.

[3] Credit card rewards programs have a long history. However, it is only recently that issuers started offering more generous rewards programs. Recently, debit card rewards programs are also getting popular.

consumers. Many merchants need to pay higher fees to issuers if their customers use a reward credit card instead of using a non-reward credit card.[5] Credit card networks do not allow merchants to reject reward card payments as long as the merchants accept the network's non-reward credit cards. The networks also prohibit merchants from price discriminating customers based on the payment method they use.[6] As a result, the more customers use reward credit cards, the higher the merchants mark up their uniform retail prices (in order to offset higher fees). Although reward credit card holders are partly compensated for higher retail prices through rewards, other consumers are not. Furthermore, it should be noted that reward credit card holders are relatively high-income earners, while many low income customers may not even qualify for having credit cards.[7] Therefore, rewards programs and the accompanied merchant fee structure may work as tools that distribute income from low-income earners to high-income earners.

Understanding how rewards programs change the market share of other payment methods is also important to card issuers. For example, it may not be profitable for an issuer if its own cardholders replaced credit card transactions with debit card transactions due to its debit rewards program (assuming that credit card business is more profitable).

This paper seeks to analyze the effects of rewards programs on consumer payment choices. Specifically, by using consumer survey data, we examine whether credit/debit reward receivers use credit/debit cards relatively more often than other consumers, if so how much more often, and which payment methods are replaced by reward card payments. We restrict our analysis to in-store payments because the heterogeneity across payment instruments for other

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[4] See, for example, *ATM&Debit News*, August 25, 2005; December 22, 2005.
[5] Visa and MasterCard introduced new interchange rate schemes in 2005. Interchange rates of reward credit cards (such as Visa's Signature Card and MasterCard's World Card) are higher than those of non-reward credit cards by about 0.1 to 0.8 percentage points, depending on the type of merchants and transactions.
[6] This is due to the no-surcharge rule. Merchants are allowed to give discounts to cash or check users.

types of transactions, such as purchases over the Internet and bill payments, is rather remarkable.[8]

Our results suggest that (i) consumers with credit card rewards use credit cards much more exclusively than those without credit card rewards; (ii) even among those who carry a credit card balance, consumers with credit card rewards use a credit card more often than those without rewards; (iii) among consumers who receive credit card rewards, those who also receive debit card rewards tend to use debit cards more often—consumers who receive rewards only from credit cards tend to use their credit cards more exclusively, while consumers who receive rewards from both credit and debit cards tend to distribute their transactions more 'equally' between credit and debit cards; and (iv) reward card transactions seem to replace not only paper-based transactions but also non-reward card transactions.

Our analysis cannot provide evidence for causality—whether that rewards encourage consumers to use their reward cards or that consumers who know they use their cards very often join the rewards programs—but reveals distinctive differences in payment choice according to whether the consumer receives rewards from which (credit, debit or both) card transactions. As more and more transactions become electronic, understanding consumer payment choice, especially choice between credit and debit card, becomes important. Several previous studies have suggested that consumer debit card use is explained by behavioral motives, such as to avoid overspending on credit cards.[9] Other studies pointed out transaction type differences, such as transaction value, types of goods purchased, and physical environment of points of sale, affect

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[7] According to the 2005/2006 Study of Consumer Payment Preference, holding a reward credit card and income are positively correlated. According to the SCF (2001), the credit card penetration rate is lower among low-income households.

[8] For example, it is difficult to make cash or check transactions for purchases over the Internet and some billers do not accept debit cards when consumers pay bills.

[9] Those studies include Ausubel (1991), Prelec and Simester (2001), and Bertaut and Haliassos (2002).

the choice between credit and debit card.[10] Zinman (2004) concluded that although consumer

debit usage can be partly explained by behavioral motives, it is also explained by consumer's

cost minimization—consumers who carry a balance on their credit cards use debit in order to

reduce their interest costs on the credit card. This paper adds another possible determinant of

consumer payment choice between credit and debit cards, which is receiving rewards on the

card.

The rest of the paper is organized as follows. Section 2 describes our data set. Empirical

models are constructed in section 3. Section 4 presents results and discusses implications of the

results. Section 5 concludes the paper.

2.   Data

Our data set is the 2005/2006 Study of Consumer Payment Preference conducted by the

American Bankers Association and Dove Consulting. Data were gathered using paper and Web-

based surveys sent to U.S. consumers in 2005. 3008 completed surveys were received; of them,

2350 were submitted via the Web and 658 on paper. Although the survey sample is not

nationally representative, the survey contains rich information on consumer payments, which is

usually unobservable in the nationally representative data sources.[11]

First, our data set includes information on whether the consumer received credit card

rewards and debit card rewards, respectively. This allows us to examine whether credit/debit

reward receivers' payment choice is different from non-reward receivers'.

Second, the survey asked consumer's payment usage in detail. Those questions includes

how many times per week the consumer used each of the six payment methods at the point of

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[10] For example, see Hayashi and Klee (2003) and Klee (2006b).
[11] For instance, Survey of Consumer Finance (SCF) conducted triennially by the Federal Reserve.

sale—cash, check, credit card, PIN-based debit card, signature-based debit card, and prepaid card—and the most frequently used payment method by retail type.[12]

Lastly, in the survey, consumers were asked to provide their perceptions toward each of the six in-store payment methods. Typically, a consumer's perceptions are not easily observed, and therefore in a typical empirical study, they are treated as part of the consumer's unobservable heterogeneity.[13] But these questions allow us to observe more detailed consumer heterogeneity.

We construct our sample by excluding missing information regarding consumer characteristics, perceptions toward in-store payment methods, card related status, such as a balance on credit card and rewards on credit and/or on debit cards. We, then, exclude responses that do not have a bank account and do not hold either a credit or debit card because we want to emphasize the difference in payment choice between reward receivers and non-reward receivers, not between card holders and non-card holders. This process leaves us 1979 responses. Compared with the general U.S. population, our sample is relatively higher educated and higher income (Table 1).

Table 2 shows statistics on reward receivers in our sample. About 36 percent of consumers receive rewards via either credit card, debit card, or both. Approximately two-thirds of them (23 percent of consumers in our sample) receive rewards from credit card only; one-quarter of them (9 percent of consumers in our sample) receive rewards from both credit and debit cards; and the rest (4 percent of consumers in our sample) receive rewards from debit card only. The majority of debit reward receivers receive rewards when they make signature-based debit transactions while only 50 percent of debit reward receivers receive rewards when they make PIN-based transactions.

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[12] See Hayashi, Sullivan, and Weiner (2003) for the difference between PIN-based and signature-based debit.
[13] Mantel (2000) utilized consumer perceptions to estimate consumers' bill payment choices.

Table 3 provides consumer characteristics and perceptions toward payment methods that are correlated with consumer reward card holdings. Consumers with higher income and higher educational level are more likely to hold a reward credit card. Income and educational level seem not to affect consumers' reward debit card holdings. Young consumers whose age is between 25 and 34 years old are more likely to hold reward debit cards. Age, however, seems to have no effects on reward credit card holdings. Both reward credit card and reward debit card holdings are affected by consumer ethnicity, residential region, and technology adoption behavior: Asian and Caucasian are more likely to hold reward credit cards; People living in New England are more likely to hold reward credit cards and people living in Mid-Atlantic region are more likely to hold reward debit cards; Consumers who use Internet at work and online banking are more likely to receive rewards from both credit and debit cards. Consumer perception toward payment cards and reward card holdings are correlated. Naturally, consumers who have positive perceptions toward a credit card tend to have reward credit cards and consumers who have positive perceptions toward a debit card tend to have reward debit cards. Interestingly, consumers who have relatively *negative* perceptions toward debit cards tend to receive credit rewards.

The next two figures indicate that credit card rewards and consumer payment choice have a strong correlation. Not only credit card rewards, but also debit card rewards and credit card balance seem to be correlated with consumer payment choice.

Figure 1(a) shows consumer distribution in terms of the share of credit card transactions in the total in-store transactions. Consumers are divided into eight groups according to whether they have a credit card balance, whether they receive debit card rewards, and whether they receive credit card rewards. All groups but one have a similar distribution pattern: the percent frequency

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(consumer density) declines as the share of credit card transactions increases. But one group—consumers who do not carry a credit card balance, do not receive debit card rewards but receive credit card rewards—has an almost uniform distribution. Clearly, consumers in this group use a credit card more exclusively. Figure 1(b) shows consumer distribution in terms of the share of debit card transactions. Similar to figure 1(a), only one group of consumers has a distinctive distribution. That group consists of consumers who do not carry a credit card balance, do not receive debit card rewards, and receive credit card rewards. The majority of consumers in the group have a debit card share that is less than 50 percent. In other groups of consumers, on the other hand, they are distributed more evenly, meaning that many consumers in these groups use a debit card more often. Figure 1(c) shows consumer distribution in terms of the share of paper-based transactions. In contrast with previous two figures, in this figure there is no group of consumers that reveals a distinctive distribution pattern.

Figure 2 presents the share of consumers who choose a particular payment instrument as their most frequently used payment method at grocery stores. Similar to figure 1, consumers are grouped into eight groups, according to their credit card balance, debit card rewards, and credit card rewards status. The top panel shows credit card, the middle is debit card, and the bottom is paper based payments as the most frequently used payment method. From the credit card panel, we see that one group exclusively choose the credit card as their most frequently used payment method at grocery stores. The group is consumers who do not carry a credit card balance, do not receive debit card rewards, and receive credit card rewards. In the other groups, at most 25 percent of consumers choose the credit card as their most frequently used method. As can be guessed, most of consumers in the group who do not carry a credit card balance, do not receive debit card rewards, and receive credit card rewards, do not choose debit card as their most

frequently used payment method. From the panel of paper-based payment method, non-receivers of credit card rewards tend to choose paper-based payments as their most frequently used payment method at grocery stores.

3.   Model

Consumer payment choice is influenced by various factors. Previous research has highlighted three important sets of factors: consumer characteristics, payment method attributes and transaction characteristics.

Consumer characteristics, such as age, income, and educational level, have shown to be correlated with use of payment methods in previous literature. Adoption of other technologies also influences consumer payment choice. These factors could proxy for preferences (checks are preferred more by women than by men), for availability of payment methods (consumers with higher income are more likely to use credit cards than those with lower income), and for familiarity with new payment technologies (people who use new technologies are more likely to use debit cards and to make transactions over the Internet).

Payment method attributes may also be important determinants when consumers choose a payment method. Some payment instruments have distinctive attributes. For example, some payment cards offer rewards to their users. Cash gives consumers anonymity, while the other payment methods don't. Credit cards provide liquidity at least until the next billing date. Other attributes, such as transaction speed, safety, and ease of use, vary by payment method.

Transaction characteristics, such as value of the transaction and physical environment, likely influence consumer payment choice. For example, consumers tend to pay with cash for a smaller value transaction, while they tend to use a credit card or a check for a larger value transaction. The effects of physical environment on the use of payment may partly be supply side

effects. Some types of retail stores may not accept all or some types of payment cards. Only cash may be accepted when consumers use public transportation systems, such as a city bus or the subway. Even when merchants accept all payment methods, some payments may be less convenient to use than the others. For example, at a restaurant consumers cannot make a PIN-based debit payment at their seat unless the restaurant carries a portable PIN pad. At a gas station, consumers may not need to go to the cashier if they pay with cards, while they need to do so if they pay with cash or checks.

Our data set does not contain information on transaction characteristics. However, we can observe each consumer's most frequently used payment method by retail type. At a certain type of retail store, variation of transaction characteristics may be limited.

Information on payment method attributes per se is not included in our data set, either. However, we can observe each consumer's perceptions toward each in-store payment method. Those perceptions include speed, safety, ease of use, comfort, convenience, help budget, etc. We see them as payment method attributes evaluated by each consumer.

Utility to consumer i from using payment method j when making a transaction at retail type h is defined as follows:

$$U_{ijh} = X_i \beta_{jh} + Z_{ij} \gamma_h + C_{ij} \delta_{jh} + \varepsilon_{ijh}, \qquad (1)$$

where X_i is a vector of consumer characteristics, Z_{ij} is a vector of attributes of payment method evaluated by the consumer and C_{ij} is a vector of card-related dummies. β, γ, and δ are vectors of parameters that weight these factors in the consumer's utility function. ε_{ijh} captures unobserved factors and is assumed to be *i.i.d.* extreme value.

We consider four card-related dummies: rewards on credit, on PIN-based debit, and on signature-based debit, and a balance on the credit card. If a consumer receives rewards on a

credit card, her utility from using the credit card will be higher than otherwise. Her utility from using another payment method will not be affected by whether she receives credit rewards or not. Similarly, PIN-based debit rewards and signature-based debit rewards affect her utility from using PIN debit and from using signature debit, respectively. If the consumer carries a positive balance on a credit card, her utility from using the credit card will be lower because it costs her. We allow coefficients on reward dummies to vary by payment method, because credit card rewards are typically more generous than debit card rewards.

Because consumers who chose prepaid card as their most frequently used payment method are negligible, we excluded such consumers from our sample. Thus, consumers have five payment options: credit card, PIN-based debit card, signature-based debit card, check, and cash.

In addition to the above discrete choice models, we also estimate each consumer's share of transactions that used a particular payment method in the consumer's total in-store transactions, which is derived from the weekly frequency question. Although the discrete choice models allow us to measure the difference between reward receivers and non reward receivers in terms of the likelihood of choosing a certain payment method as their most frequently used payment method, they cannot be used to measure the intensity of a certain payment method usage. Estimating the share, on the other hand, allows us to measure how much more or less reward receivers use a particular payment method relative to non-reward receivers, if each consumer's consumption basket is alike. We use a series of least square estimations to estimate the share.

4. Results

4.1 Estimation of the most frequently used payment method by retail type

Table 4 reports the estimation results for the most frequently used payment method at grocery stores. We estimate four model specifications. The first specification includes only

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consumer characteristics in order to offer a point of comparison to previous studies and to our other specifications. The second includes card related variables, such as credit and debit reward dummies and a credit card balance dummy, in addition to the variables in the first specification. The third specification includes perception variables instead of card related variables. Finally, the fourth specification includes both card related and perception variables as well as consumer characteristics.

Since our model is a multinomial logit model, coefficients are not easily interpreted. Nevertheless, in the first specification coefficients on gender, age, income, educational level, race, and technology adoption variables are statistically significantly different from zero. This implies that these consumer characteristics influence consumer payment choice.

By adding three rewards dummies and a credit card balance dummy, the log-likelihood increases from -2689 to -2571. In this specification, coefficients on all reward dummies and credit balance dummy are statistically significantly different from zero. Signs of these coefficients are as expected: Rewards increase the probability that consumers choose to pay with the card with rewards and consumers without credit card balance are more likely to choose credit card.

By adding perception variables to consumer characteristics, the log-likelihood is improved significantly (from -2689 to -1689). This implies that consumer perceptions are important to predict the probability of choosing the most frequently used payment method at grocery stores.

In the full specification, the effect of payment card rewards and credit balance is diminished. The coefficients on credit and signature-based debit reward dummies and credit balance dummy are still significant, but that on PIN-based debit reward dummy becomes insignificant. This may suggest that the PIN debit reward dummy acts as a proxy for consumer's

better perception toward PIN-based debit. Therefore, after controlling for consumer perception, it has little effect on consumer payment choice. In contrast, credit rewards, signature debit rewards, and a credit card balance have significant effects on the consumer use of payment, even after controlling for consumer perception.

We also estimate models of the most frequently used payment method at other types of stores—department stores, discount stores, drug stores, and fast food restaurants.[14] In the full specification, only credit rewards have a significant effect on consumer payment choice at all types of stores. Signature debit rewards and a credit card balance have a significant effect at some types of stores, while PIN debit rewards do not have a significant effect at any types of stores.

We now quantify the effects of payment card rewards on consumer payment choice. To do so, we construct predicted probability of using different payment methods according to whether the consumer receives rewards on credit card and/or on signature debit card. The predicted probability varies by consumer and by retail type. Figure 3 shows these probabilities for middle-aged Caucasian male college graduates with income $70,000 who do not carry a credit card balance at five different retail types.[15] We consider four cases: 1) rewards on neither credit nor debit card; 2) rewards on credit card only; 3) rewards on (signature-based) debit card only; and 4) rewards on both credit and debit cards.

Before analyzing four cases, it may be worth noting that the same consumer's probabilities of choosing a payment method significantly vary by retail type. The consumer tends to use a credit card more exclusively at department stores, while at fast food restaurants he tends to use cash more exclusively. For the other three types of stores, his probability of choosing a payment

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[14] Specification 4 results are shown in appendix.

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method from a credit card, a debit card, and a paper-based payment (cash or check) is relatively more evenly distributed.

Compared with the case where the consumer does not receive rewards at all (case 1), when he receives rewards on credit card only (case 2) his probability of choosing a credit card is greater at any of the five types of retail stores. As a result, not only his probability of choosing a paper-based payment but also the probability of choosing a debit card become smaller. The effects of credit card rewards vary by retail type. The reward credit card holder's probability of choosing a credit card is about 25 percentage points greater at grocery stores, approximately 15 percentage points greater at department stores, discount stores and drug stores, and only 8 percentage points greater at fast food restaurants. The decline in probability of choosing a debit card surpasses the decline in probability of choosing a paper-based payment at grocery stores and department stores.

Compared with case 1, when the consumer receives rewards on debit card only (case 3), his probability of choosing a debit card becomes greater. Both probabilities of choosing a credit card and of choosing a paper-based payment become smaller. Similar to the effects of credit card rewards, the effects of debit card rewards vary by retail type. The reward debit card holder's probability of choosing a debit card is about 10 percentage points greater at grocery stores and department stores, 5 to 7 percentage points greater at discount stores and drug stores, and less than 1 percentage point greater at fast food restaurants. At all types of stores but department stores, the decrease in probability of choosing a paper-based payment is greater than the decrease in probability of choosing a credit card.

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[15] As these consumers' other consumer characteristics and perceptions, we take the average of male Caucasian college graduate consumers.

As we have seen, the effects of credit card rewards seem to be larger than the effects of debit card rewards. For example, at grocery stores, the consumer's probability of choosing a credit card increases more than 20 percentage points, while his probability of choosing a debit card increases about 10 percentage points. This may imply that consumers will react to rewards on credit card more enthusiastically than to rewards on debit card.

Compared with case 1, when the consumer receives rewards on both credit and debit cards his probability of choosing a credit card is always greater, but his probability of choosing a debit card is not always greater. Rather, his probability of using a debit card is smaller at grocery stores, department stores and discount stores.

We also compare the probabilities with other consumer characteristics. Consumers with different characteristics, such as consumers with a credit card balance, female consumers, and consumers with less educational level, show similar patterns of probability differences as we compare four cases. Although the pattern is similar, the reaction to rewards by those consumers is somewhat more moderate.

Our findings suggest four things. First, the effects of rewards on consumer payment choice may vary by retail type. Second, reward card transactions—either credit or debit card rewards— may replace not only paper-based transactions but also non-reward card transactions. Third, the effects of credit card rewards may surpass the effects of debit card rewards. Fourth, even among consumers who carry a positive credit card balance, consumers who receive rewards on credit card may be more likely to use credit card than those who do not receive rewards on credit card.

4.2   Share estimation

Table 5 presents the results of the share estimation.[16] Similar to the multinomial logit models, four model specifications are used. For all of our specifications, the baseline race category is Caucasian, the baseline age category is 35-44 years old, the baseline education category is college, the baseline income category is less than $40,000 and the baseline census division is East South Central.

Our results from the first specification are basically aligned with findings in the previous studies. Female consumers tend to use debit cards more frequently than male consumers. African Americans are heavy users of paper-based payments, while Asian Americans use credit cards more exclusively. Younger consumers use both credit and debit cards more often than older consumers. Interestingly, both consumer groups whose education level is high school or less and higher than college tend to use debit cards less often than the consumer group whose education level is college, while consumers with higher education tend to use credit card more often. Credit card share does not vary by region very much; however debit card share and paper-based payments share vary by region. Technology adoption variables significantly affect debit card share (positively) and paper-based payments share (negatively). Although demographic, financial, regional, and technology adoption characteristics significantly affect consumer payment choice, the adjusted R-square of this specification is at most 0.1.

From the second specification, we see that credit and debit rewards dummies significantly affect the shares of credit card, debit card, and paper-based transactions. The signs of coefficients on credit card rewards and on debit card rewards are as expected: the coefficients on credit card rewards is positive for the credit card share, but it is negative for the share of debit card and of

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[16] All of the results shown in table 5 used OLS models, but we will modify the models to more sophisticated ones, such as GLS and with instrumental variables.

paper-based transactions; the coefficient on debit card reward is positive for the debit card share, but it is negative for the share of credit card and of paper-based transactions. The magnitude of coefficients on both rewards dummies is greater than that of most other coefficients on demographic, financial, regional, and technology adoption variables. The credit card balance dummy is statistically significant for the credit and debit card share estimations. Consumers who have a positive balance on credit cards use debit cards more often and consumers who do not carry a balance use credit cards more often. Compared with the first specification, adding three card-related dummies significantly improves the adjusted R-squares for the credit card and debit card share estimations.

The results from the third specification suggest that consumer perceptions toward payment instruments significantly predict consumer payment usage. The adjusted R-square of the third specification is at least three times as high as that of the first specification. Naturally, consumers who have better perceptions toward a certain payment method use the payment method more often. For example, consumers who feel comfortable with a credit card transaction tend to use a credit card more often and to use a debit card or a paper-based payment less often.

By adding the three card-related variables to the third specification, the adjusted R-square is not increased very much. Nevertheless, the coefficients on the three card-related dummies are statistically significant for both credit and debit card shares in the fourth specification. Two of the three dummies (credit card balance and credit card rewards) significantly affect the share of paper-based payments. This implies that whether a consumer receives rewards from credit card transactions and/or from debit card transactions is important to predict the consumer's payment usage.

According to our specification 4 results, receiving rewards on credit card represents a 9.0 percentage point increase in credit card share, a 5.6 percentage point decrease in debit card share, and a 4.1 percentage point decrease in paper-based payment share. Although either the increase in credit card share is underestimated or the decrease in debit card share and/or in paper-based payment share is overestimated, the results suggest that reward credit card transactions likely replace both debit transactions and paper-based transactions. Receiving rewards on debit card represents a 6.9 percentage point increase in debit card share, a 6.2 percentage point decrease in credit card share, and a 0.9 percentage point decrease in paper-based payment share. This may imply that majority of reward debit card transactions replace credit card transactions. The effects of credit card rewards seem to be larger than the effects of debit card rewards.

5. Conclusion

This paper shows that consumer payment choice is correlated with rewards on payment cards. Our results suggest that (i) consumers with credit card rewards use credit cards more exclusively than those without credit card rewards; (ii) even among those who carry a credit card balance, consumers with credit card rewards use a credit card more often than those without rewards; (iii) among consumers who receive credit card rewards, those who receive rewards on credit cards as well as on debit cards tend to use debit cards more often than those who receive rewards only on credit cards; and (iv) reward card transactions seem to replace not only paper-based transactions but also non-reward card transactions.

We also show that the effects of payment card rewards vary by consumer and retail type. Because we cannot observe how many in-store transactions take place at each type of retail stores it is difficult to examine how payment card rewards affect overall consumer in-store payment choice. Moreover, consumer payments are not just in-store payments but also payments

over Internet, such as electronic bill payments and e-commerce payments. It is very likely that the payment card rewards affect consumer payment choice differently according to whether the transactions are in-store transactions, electronic bill payments, or e-commerce transactions. More comprehensive analysis is needed to understand how payment rewards affect overall consumer payment choice.

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Table 1: Summary statistics

	Our sample	Census
Demographic		
Female	.491	.514
Race		
African American	.117	.120
Asian	.067	.040
Caucasian	.703	.700
Hispanic	.070	.120
Other	.043	.020
Age		
18-34	.269	.315
35-44	.253	.200
45-54	.174	.189
55-64	.208	.132
65 and over	.096	.165
Education		
Less than high school	.011	.160
High school	.536	.510
College	.311	.250
Some graduate school	.142	.080
Financial (Income)		
$0 - $40,000	.352	.463
$40,000 - $59,999	.240	.178
$60,000 - $99,999	.282	.209
$100,000 and over	.126	.151
Census division		
New England	.050	.051
Mid Atlantic	.118	.142
South Atlantic	.209	.191
ES Central	.050	.061
EN Central	.106	.105
WS Central	.168	.160
WN Central	.072	.069
Mountain	.070	.058
Pacific	.158	.163

Table 2: Reward card holders

	Sample size	Percent of sample	Percent of reward holders
Rewards card holders	721	36.43	100
Reward credit	634	32.03	87.93
Reward debit	269	13.59	37.31
Reward PIN debit	131	6.62	18.17
Reward signature debit	242	12.28	33.56
Reward credit & debit	182	9.20	25.24
Reward credit & PIN debit	82	4.14	11.37
Reward credit & signature debit	167	8.44	23.16

Table 3: Characteristics of reward card holders

Credit card reward	PIN debit card reward	Signature debit reward

Asian
Caucasian
Income>$60,000
Education>college
Living in New England
Technology users
With credit card perception
  - comfortable
  - fast
  - convenient
  - easy to use
  - preferred by stores
  - safe
  - spend within my means
  - for small amounts
  - control over money
  - easy to get refund
	Asian
	25<=Age<=34
	Living in Mid-Atlantic
	Users of Internet at work
	With PIN and signature debit
	  card perception
	  - comfortable
	  - fast
		25<=Age<=34
		Living in Mid-Atlantic
		Users of Internet at work
		Users of online banking
		With PIN and signature debit
		  card perception
		  - comfortable
		  - fast
		With signature debit card
		  perception
		  - convenient
		  - easy to use
		  - preferred by stores
		  - safe
		  - spend within my means
		  - for small amounts
		  - control over money
		  - easy to get refund
		  - money is taken from
		    account right away

Figure 1(a): Consumers' distribution in terms of their share of credit transactions: grouped by credit card balance, debit rewards, and credit rewards
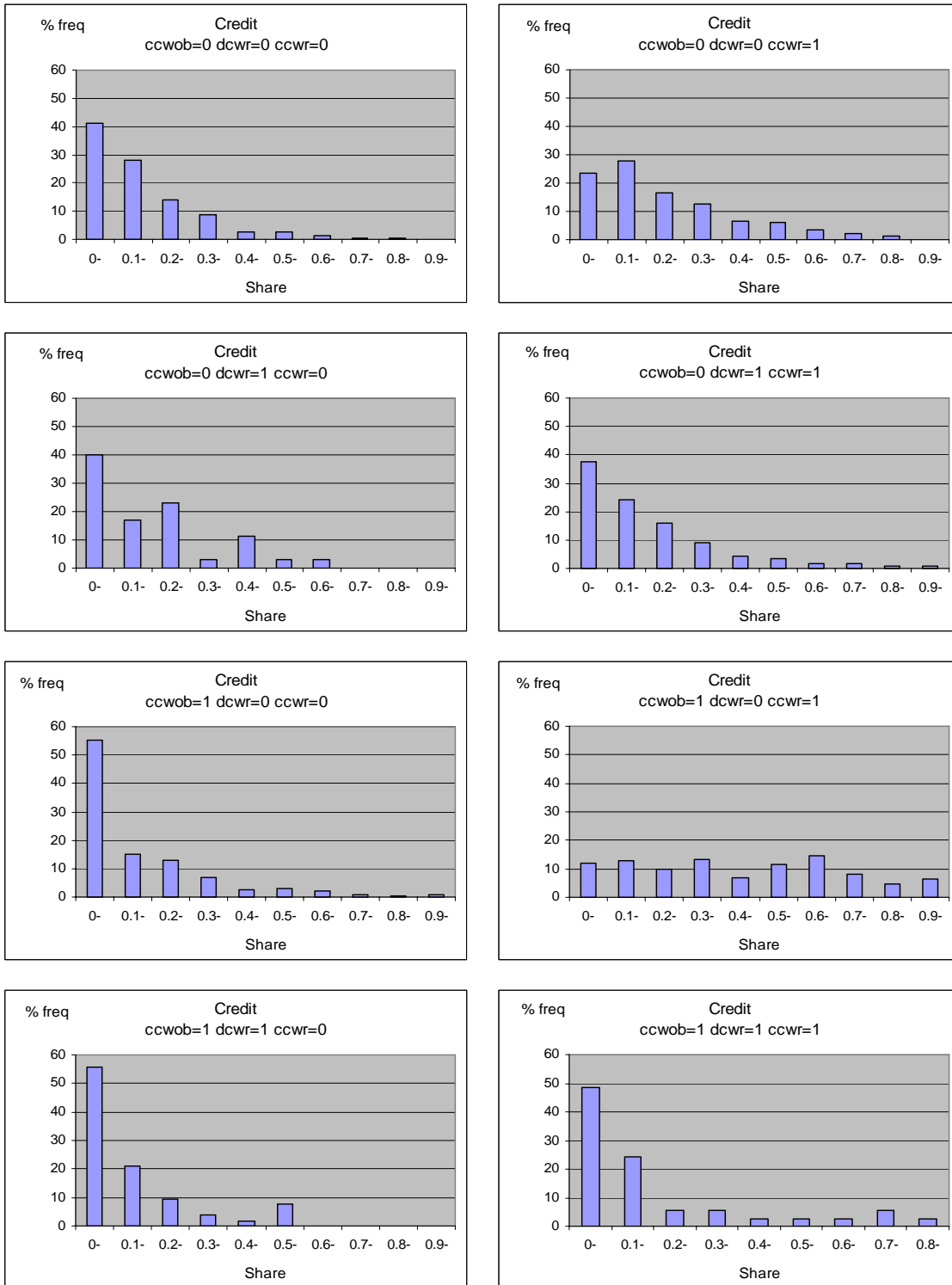
Notes: ccwob=1, if consumers do not carry a credit card balance; ccwob=0, otherwise.

dcwr=1, if consumers receive debit card rewards; dcwr=0, otherwise.

ccwr=1, if consumers receive credit card rewards; ccwr=0, otherwise.

Figure 1(b): Consumers' distribution in terms of their share of debit transactions: grouped by credit card balance, debit rewards, and credit rewards
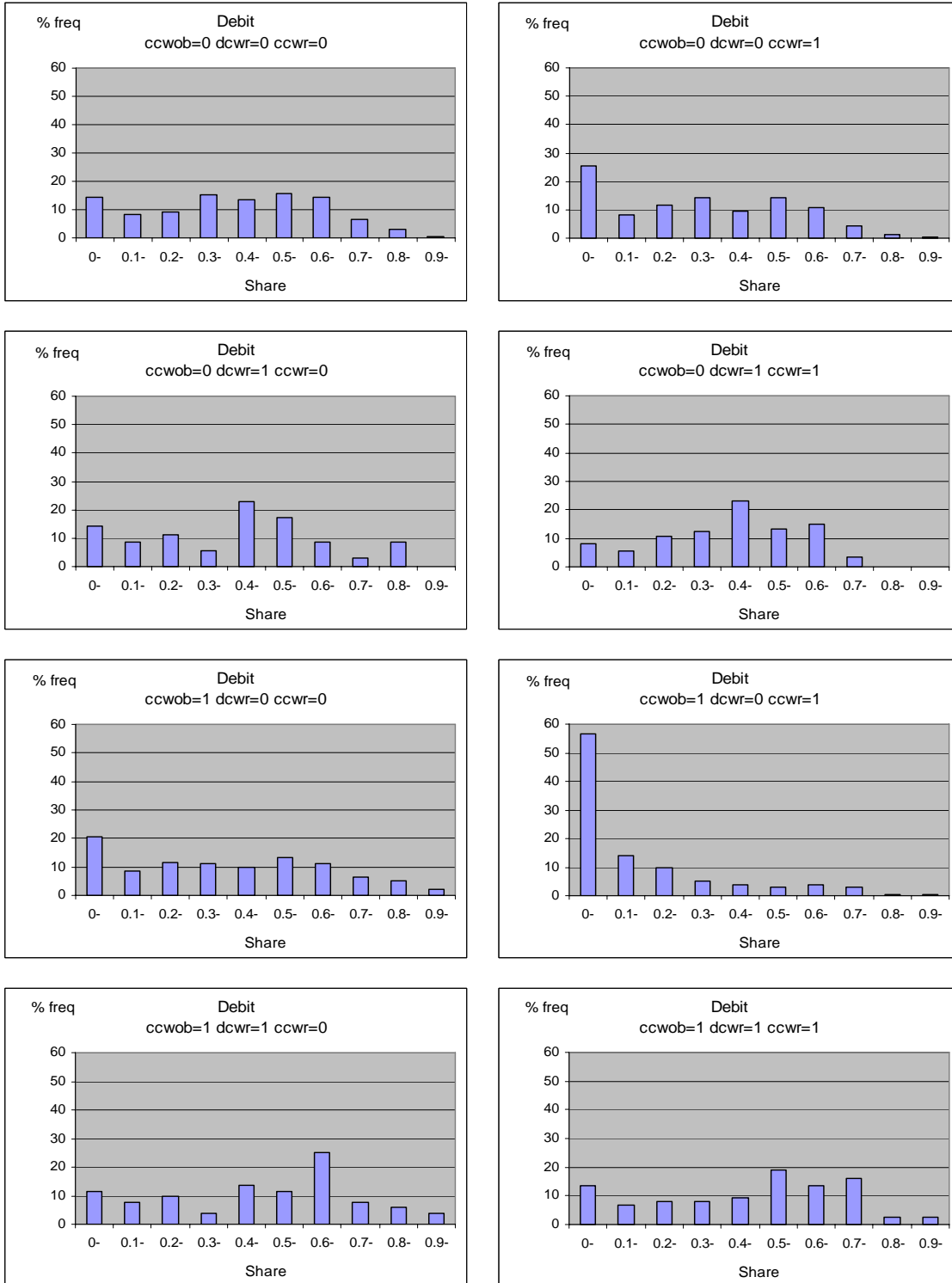
Notes: ccwob=1, if consumers do not carry a credit card balance; ccwob=0, otherwise.

dcwr=1, if consumers receive debit card rewards; dcwr=0, otherwise.

ccwr=1, if consumers receive credit card rewards; ccwr=0, otherwise.

Figure 1(c): Consumers' distribution in terms of their share of paper-based transactions: grouped by credit card balance, debit rewards, and credit rewards
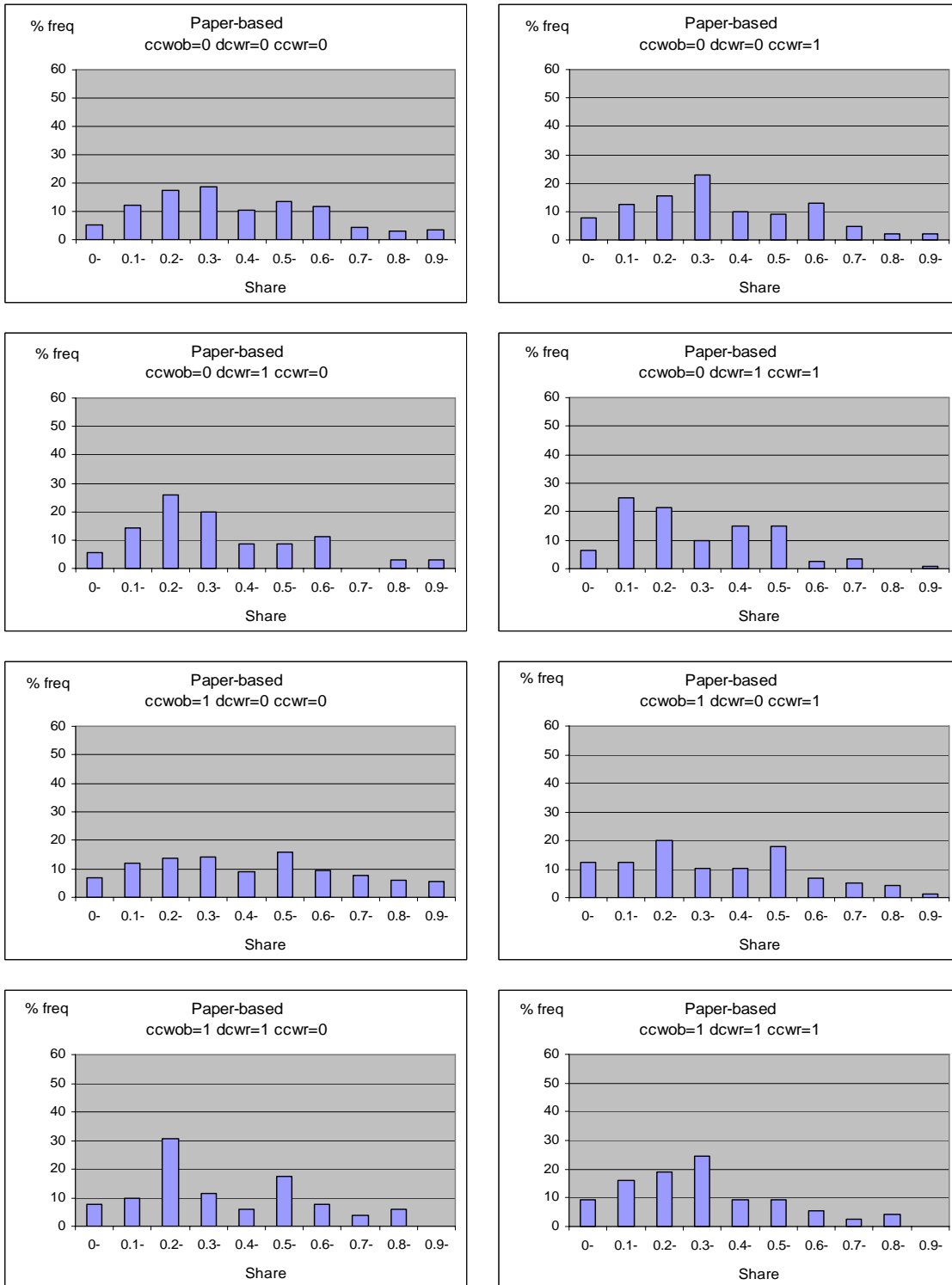
Notes: ccwob=1, if consumers do not carry a credit card balance; ccwob=0, otherwise.
dcwr=1, if consumers receive debit card rewards; dcwr=0, otherwise.
ccwr=1, if consumers receive credit card rewards; ccwr=0, otherwise.

Figure 2: Share of the payment method as the most frequently used method at the grocery stores by credit card balance, debit rewards, and credit rewards
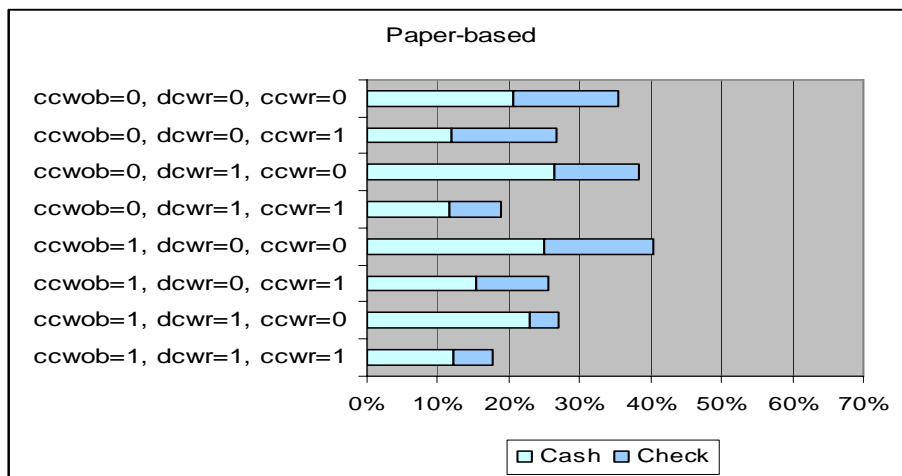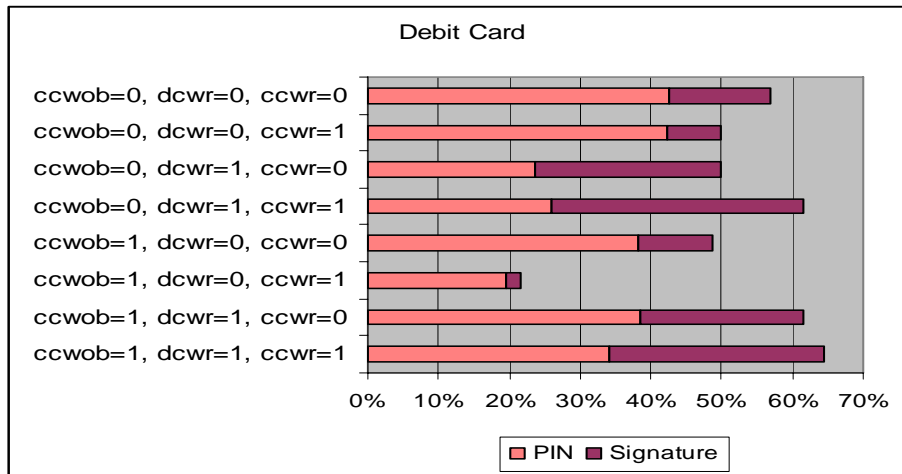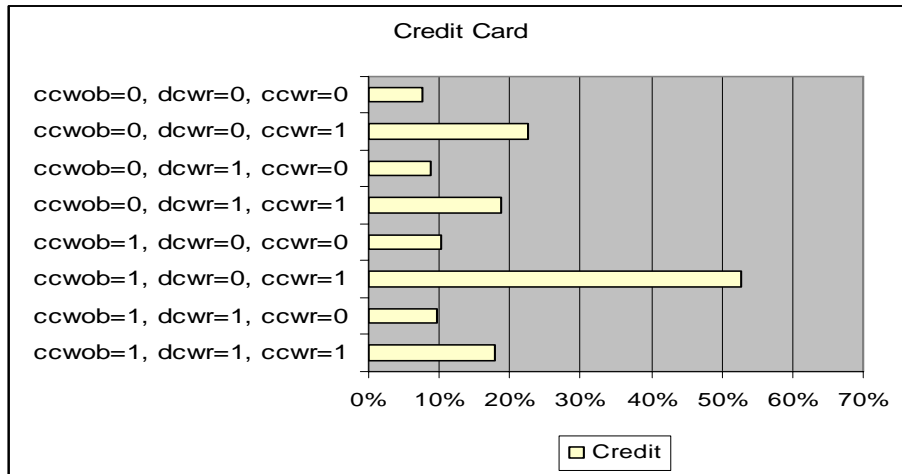
Notes: ccwob=1, if consumers do not carry a credit card balance; ccwob=0, otherwise.

dcwr=1, if consumers receive debit card rewards; dcwr=0, otherwise.

ccwr=1, if consumers receive credit card rewards; ccwr=0, otherwise.

Figure 3: Predicted probability of choosing payment method by retail type

Grocery Stores

Department Stores

Fast Food Restaurants

Discount Stores

Drug Stores
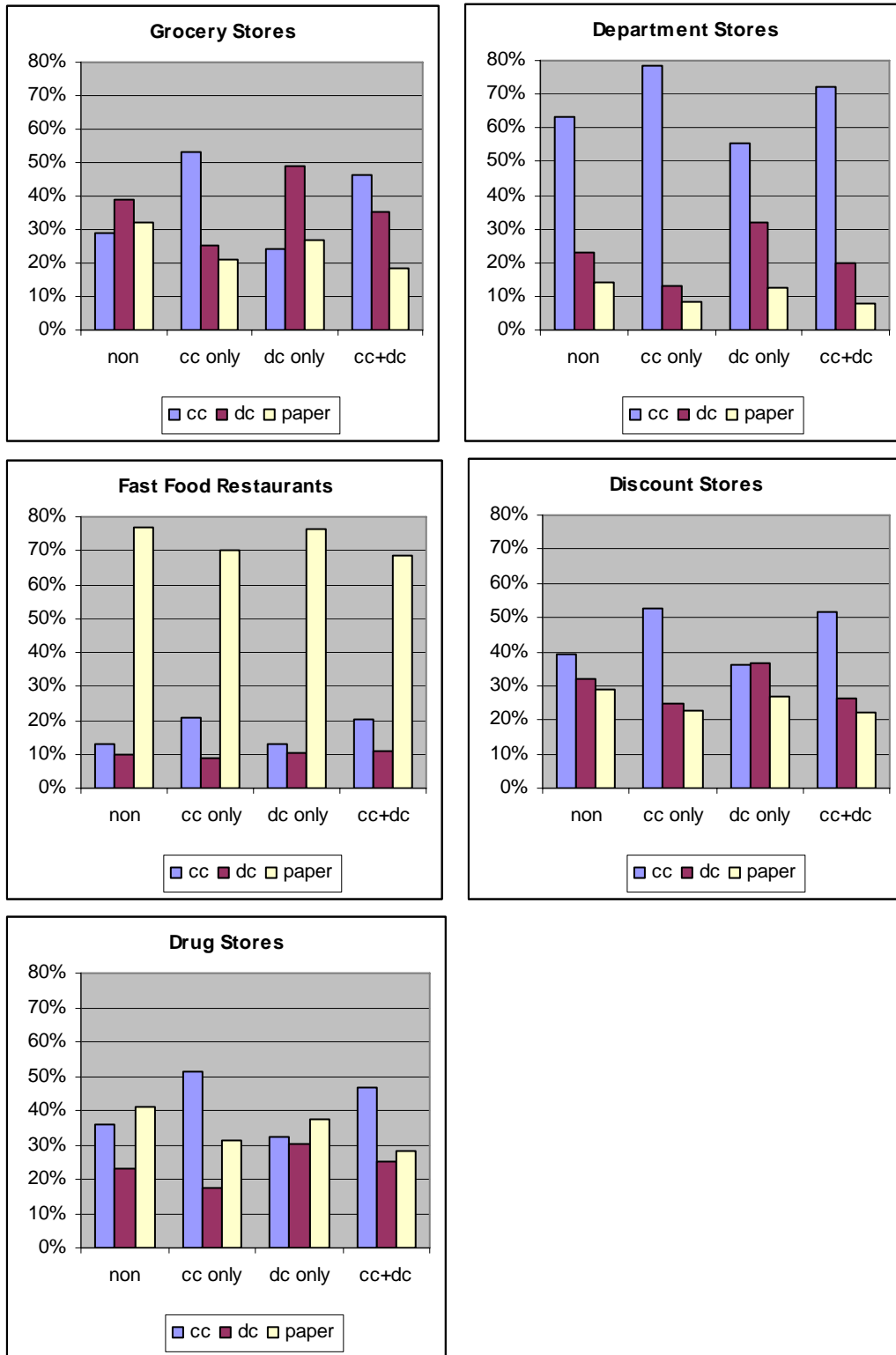
Table 4: Multinomial logit model for payment choice at grocery stores

|	Specification															
	1								2							
	Credit		PIN debit		Signature debit		Check		Credit		PIN debit		Signature debit		Check	
Card related																
No balance on credit									.800**	.147						
Rewards on credit									1.63**	.145						
Reward on PIN											.563**	.202				
Reward on Sig													1.63**	.174		
Demographic																
Female	.365**	.165	.582**	.137	.619**	.174	1.09**	.176	.425**	.173	.588**	.138	.613**	.179	1.09**	.176
Race																
Asian	.238	.280	-1.40**	.323	-1.71**	.480	-.697*	.435	.376*	.286	-1.47**	.320	-1.82**	.511	-.731*	.459
Other	-1.15**	.217	-.627**	.158	-.675**	.201	-.999**	.231	-.961**	.231	-.647**	.158	-.730**	.208	-1.01**	.232
Age	-.111**	.033	-.011	.029	.008	.040	.048*	.039	-.095**	.034	-.012	.029	.015	.041	.046*	.041
Age^2	.001**	.000	.000	.000	.000	.000	-.000	.000	.001**	.000	.000	.000	-.000	.000	-.000	.000
Education	.194	.543	.364	.425	1.34**	.610	-.105	.521	.208	.568	.369	.410	1.27*	.664	-.075	.546
Education^2	.051	.077	-.023	.063	-.161*	.089	.035	.076	.035	.081	-.024	.061	-.150*	.096	.029	.081
Income	.159**	.058	.111**	.050	.070*	.064	.235**	.069	.116*	.060	.114**	.050	.072*	.068	.238**	.069
Income^2	-.005*	.003	-.005*	.003	-.003	.003	-.013**	.004	-.005*	.003	-.006**	.003	-.004	.004	-.013**	.004
Technology																
Direct deposit	.584**	.193	.556*	.155	.956**	.219	.200*	.195	.584**	.193	.556**	.155	.939**	.224	.198*	.202
Online banking	.672**	.167	.825**	.139	.879**	.181	.012	.176	.672**	.167	.825**	.139	.772**	.185	-.002	.181
Intercept	-.360	1.18	-1.10*	.957	-4.02**	1.34	-3.23*	1.27	-1.42*	1.24	-1.12*	.911	-4.29**	1.42	-3.22**	1.29
Perceptions																
Comfortable																
Fast																
Convenient																
Easy to use																
Preferred by stores																
Safe																
Taken right away																
Help me budget/spend																
For small amounts																
Control over money																
Easy to get refund																
Log-likelihood	-2688.99								-2570.88							
N	1915								1915							

Standard errors are in parentheses. ** t-value is greater than 2. * t-value is greater than 1

Table 4: Multinomial logit model for payment choice at grocery stores

	Specification															
	3								4							
	Credit		PIN debit		Signature debit		Check		Credit		PIN debit		Signature debit		Check	
Card related																
No balance on credit									.516**	.175						
Rewards on credit									1.01**	.174						
Reward on PIN											.150	.237				
Reward on Sig													1.19**	.208		
Demographic																
Female	.574**	.193	.550**	.165	.565**	.208	1.10**	.210	.579**	.196	.523**	.166	.537**	.214	1.07**	.211
Race																
Asian	-.195	.316	-1.58**	.381	-1.43**	.569	-.520	.544	-.078	.320	-1.59**	.379	-1.46**	.586	-.555	.558
Other	-1.15**	.257	-.749**	.186	-.863**	.235	-.886**	.265	-.956**	.269	-.736**	.187	-.826**	.239	-.888**	.265
Age	-.104**	.039	-.042*	.037	-.007	.049	.012	.053	-.098**	.040	-.045*	.037	-.001	.051	.009	.053
Age^2	.001**	.000	.000	.000	-.000	.001	-.000	.001	.001*	.000	.000	.000	-.000	.001	-.000	.001
Education	.506	.639	.573	.561	1.09*	.783	.086	.633	.457	.661	.475	.563	1.02*	.794	.027	.636
Education^2	-.019	.090	-.036	.082	-.105	.113	.007	.094	-.021	.093	-.023	.083	-.098	.115	.015	.095
Income	.100*	.066	.061*	.061	.026	.083	.255**	.083	.066	.069	.057	.062	.021	.087	.255**	.083
Income^2	-.003	.003	-.002	.004	-.001	.005	-.013**	.005	-.003	.004	-.002	.004	-.001	.005	-.013**	.005
Technology																
Direct deposit	.613**	.231	.499**	.188	.826**	.264	.200*	.195	.617**	.235	.499**	.188	.812**	.269	.196	.248
Online banking	.479**	.196	.432**	.169	.589**	.217	.012	.176	.451**	.201	.432**	.169	.507**	.222	.141	.223
Intercept	1.18	1.45	1.24	1.26	-1.52	1.72	.027	1.57	.695	1.50	1.41	1.27	-1.73	1.74	.150	1.57
Perceptions																
Comfortable					.696**	.059							.670**	.060		
Fast					.329**	.051							.323**	.052		
Convenient					.813**	.127							.809**	.129		
Easy to use					.642**	.130							.650**	.131		
Preferred by stores					.274**	.088							.275**	.090		
Safe					.148*	.078							.132*	.080		
Taken right away					-.081	.093							-.041	.093		
Help me budget/spend					.316**	.089							.329**	.090		
For small amounts					.227**	.097							.239**	.098		
Control over money					.628**	.093							.568**	.095		
Easy to get refund					.179**	.084							.154*	.085		
Log-likelihood	-1688.74								-1650.80							
N	1915								1915							

Standard errors are in parentheses. ** t-value is greater than 2. * t-value is greater than 1

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Table 5: Share estimation results

	Credit card								Debit card							
	Specification								Specification							
	1		2		3		4		1		2		3		4	
Card related																
No balance on credit			.030**	(.009)			.027**	(.008)			-.036**	(.011)			-.009*	(.009)
Rewards on debit			-.097**	(.014)			-.059**	(.012)			.152**	(.017)			.067**	(.013)
Rewards on credit			.158**	(.010)			.083**	(.009)			-.135**	(.013)			-.053**	(.011)
Perceptions																
Comfortable																
Credit card					.029**	(.003)	.027**	(.003)					-.015**	(.004)	-.013**	(.004)
Debit card					-.024**	(.004)	-.020**	(.004)					.046**	(.005)	.042**	(.005)
Cash or checks					-.030**	(.006)	-.031**	(.006)					-.010*	(.007)	-.009*	(.007)
Fast																
Credit card					.012**	(.004)	.013**	(.004)					.003	(.004)	.002	(.004)
Debit card					-.006*	(.004)	-.007*	(.004)					.017**	(.005)	.017**	(.005)
Cash or checks					-.009*	(.005)	-.010**	(.005)					-.002	(.006)	-.003	(.005)
Convenient																
Credit card					.059**	(.010)	.048**	(.009)					-.053**	(.011)	-.044**	(.011)
Debit card					-.049**	(.011)	-.048**	(.011)					.090**	(.012)	.091**	(.012)
Cash or checks					-.010	(.012)	-.007	(.012)					-.062**	(.014)	-.062**	(.013)
Help me budget/spend																
Credit card					.053**	(.012)	.051**	(.012)					-.039**	(.013)	-.037**	(.013)
Debit card					.003	(.010)	.003	(.010)					.040**	(.011)	.039**	(.011)
Cash or checks					-.010	(.010)	-.013*	(.010)					-.024**	(.012)	-.021*	(.012)
Control over money																
Credit card					.076**	(.011)	.063**	(.011)					-.053**	(.012)	-.047**	(.012)
Debit card					-.032**	(.010)	-.026**	(.010)					.058**	(.012)	.055**	(.012)
Cash or checks					-.014*	(.011)	-.008	(.011)					-.021*	(.012)	-.024**	(.012)
Demographic																
Female	-.014*	(.009)	-.011*	(.009)	.005	(.008)	.004	(.008)	.045**	(.012)	.042**	(.011)	.017*	(.009)	.018**	(.009)
Race																
African American	-.046**	(.015)	-.030**	(.014)	-.025*	(.013)	-.018*	(.012)	.006	(.019)	-.012	(.018)	-.017*	(.014)	-.022*	(.014)
Asian	.130**	(.020)	.128**	(.019)	.048**	(.017)	.053**	(.016)	-.131**	(.025)	-.129**	(.024)	-.039**	(.019)	-.043**	(.019)
Hispanic	.011	(.019)	.029*	(.018)	-.007	(.016)	.002	(.015)	.000	(.024)	-.015	(.023)	.007	(.018)	.001	(.018)
Other	-.030*	(.024)	-.023*	(.022)	-.016	(.019)	-.013	(.019)	.033*	(.029)	.028*	(.028)	.015	(.022)	.013	(.021)
Age																
18-34	.021*	(.013)	.018*	(.012)	.022*	(.011)	.021*	(.011)	.020*	(.016)	.021*	(.015)	.014*	(.012)	.014*	(.012)
45-54	-.007	(.015)	-.005	(.014)	-.010	(.012)	-.009	(.012)	-.014	(.018)	-.013	(.017)	-.006	(.013)	-.006	(.013)
55-64	.016*	(.014)	.011	(.014)	-.006	(.012)	-.008	(.011)	-.034*	(.018)	-.027*	(.017)	-.012	(.013)	-.010	(.013)
65 and over	.070**	(.019)	.047**	(.017)	.006	(.015)	-.002	(.015)	-.114**	(.023)	-.091**	(.022)	-.030*	(.017)	-.025*	(.017)

Table 5: Share estimation results (cont)

	Credit card								Debit card							
	Specification								Specification							
	1		2		3		4		1		2		3		4	
Demographic																
Education																
High school	-.034**	(.013)	-.025**	(.012)	-.016*	(.011)	-.013*	(.010)	-.015	(.016)	-.021*	(.015)	-.011	(.012)	-.012*	(.012)
Graduate school	.081**	(.014)	.057**	(.013)	.035**	(.011)	.026**	(.011)	-.074**	(.017)	-.052**	(.016)	-.018*	(.013)	-.012	(.013)
Financial (Income)																
$40,000 - $59,999	.000	(.012)	-.010	(.012)	-.005	(.010)	-.010*	(.010)	.010	(.015)	.017*	(.015)	.001	(.011)	.003	(.011)
$60,000 - $99,999	.032**	(.012)	.011	(.011)	.010*	(.010)	.002	(.010)	-.015	(.015)	.001	(.014)	-.002	(.011)	.003	(.011)
$100,000 and over	.104**	(.016)	.062**	(.015)	.052**	(.013)	.034**	(.013)	-.066**	(.020)	-.033*	(.019)	-.027*	(.015)	-.018*	(.015)
Census division																
New England	.061**	(.024)	.047**	(.022)	.056**	(.019)	.049**	(.019)	-.009	(.029)	.005	(.028)	-.011	(.022)	-.006	(.022)
Mid Atlantic	-.013	(.018)	-.000	(.017)	.015*	(.014)	.020*	(.014)	-.005	(.022)	-.024*	(.021)	-.023*	(.016)	-.030*	(.016)
South Atlantic	.010	(.015)	.027*	(.014)	.020*	(.012)	.028**	(.012)	.048**	(.019)	.031*	(.018)	.028**	(.014)	.022*	(.014)
ES Central	-.026*	(.024)	-.021	(.022)	.001	(.019)	.001	(.019)	.049*	(.029)	.047*	(.028)	.033*	(.022)	.035*	(.022)
EN Central	-.016	(.018)	.001	(.017)	.004	(.015)	.010	(.015)	.071**	(.022)	.057**	(.022)	.045**	(.017)	.040**	(.017)
WN Central	.005	(.021)	.011	(.019)	-.004	(.017)	-.001	(.016)	.004	(.025)	-.002	(.024)	.022*	(.019)	.019*	(.019)
Mountain	.005	(.021)	.006	(.020)	.017	(.017)	.015	(.017)	.050*	(.026)	.051**	(.025)	.029*	(.019)	.030*	(.019)
Pacific	-.029*	(.016)	-.020*	(.016)	.004	(.014)	.005	(.013)	.084**	(.020)	.077**	(.019)	.030**	(.015)	.030*	(.015)
Technology adoption																
Direct deposit	.021*	(.011)	.017*	(.011)	.030**	(.009)	.027**	(.009)	.049**	(.014)	.051**	(.013)	.023**	(.010)	.025**	(.010)
Internet at home	.022*	(.015)	.011	(.014)	.024*	(.012)	.020*	(.012)	.008	(.018)	.017	(.018)	.006	(.014)	.010	(.014)
Online banking	-.010*	(.010)	-.013*	(.010)	.002	(.009)	.000	(.008)	.067**	(.013)	.066**	(.012)	.015*	(.009)	.016*	(.010)
Intercept	.139**	(.023)	.105**	(.023)	.286**	(.037)	.255**	(.037)	.259**	(.028)	.290**	(.028)	.201**	(.041)	.211**	(.042)
R-square	.1188		.2207		.4209		.4494		.1008		.1692		.5050		.5149	
Adj. R-square	.1076		.2095		.4090		.4372		.0893		.1573		.4948		.5041	

Notes: N=2000. Standard errors are in parentheses. ** t-value is greater than 2. * t-value is greater than 1.

Table 5: Share estimation results (cont)

	Paper-based							
	Specification							
	1		2		3		4	
Card related								
No balance on credit			.007	(.011)			-.016*	(.009)
Rewards on debit			-.056**	(.016)			-.010	(.014)
Rewards on credit			-.032**	(.012)			-.037**	(.011)
Perceptions								
Comfortable								
Credit card					-.015**	(.004)	-.014**	(.004)
Debit card					-.018**	(.005)	-.019**	(.005)
Cash or checks					.042**	(.007)	.041**	(.007)
Fast								
Credit card					-.014**	(.004)	-.014**	(.004)
Debit card					-.012**	(.005)	-.011**	(.005)
Cash or checks					.015**	(.006)	.016**	(.006)
Convenient								
Credit card					-.007	(.011)	-.005	(.011)
Debit card					-.041**	(.013)	-.042**	(.013)
Cash or checks					.072**	(.014)	.070**	(.014)
Help me budget/spend								
Credit card					-.012	(.014)	-.011	(.014)
Debit card					-.042**	(.012)	-.041**	(.012)
Cash or checks					.030**	(.012)	.031**	(.012)
Control over money								
Credit card					-.029**	(.013)	-.022*	(.013)
Debit card					-.032**	(.012)	-.036**	(.012)
Cash or checks					.037**	(.013)	.033*	(.013)
Demographic								
Female	-.038**	(.011)	-.039**	(.011)	-.030**	(.009)	-.030**	(.009)
Race								
African American	.056**	(.017)	.057**	(.017)	.056**	(.015)	.055**	(.015)
Asian	.006	(.022)	.008	(.022)	.000	(.020)	-.002	(.020)
Hispanic	.003	(.021)	.001	(.021)	.014	(.019)	.010	(.019)
Other	-.003	(.026)	-.006	(.026)	.001	(.023)	-.001	(.023)
Age								
18-34	-.045**	(.015)	-.042**	(.015)	-.040**	(.013)	-.037**	(.013)
45-54	.026*	(.016)	.023*	(.016)	.022*	(.014)	.020*	(.014)
55-64	.027*	(.016)	.024*	(.016)	.028**	(.014)	.028**	(.014)
65 and over	.052**	(.021)	.051**	(.021)	.033*	(.018)	.036*	(.018)

	Paper-based						
	Specification						
	1		2		3		4	
Demographic								
Education								
High school	.055**	(.014)	.052**	(.014)	.034**	(.012)	.031**	(.012)
Graduate school	-.015	(.015)	-.012	(.015)	-.023*	(.013)	-.019*	(.013)
Financial (Income)								
$40,000 - $59,999	-.007	(.014)	-.003	(.014)	.007	(.012)	.010	(.012)
$60,000 - $99,999	-.020*	(.013)	-.014*	(.014)	-.012*	(.012)	-.007	(.012)
$100,000 and over	-.039**	(.018)	-.028*	(.018)	-.024*	(.016)	-.014	(.016)
Census division								
New England	-.046*	(.026)	-.044*	(.026)	-.038*	(.023)	-.036*	(.023)
Mid Atlantic	.027*	(.020)	.034*	(.019)	.017*	(.017)	.019*	(.017)
South Atlantic	-.051**	(.017)	-.053**	(.017)	-.041**	(.015)	-.045**	(.015)
ES Central	-.003	(.026)	-.007	(.026)	-.015	(.023)	-.017	(.023)
EN Central	-.059**	(.020)	-.062**	(.020)	-.052**	(.018)	-.055**	(.018)
WN Central	.000	(.023)	.000	(.023)	-.007	(.020)	-.008	(.020)
Mountain	-.054**	(.023)	-.057**	(.023)	-.044**	(.020)	-.044**	(.020)
Pacific	-.052**	(.018)	-.053**	(.018)	-.031*	(.016)	-.032**	(.016)
Technology adoption								
Direct deposit	-.073**	(.013)	-.070**	(.013)	-.056**	(.011)	-.054**	(.011)
Internet at home	-.025*	(.017)	-.023*	(.017)	-.025*	(.015)	-.024*	(.014)
Online banking	-.060**	(.011)	-.055**	(.011)	-.020**	(.010)	-.019*	(.010)
Intercept	.559**	(.026)	.563**	(.027)	.444**	(.043)	.464**	(.044)
R-square	.1040		.1168		.3431		.3493	
Adj. R-square	.0925		.1041		.3296		.3348	

Notes: N=2000. Standard errors are in parentheses. ** t-value is greater than 2. * t-value is greater than 1.

Appendix: Multinomial logit model for payment choice by retail type

	Department stores								Fast food restaurant							
	Credit		PIN debit		Signature debit		Check		Credit		PIN debit		Signature debit		Check	
Card related																
No balance on credit	-.049	.125							.539**	.245						
Rewards on credit	.720**	.145							.614**	.227						
Reward on PIN			.035	.287							.242	.389				
Reward on Sig					.821**	.204							.100	.295		
Demographic																
Female	.317*	.204	.112	.165	.255*	.234	.277*	.257	-.571**	.253	-.034	.219	-.400*	.237	-.485	.617
Race																
Asian	.889*	.582	.118	.669	.326	.660	.536	.710	1.11**	.343	.156	.537	-1.30*	.800	.914	2.28
Other	-1.12**	.225	-.714**	.237	-.980**	.253	-.939**	.316	.469*	.297	.744**	.247	.481*	.254	-.841	1.05
Age	-.022	.044	.042	.049	.071*	.056	.135**	.060	-.055*	.046	-.071*	.053	-.058*	.058	.079	.168
Age^2	.000	.001	-.001	.001	-.001*	.001	-.001	.001	.000	.001	.001	.001	.000	.001	-.001	.002
Education	1.57**	.679	1.36*	.733	.887*	.807	.690	.792	-.288	.770	1.33*	.703	1.91*	1.02	3.24	4.28
Education^2	-.168*	.104	-.161*	.112	-.063	.123	-.065	.121	.069	.106	-.203*	.105	-.217*	.145	-.543	.753
Income	.056	.094	.027	.097	-.004	.110	-.007	.115	-.114*	.078	.271*	.136	.068	.094	.216	.978
Income^2	.001	.007	.000	.006	.001	.007	.002	.008	.005*	.004	-.015*	.009	-.004	.005	-.104	.157
Technology																
Direct deposit	.445*	.229	.378*	.246	.748**	.270	.384*	.293	.386*	.302	.173	.288	.591*	.347	.509	1.02
Online banking	.334*	.205	.495**	.226	.487**	.240	.200	.267	.218	.255	.182	.249	-.062	.256	-.575	.691
Intercept	-1.10	1.43	-2.06*	1.60	-2.19*	1.76	-2.86*	1.78	.683	1.76	-3.35*	1.76	-4.02*	2.14	-7.54	8.24
Perceptions																
Comfortable	.585**	.055							.341**	.063						
Fast	.281**	.056							.223**	.065						
Convenient	.511**	.129							.466**	.168						
Easy to use	.429**	.131							.199*	.186						
Preferred by stores	.318**	.095							.158*	.120						
Safe	.175**	.086							.110*	.102						
Taken right away	-.115*	.100							-.134*	.122						
Help me budget/spend	.232**	.097							.241**	.116						
For small amounts	.020	.102							.706**	.108						
Control over money	.565**	.105							.197*	.121						
Easy to get refund	.385**	.087							.207*	.114						
Log-likelihood	-1637.62								-1010.97							
N	1798								1813							

Standard errors are in parentheses. ** t-value is greater than 2. * t-value is greater than 1

	Retail type							
	Discount stores				Drug stores			
	Credit	PIN debit	Signature debit	Check	Credit	PIN debit	Signature debit	Check
Card related								
No balance on credit	-.009 .134				.593** .156			
Rewards on credit	.516** .145				.656** .164			
Reward on PIN		-.241 .246				.233 .237		
Reward on Sig			.656** .207				.808** .207	
Demographic								
Female	-.226* .168	-.061 .168	-.106 .212	.620** .203	.139 .170	.390** .151	.367* .185	.583** .204
Race								
Asian	1.03** .426	.412 .480	-.015 .637	.646* .554	.546* .335	-.608* .384	-.890* .532	-.902* .740
Other	-.949** .209	-.729** .191	-.695** .243	-1.20** .287	-.189 .220	-.270* .178	-.483* .222	-.886** .294
Age	-.014 .036	.012 .036	.066* .054	.120** .048	-.110** .037	-.079** .034	-.020 .045	.049 .053
Age^2	.000 .000	-.000 .000	-.001 .001	-.001** .001	.001** .000	.001* .000	.000 .001	-.001 .001
Education	.534 .535	1.25** .554	1.11* .739	1.02* .663	.610* .592	.921* .508	.957* .636	.219 .676
Education^2	-.053 .078	-.140* .082	-.113* .107	-.131 .097	-.040 .083	-.103* .075	-.100* .093	-.009 .100
Income	-.047 .069	-.008 .069	-.136* .083	-.004 .081	.101* .062	.139** .057	.110* .072	.136* .087
Income^2	.005* .004	.003 .004	.008* .005	.005 .005	-.004* .003	-.006* .003	-.006 .004	-.009* .006
Technology								
Direct deposit	.388* .211	.633** .205	.636** .264	.491* .248	.278* .210	.350* .183	.681** .235	.103 .245
Online banking	.362** .172	.249* .172	.367* .219	.455** .210	.199* .174	.104 .156	.223* .198	-.190 .214
Intercept	.155 1.18	-1.77* 1.23	-2.89* 1.71	-3.92** 1.55	-.055 1.35	.204 1.17	-1.88* 1.42	-1.26 1.72
Perceptions								
Comfortable			.548** .053				.650** .060	
Fast			.161** .050				.203** .049	
Convenient			.541** .120				.667** .120	
Easy to use			.288** .120				.395** .125	
Preferred by stores			.319** .088				.309** .082	
Safe			.158* .075				.243* .070	
Taken right away			.020 .090				-.031 .086	
Help me budget/spend			.301** .085				.158* .084	
For small amounts			.143* .095				.316** .089	
Control over money			.407** .090				.398** .086	
Easy to get refund			.169** .080				.274* .076	
Log-likelihood	-1855.18				-1856.88			
N	1761				1846			

Standard errors are in parentheses. ** t-value is greater than 2. * t-value is greater than 1