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The Effect of Demographics on Payment Behavior: Panel Data with Sample Selection

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Abstract:

Connolly and Stavins (2015) showed that payment behavior is strongly correlated with consumers' demographic and income attributes over the 2009–2013 period. In this paper, we apply a random effects panel data model with sample selection based on Wooldridge (1995) to estimate the effect of each attribute on payment-instrument adoption and use. We find that age, education, income, and race are significant in explaining payment behavior even after controlling for all the other attributes of consumers and for payment-instrument characteristics. Most notably, the lowest-income, lowest-education, and minority consumers adopt a very limited set of payment instruments compared with their counterparts even when education and age are controlled for. These consumers also have a significantly different pattern of payment use conditional on adoption; they rely significantly more on cash and less on credit cards for their transactions. The data do not allow us to isolate supply-side and demand-side factors to explain the causes of these discrepancies. Women use significantly less cash than men, but use more debit cards, checks, and online banking bill pay, even when we control for the degree of bill-paying responsibility they have for their households. Single people use more cash, while married people use more checks. Although characteristics of payment instruments, such as cost, convenience, and security, significantly affect payment behavior, consumers' socio-demographic attributes explain most of the variation. Separating the effects of consumers' age from the effects of birth cohorts indicates that in most cases age and birth-cohort trends move together.

JEL classifications: E41, D14, D12

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I. Introduction

Connolly and Stavins (2015) showed that payment behavior is strongly correlated with demographic and income attributes over the 2009–2013 period, based on data from the annual Survey of Consumer Payment Choice (SCPC). However, that paper showed correlations between a single attribute and payment behavior, as measured by the adoption and use of several payment instruments. Any of those effects could become insignificant when all other attributes are controlled for in econometric regressions. Here, we estimate an econometric model of payment-instrument adoption and use where the effect of each individual attribute on payment behavior is estimated while all other demographic and financial variables as well as the characteristics of payment instruments are held constant.

Our methodology is based on Wooldridge (1995) to correct for sample selection in panel data regressions. Instead of fixed effects as used in Wooldridge (1995), we apply random effects to estimate the effect on payment behavior of time-invariant consumer attributes. We find that age, education, income, and race are highly significant in explaining payment behavior, even when we control for all other attributes of the individuals and for the payment-instruments' characteristics. Notably, lowest-income, lowest-education, and minority consumers differ from their respective counterparts: they are significantly less likely to adopt many payment instruments even when education and age are controlled for. Their pattern of payment use also differs significantly from that of their counterparts. The discrepancies among the demographic cohorts do not diminish over time.

Women use significantly less cash than men, but use more checks, debit cards, and electronic bill payments, even when the degree of bill-paying responsibility they have for their households is controlled for. Characteristics of payment instruments, such as cost, convenience, and security, significantly affect payment behavior, as cross-sectional studies have previously found (Schuh and Stavins 2010, 2013 and Koulayev et al. 2016). Nevertheless, consumers' socio-demographic attributes explain most of the variation in payment behavior.

We estimate annual adoption regressions for every payment instrument. Most of the demographic effects remained stable throughout the five-year period. However, the youngest consumers became increasingly more likely to adopt OBBP and debit cards over time, and less likely to adopt checks.

Section II describes the survey data used in this paper. Section III utilizes the panel aspect of the data to show that payment behavior tends to be persistent over time. Section IV discusses the empirical methodology applied to correct for sample selection in panel data. Section V presents the results, and Section VI concludes.

II. Data: the Survey of Consumer Payment Choice

The Survey of Consumer Payment Choice (SCPC) is developed by the Consumer Payments Research Center (CPRC) of the Federal Reserve Bank of Boston and administered annually through the RAND Corporation's American Life Panel (ALP) to a sample of the adult U.S. population.[1] The survey data used here include individual-level variables on payment choice from 2008 to 2013, including adoption and use of nine common payment instruments, ownership of deposit accounts, assessments of payment characteristics, and payment history (credit rating, revolving on credit, overdraft, foreclosure, and bankruptcy). A detailed description of the data, survey methodology, and summary of aggregate changes in U.S. payments by consumers can be found in Foster et al. (2009, 2011), Foster, Schuh, and Zhang (2013), and Schuh and Stavins (2014, 2015). The annual surveys were administered primarily in October of each year. Appendix Table 1 shows the number of respondents and the size of the longitudinal panel in the 2008–2013 SCPC.

The SCPC was administered to ALP members selected to maximize the number of longitudinal panelists. As a result, the unweighted composition of the SCPC is not representative of the U.S. consumer population as reported in the Census Bureau's Current Population Survey Annual Social and Economic Supplement (CPS ASEC). As reported in

[1] In 2014, the CPRC started using a new survey vendor to collect the data. The dataset used in this paper ends in 2013 to maintain consistency.

Angrisani, Foster, and Hitczenko (2014), the demographic composition of the SCPC under-samples the male, Hispanic, non-white, younger, immigrant, and less-educated cohorts while oversampling households earning $50,000–$75,000 and married individuals. To improve the representativeness of the SCPC estimates, respondents are assigned a post-stratified weight to adjust the demographic composition of the SCPC to better align with the demographic attributes reported in the CPS ASEC: gender, age, ethnicity, education, household size, and household income. Further information on the algorithm constructing the SCPC weights is available in Angrisani, Foster, and Hitczenko (2014).

Payment behavior is measured at the individual-consumer level. Each year, a respondent is asked about his or her adoption and use of each payment instrument, as well as the assessment of the characteristics of every payment instrument, regardless of whether the person has that instrument or not. The characteristics include acceptance, setup, cost, convenience, records, and security. The SCPC provides demographic information on age, gender, race, highest education level attained, marital status, ethnicity, nationality, and geographic region, as well as information on labor force status, household income, and the degree of financial responsibility within the household for every respondent. The survey questionnaire has changed somewhat over the years; therefore, not all the variables exist for all the years of the sample. For example, in 2009 the SCPC did not ask about assessments for setup or records, or whether a respondent reported bankruptcy in the previous seven years. Table 1 shows the number of respondents by demographic cohort for each year.

All the SCPC data, including information contained in this report, are available to the public free of charge after the official results are published.[2] As with previously published SCPC results, estimates reported here may be revised in the future due to additional improvement and insights from new data.

[2] See http://www.bostonfed.org/economic/cprc/data-resources.htm for the available data.

III. Persistence of Payment Behavior over Time

We utilize the panel nature of the data to explore whether the patterns of adoption and use are persistent over time for a given individual. To do this, we follow individuals throughout their time span in the panel to examine their payment-behavior patterns. For every payment instrument, Table 2 shows the percentage of panelists who are "always adopters" during their time in the panel as well as those who are "never adopters." The percentage of panelists with an unchanged adoption status varies by payment instrument, but for the majority of consumers, payment behavior is persistent over time.

For roughly 80 or more percent of consumers, adoption of cash, check, credit and debit cards remained constant throughout the duration of the panel. Cash is held almost uniformly by every consumer, so it is not surprising that over 96 percent of the panelists never changed their cash-adoption status. However, 89 percent of the sample panelists never changed their check-adoption status, despite the fact that check use declined significantly during the sample period. Credit cards had the third-highest percentage of panelists who never changed their adoption status, although that percentage includes over 13 percent who never adopted credit cards. Even bank account number payment (BANP) had over 50 percent of panelists with no change in the adoption status, the lowest percentage among payment instruments.

Payment use—conditional on adoption—is also persistent. For over two-thirds of the panelists in the sample, the share of use of check, money order, and electronic payments stayed within 10 percent of their own mean share throughout the duration of the panel. Therefore, we conclude that consumer payment behavior is persistent over time.

Figure 1 depicts the percentage of consumers who changed their adoption status each year. The numbers represent a sum of the percentage of consumers who switched from being an adopter to being a non-adopter and vice versa. The numbers in the graph are calculated for each year separately. The electronic payment instruments—online banking bill pay (OBBP) and bank account number payment (BANP)—have the highest percentage of consumers who either newly adopted or dropped the payment instrument each year. In contrast, the more established

the payment instrument, the lower the percentage of consumers who switched their status, with paper checks having the lowest percentage.

Because a substantial share of consumers maintained their payment patterns over the five-year period, the effect of individual consumer and payment attributes on payment behavior may not change much from year to year. Nevertheless, we take advantage of the multiyear panel data to estimate the effect of each attribute based on a panel data model. The section below outlines the panel data model used in this study.

IV. Panel Data Model in the Presence of Sample Selection

Estimating consumers' decisions to adopt and use payment instruments as independent events can lead to sample-selection problems, because the only consumers who use a payment instrument are those who have already adopted it. To correct for potential sample-selection problems when using single-year cross-sectional data, previous papers estimated the two-step Heckman (1976) model, where consumers make adoption decisions in stage 1, and then use decisions conditional on adoption in stage 2 (Schuh and Stavins 2010, 2013; Khan and Liñares-Zegarra 2015).

In this paper, we estimate consumer payment adoption and use with pooled data from five annual surveys from 2009 to 2013.[3] Although the dataset is not a balanced panel, more than half of the 2013 respondents took the survey in every year from 2009 to 2013 (see Appendix Table 1 for the number of panelists in the data). Because our analysis is based on panel data, the Heckman (1976) sample-selection model can lead to inconsistent estimates if the selection process is not consistent over time. A pooled probit estimation in the first step (adoption) would then lead to inconsistent estimates due to correlation of the error terms in adoption and use equations over time.

We apply the methodology based on Wooldridge (1995), where the first stage (adoption) is estimated with probit models for each year separately, and the calculated inverse Mills ratios from the first stage are included in the second-stage (use) equation, which is estimated using

[3] Although the survey started in 2008, the survey questionnaire changed substantially in 2009. Therefore, we use the 2009–2013 data in the regressions.

pooled OLS with fixed effects. Although this approach eliminates the possible sample-selection bias in a panel context, it also precludes estimating coefficients on time-invariant demographic variables, which constitute the main focus of this paper. Therefore, instead of fixed effects, we estimate pooled OLS with random effects in the second stage. As in Wooldridge (1995), standard errors are bootstrapped in the use equation.

Following Wooldridge (1995), we model y_{it}, payment-instrument use by consumer i in year t, as:

$$y_{it} = \alpha_i + x_{it}\beta + u_{it}, \quad t=1, \dots, T,$$

where x_{it} is a vector of variables affecting use, namely, demographic attributes, income, financial responsibility, and payment-instrument characteristics, and α_i are individual fixed effects.

The random effects assumption is that the individual specific effects are uncorrelated with the independent variables. If this assumption does not hold, then the random effects model is not consistent. Therefore, the following assumption must hold:

$$E(\alpha_i | x_{i1}, \dots, x_{iT}) = E(\alpha_i).$$

The assumption is reasonable, as α_i picks up the random effect not already included in any of the $x_{i1}, \dots, x_{iT}$ demographic variables. A Hausman specification test did not reject the random effects model.

Additionally, for random effects with sample selection to be consistent, the following assumption must hold:

$$E(\alpha_i | x_i, s_i) = E(\alpha_i),$$

where s_i is the selection variable. In our model, s_i=1 if consumer i adopts the payment instrument, and 0 otherwise. Recall that payment use y_{it} is observed only if consumer i adopts that payment instrument, or if s_i=1. The assumption above states that the random effect α_i is uncorrelated with the selection variable, in addition to being uncorrelated with the vector of x_i demographic variables.

Following Wooldridge (1995), the estimation steps for the panel data model with sample selection and random effects are as follows:

Step 1: Adoption

For each year t = 1, …, T, estimate $P(s_{it} = 1|x_i)$ using standard probit estimation. Step 1 is the same as Step 1 of the Heckman (1976) model and is estimated separately for each year:

$$P(s_{it} = 1|x_i) = \delta_{t0} + \bar{x}_{it}\delta_t + \vartheta_{it,}$$

where $\vartheta_{it}$is independent of (α_i, x_i) and $\vartheta_{it} \sim N(0, \sigma_t^2)$.

Following step 1, compute the inverse Mills ratio:

$\hat{\lambda}_{it} = \lambda(x_i\hat{\delta}_t)$ for each t = 1, …, T.

Step 2: Use

Estimate:

$$y_{it} = c + x_{it}\beta + \gamma_t\hat{\lambda}(x_i\hat{\delta}_t),$$

using pooled OLS and bootstrap standard errors, with the estimated inverse Mills ratio included in the equation.

Below, we show the variables used in the pooled-data sample-selection model outlined above, first for the adoption stage, then for the use stage.

A. Adoption

In the first stage of the model we estimate consumer *i*'s probability of adopting payment-instrument *j* in year *t* by using the following probit specification separately for each year *t*:

$$A_{jit} = A_t(DEM_{it}, GEO_{it}, Y_{it}, \overline{RCHAR}_{jit}),$$

where:

$$A_{jit} = \begin{cases} 1 & \text{if consumer } i \text{ adopted payment-instrument } j \text{ in year } t \\ 0 & \text{otherwise} \end{cases}$$

j = {check, debit card, credit card, OBBP, BANP, prepaid card and money order}; cash is almost universally adopted by all respondents;

t = 2009, 2010, 2011, 2012, and 2013;[4]

DEM_{it} = {age$_{it}$, education$_{it}$, marital$_{it}$, race$_i$, gender$_i$, homeownership$_{it}$, household size$_{it}$, ethnicity$_i$, nationality$_i$}

is a set of variables for demographic attributes for respondent i.

Some of the respondent's attributes may vary over time (subscript t), while others do not. All of the continuous variables have been transformed into ranges or cohorts. In particular, age is measured as follows: under 25, 25–34, 35–44, 45–54, 55–64, and 65 or over. Education is measured as: less than high school, high school, some college, college, post-graduate. Annual household income is grouped as: under $25K, $25–50K, $50–75K, $75–100K, over $100K a year.

Y_{it} is a set of financial variables for respondent i in year t: {income, employment status, financial responsibility, bankruptcy in past year, bankruptcy in last seven years[5]} GEO_{it} is a set of dummy variables for the geographic census regions: {New England, Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific}.

$\overline{RCHAR}_{jit}$ is a vector of the average relative characteristics of payment j as perceived by consumer i in year t. Respondents are asked to assess the characteristics of every payment instrument—acceptance, setup, cost, convenience, records, and security—on an absolute scale of 1 to 5, where 1 is least desirable (for example, most expensive, or rarely accepted) and 5 is most desirable (for example, very secure, or very convenient). Following Schuh and Stavins (2010 and 2013) we calculate k average relative characteristics by applying the following transformation to the respondents' absolute rating:

$$RCHAR_{kit}(j, j') \equiv log\left(\frac{CHAR_{kijt}}{CHAR_{kijt}}\right),$$

[4] The SCPC began measuring consumers' assessment characteristics for money orders in 2012, so money order regressions start in 2012. Because of changes in the survey questionnaire, prepaid card adoption can only be estimated for the 2011–2013 period.

[5] In 2009, the SCPC did not ask about bankruptcy in the previous seven years.

where k indexes the characteristics (acceptance, setup, cost, convenience, records, and security),[6] i indexes the consumer, j is the payment instrument in question, and j' is every other payment instrument excluding j. The average relative characteristic for each payment characteristic k included as an element in the vector $\overline{RCHAR}_{jit}$ is constructed by:

$$AVG\_RCHAR_{kit}(j) \equiv \frac{1}{J}\sum_{j=j'} RCHAR_{kit}(j, j')$$

over all payment instruments for consumer i. To provide a concrete example of an element in vector $\overline{RCHAR}_{jit}$, let k = security, j= cash, then $AVG\_RCHAR_{kit}(j)$ is the average of the log ratios of security of cash to the security of each of the other payment instruments assessed by consumer i. The higher the $AVG_{RCHAR_{kit}(j)}$, the more secure is cash relative to all other payment instruments, according to consumer i. The average relative characteristic is relative to all payments, not just to the payments adopted by the consumer.

B. Use

As in Schuh and Stavins (2010 and 2013), we measure the use of a given payment instrument as a share of all transactions conducted by the consumer with that payment instrument in a typical month. We use shares rather than the absolute number of transactions to reduce a potential bias resulting from poor recall by consumers: while poor recall could lead to an underestimate of the absolute number of transactions, it is less likely to bias the shares. We estimate the following specification in the second stage:

$$U_{jit} = U\left(DEM_{it}, Y_{it}, GEO_{it}, \overline{RCHAR}_{jit}, NUM_{jit}, MR_{jit}^{-1}\right),$$

where:

$$U_{ijt} \equiv \left(\frac{n_{ijt}}{N_{it}}\right)$$

is the ratio of the number of payments consumer i made using payment-type j in period t divided by the total number of payments consumer i made in period t; $N_{it} \equiv \sum_j n_{ijt}$ is the total

[6] For 2009, the characteristics include: acceptance, cost, convenience, and security, because the SCPC did not ask about setup or records in 2009.

number of payments made by consumer i in period t using all j payment instruments, and n_{ijt} is the number of payments consumer i made with payment instrument j in period t.

As in the adoption stage, DEM_{it} is a set of demographic variables, Y_{it} is a set of income, employment status, and financial responsibility variables, $and\ \overline{RCHAR}_{jit}$ is a vector of relative characteristics of payment j by consumer i in year t. We exclude acceptance and setup from stage 2, as they are much more likely to affect the decision whether or not to adopt a payment instrument than the use of that payment instrument (in 2009 the survey did not ask about record keeping).

The second stage also includes additional variables: NUM_{jit} is the number of other payment instruments consumer i adopted in year t (excluding payment-instrument j), and MR_{jit}^{-1} is the inverse Mills ratio obtained from the first stage of the model. NUM_{jit} is included in the regression because shares are mathematically affected by how many payment instruments the consumer has adopted. MR_{jit}^{-1} controls for selection bias resulting from simultaneity of payment adoption and use decisions. Cash use was estimated without the Mills ratio because cash adoption was nearly universal.

V. Regression Results

Tables 3a–3g show the results of the probit adoption regressions for each payment instrument by year. Because the annual regression results vary across years, Table 4 summarizes the results in a heat map to show which coefficients were consistently significant over time.

For most payment instruments, age, education, income, and race are significant, even after controlling for all other demographic and financial attributes. In contrast, ethnicity and nationality were rarely significant when controlling for other variables.

Most notably, lowest-income, lowest-education, and minority consumers are significantly less likely to adopt many payment instruments even when education and age are controlled for. However, the relationship between income and adoption is not as significant for higher-income cohorts. Characteristics of payment instruments—cost, convenience, security, and others—significantly affect payment behavior, as shown in Schuh and Stavins (2010, 2013)

and Koulayev et al. (2016). Nevertheless, socio-demographic attributes of consumers remain important in explaining payment behavior even when we control for the payment-instrument characteristics. Each table shows the mean coefficient and standard error, averaged over the 2009–2013 period (right-hand-side columns in each adoption-regression table).

Table 5 reports the results of the second-stage use regression, using pooled OLS with random effects for each payment instrument. The inverse Mills ratios from the first stage are included in the model. There is evidence that sample selection exists, as indicated by the statistical significance of all but one coefficient on inverse Mills ratios in the use regressions.

Age, education, income, and race have a strong effect on the use of payments. As was observed in the summary data (Connolly and Stavins 2015), check use increases with age, while debit card use decreases with age. Credit card use increases with income, while cash use drops with income. Characteristics of payment methods have a positive and significant effect on the use of payments. We discuss the results in greater detail below. Because the dependent variables in the use-stage regressions are shares of transactions conducted with a given payment instrument, the higher the number of other payment instruments consumer i had adopted in year t (NUM_{jit},), the lower the share of use of payment j.

Figure 2 shows the estimated coefficient values for each year on selected variables for adoption. The four panels represent coefficients on the most notable variables: age 18–25, education high school or below, household income below $25K, and black. The statistically significant coefficient estimates are represented by filled circles, while those that were not significant are represented by empty circles. Each color represents a different payment instrument.

As the panels in Figure 2 show, almost all of the coefficients on the lowest-income, lowest-education, and black dummy variables were negative and significant throughout the sample period: the estimated coefficients are below the gray horizontal line representing 0. This indicates that consumers in those cohorts have a much more limited set of payment instruments to choose from than their counterparts have. The data do not allow us to isolate supply-side and demand-side factors to explain the causes of discrepancies across the income, education, and racial groups.

Looking at changes in the effect of demographics on behavior over time, the youngest consumers became increasingly more likely to adopt OBBP and debit cards over time, but less likely to adopt checks. Lowest-income consumers became less likely to adopt checks over the years.

Below is a summary of the most notable results grouped by demographic, financial, and geographic attributes.

A. Bank Account Ownership

Several payment instruments are paid out of consumers' bank accounts: check, debit cards, OBBP, and BANP. Therefore, for a consumer to adopt and use these payment instruments, the consumer must have a bank account, and the consumer's decision to have a bank account is closely related to the consumer's choice of payment instruments. The majority of the SCPC survey respondents—over 90 percent, depending on the survey year—have a bank account. We estimate the effects of demographic and financial variables on the probability that a consumer has adopted a bank account, using a probit regression on the pooled 2009–2013 data (Table 6).

As Table 6 shows, bank account ownership and demographic characteristics are highly correlated: low-education, low-income, unemployed, and black consumers are significantly less likely than other consumers to have a bank account. Consumers with a high-school education or less, those with annual household income below $25K, and/or black consumers are the least likely to hold a bank account. In contrast, older consumers and homeowners are significantly more likely than others to have a bank account. Surprisingly, respondents with a post-graduate education were significantly less likely to have a bank account than those with a college degree (omitted category).

Although the SCPC data do not allow us to determine whether the lack of bank account access is caused by supply-side or demand-side reasons, the survey asks respondents why they did not have a bank account. Every year, the most common response has been "I don't like dealing with banks." This suggests that the reason is related to demand, and not caused by supply-side restrictions.

When we limit the sample to consumers with a bank account, some of the regression results lose their statistical significance, despite the fact that there are only a small number of consumers without a bank account in the sample. In particular, the adoption and/or use of payment instruments that require a bank account—checks, debit cards, and BANP—is not as significantly affected by demographic effects as in the full-sample results. One way to estimate the effect of demographics on payment-method use is to estimate the adoption of a bank account first, and then estimate the adoption of payment instruments conditional on bank account ownership. However, we cannot determine from the data whether consumers open a bank account solely because they want access to a payment instrument, such as a debit card. In that case, the decision whether or not to open a bank account would not be exogenous with respect to payment-method adoption, and modeling payment adoption conditional on bank account adoption might yield biased results.

B. Adoption and Use of Payment Instruments

1. Age

Compared with the omitted group of 35–45 year olds, the oldest cohort of consumers were 48 percent more likely to adopt checks and 52 percent more likely to adopt credit cards, but 37 percent less likely to adopt debit cards and 35 percent less likely to adopt OBBP. Conditional on adoption, older consumers also use checks more and debit cards less than did younger consumers. The effect of age on the use of credit cards and electronic payments—while strong in the summary statistics—almost disappears in the regressions.

2. Education

Education is a strong and consistent predictor of payment-instrument adoption. Less-educated consumers were significantly less likely to adopt all payment instruments except for money order, even when all other attributes were controlled for. Most of the patterns persisted throughout the 2009–2013 sample period. Compared with those with a college degree, consumers with less than a high-school diploma were on average 88 percent less likely to adopt

checks, 86 percent less likely to adopt a debit card, and 70 percent less likely to adopt a credit card. Moreover, the effect of education did not diminish over time.

The effect of education on payment use was less uniform. Less-educated consumers used cash more, but used credit cards less than more-educated consumers did. The effect of education on debit card use was not monotonic. Credit card use for those with less than a high-school education or high-school graduates was 9 percentage points lower than credit card use by college graduates. Cash share among the least-educated cohort was 12 percentage points higher than among college graduates.

3. Income

Lowest-income consumers—those in households earning less than $25K a year—have a very different pattern of payment behavior from the rest of the population. Compared with the omitted cohort of those with annual income of $50K–$75K, they had a consistently and significantly lower probability of adopting almost any payment method than higher-income consumers (the exceptions were prepaid card and money order), even when age, education, and employment were controlled for. On average, check adoption was 83 percent lower, debit card adoption was 41 percent lower, and credit card adoption was 68 percent lower than the omitted category. For credit cards, the effect was stronger than for other payment instruments and was statistically significant across all income cohorts. These lowest-income consumers used cash more intensively than higher-income consumers did.

Income affects debit and credit card use in opposite ways: For consumers with household income above $100,000, the debit card share was 3 percentage points lower than for the omitted cohort, while credit card use was 3 percentage points higher than for the omitted cohort.

4. Income Conditional on Education

We showed above that both income and education significantly affect payment behavior. However, because income and education are positively correlated, it is interesting to examine

whether the effect of income holds conditional on educational attainment. We analyzed the data in two different ways to address this question:

1) We included interaction terms of 15 income cohorts with a dummy variable for "high education" (1 if completed college or post-graduate education, 0 otherwise). The interaction terms measure the additional income effect for those who are highly educated.

The coefficients on the interaction terms were largely insignificant, except for the use of debit cards and credit cards. Highly educated consumers had a stronger negative effect of income on debit card use and a stronger positive effect of income on credit card use, compared with those with less education. Therefore, the effect of income on both debit and credit card use is stronger for those with more education, and both income and education influenced behavior.

2) We estimated the entire model separately for those with "high education" (college or post-graduate education) and those with "low education" (everyone else).

The regression results were similar for the two subsamples: Most of the coefficients on the income variables had the same sign and significance for those with high and low education, although the effect of income on payment behavior was slightly stronger for consumers with low education.

Overall, we found that the effect of income holds, conditional on educational attainment, although income has a slightly weaker effect on the behavior of those who are highly educated.

5. Race

Relative to white consumers, black consumers were 73 percent less likely to adopt checks and 39 percent less likely to adopt credit cards, but 73 percent more likely to adopt money orders. Black consumers had a 6 percent higher share of cash, but an 8 percent lower share of credit cards than white consumers, all with controls for income and education. The results indicate that there are racial disparities in payment habits beyond the differences that can be explained by other observable consumer attributes.

6. Employment and Marital Status

Unemployed consumers tend to use more cash and fewer checks for their transactions than consumers who are employed. They are also less likely to adopt most payment instruments—checks, debit cards, credit cards, and BANP. Compared with those who had never married, married consumers were more likely to adopt all payment cards: debit, credit, and prepaid. Single consumers' share of cash use was significantly higher than married consumers' share, while married consumers used more checks. Consumers in larger households were significantly less likely than others to have a credit card, even after age, income, and education were controlled for.

7. Gender

Women use significantly less cash than men—on average their share of cash was 5 percent lower than men's. However, women use more checks, debit cards, online banking bill pay, and bank account number pay, even when the degree of bill-paying responsibility they have for their households is controlled for. Women are more likely to hold prepaid cards, which include gift cards.

8. Geographic Area

People living in the Northeast and Mid-Atlantic regions use more cash than residents of the rest of the country. Figure 3 shows the mean share of cash transactions averaged over the 2009–2013 period. The mean share of cash use was 33 percent for the Mid-Atlantic region and 32 percent for the Northeast region. In contrast, the shares for the West-North Central and Mountain regions were only 23 percent. Interestingly, even when we control for income and demographic factors that are correlated with cash use, the differences among geographic regions remain statistically significant (Table 5). The average cash share in several regions was 4–5 percentage points lower than in the omitted region, even when all other factors were controlled for.

In some years, people living outside of New England were more likely to adopt BANP (Table 3g). The use of BANP was also significantly lower in New England than in some other regions (Table 5). It is not clear what causes these geographic differences, but they persist even after we control for many socio-demographic attributes.

9. Characteristics of Payment Instruments

Characteristics of payment instruments have been found significant in affecting payment behavior (Koulayev et al. 2016, Schuh and Stavins 2010, 2013, 2015, Stavins 2013, Rysman 2010). However, none of the previous studies used panel data models with sample selection. Based on the explanatory power of the regressions with and without the inclusion of payment characteristics, we find that payment characteristics explain half or more of the variation in payment adoption for some payment instruments, especially for debit cards and online banking bill payments (Tables 3a–3g). The assessments of cost, convenience, and security all significantly increase both the adoption and use of payment instruments, while setup and record keeping also affect adoption. However, in the use regressions, payment characteristics explain less than 5 percent of the variation in the dependent variable, despite the statistical significance of the estimated coefficients.[7]

As in the cross-sectional studies references cited above, payment characteristics are significant in panel data regressions after demographics and income are controlled for, because of the substantial heterogeneity in behavior even within narrowly constructed demographic cohorts. More research needs to be done to find the causes of this heterogeneity, or to better understand why consumers behave the way they do.

10. Other

Having gone through bankruptcy significantly lowers the probability of having a credit card, regardless of income or of other consumer attributes. The effect is very strong and significant every year. Consumers with little or no household bill-paying responsibility are less likely to adopt the electronic payments BANP and OBBP.

[7] The difference in R^2 between the random effects specification with and without characteristics ranges from 0.4 percentage points for BANP and money orders to 5.4 percentage points for credit cards. For most payment instruments the difference is below 2 percentage points.

C. Age versus Birth-Cohort Effects

Age has a consistently significant effect on payment behavior, as discussed above. Taking advantage of the multi-year panel, we tested whether that effect is due to the age of each consumer or whether it is due to the birth cohort. For example, are 20-year-old consumers always more likely to use debit cards than older consumers, or do consumers born in 1995 use debit cards more heavily regardless of how old they are? We are primarily interested in credit and debit use, as the use of these payment methods is most sensitive to consumers' age, with younger consumers using debit cards more intensively and older consumers using credit cards more. To examine the age-cohort effects, we created groups based on birth-year cohorts that correspond to the age buckets used in the regressions above. For example, consumers age 25–34 in 2009 were born between 1975 and 1984, consumers age 25–34 in 2010 were born between 1976 and 1985, and so on, consumers age 35–44 in 2009 were born between 1965 and 1974, and consumers age 35–44 in 2010 were born between 1966 and 1975. We then plotted debit card shares and credit card shares for each birth-cohort group, along with the real-time age group. The plots were also split up by income.[8]

We examined the plots to see whether shares by birth cohorts differ from one another and whether they differ from shares by age. If they differed, we could conclude that a cohort effect exists separate from the age effect. However, the plots indicate that the cohort trends are consistent with the age trends. The trends overlap or are very close in most cases. Note that we observe only five years of data, a time span that is likely too short to reveal any generational effects. In addition, because the groups are split by age and by income, most have only between 50 and 100 observations, generating a lot of noise from year to year. The graphs indicate that all the groups follow similar trends over time.

[8] The plots are available from the authors. Because this method generated many plots, we did not include them in the paper.

VI. Conclusion

Connolly and Stavins (2015) showed that income and demographic attributes are correlated with payment behavior, based on the 2009–2013 data from the Survey of Consumer Payment Choice. Here, we apply a panel data model with sample selection based on Wooldridge (1995) to test whether socio-demographic attributes affect payment behavior even when all the other observable characteristics are controlled for.

We find that several effects observed in summary statistics remain statistically and economically significant. In particular, income, education, age, and race strongly and consistently affect the way people pay. Lowest-income, lowest-education and minority consumers have a very different pattern of payment adoption than their counterparts. Based on the estimated coefficients, a black consumer with annual household income below $25K and with less than high-school education is 27 percent less likely to have a credit card and 18 percent less likely to have adopted electronic payments than a white consumer with annual household income above $100K and post-graduate education (Table 7). Conditional on adoption, a consumer in the first group has a credit card share that is 37 percent lower than a consumer in the second group. The opposite is found for cash: a consumer in the first group has a cash share that is 37 percent higher than a consumer in the second group. Those discrepancies did not diminish over the five-year time span included in our sample. Even after we controlled for all the other attributes, women differed in their payment habits from men, and people living in the Northeast and Mid-Atlantic regions used more cash. Most of the results are consistent throughout the five-year sample period.

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Table 1: Number of Respondents, by Year and Demographic Cohort (weighted)

Year		2009	2010	2011	2012	2013
Categories	Variables	Number of Individuals in Demographic Cohort				
Total Number of Respondents		2169	2102	2151	2065	2089
Age	<25	200	168	161	127	132
	25 – 34	472	482	526	506	493
	35 – 44	373	351	328	320	346
	45 – 54	421	404	423	395	388
	55 – 64	337	336	343	340	347
	≥ 65	365	361	369	377	384
Gender	Male	1048	1018	1041	994	1007
	Female	1121	1084	1110	1071	1082
Race	White	1581	1539	1616	1520	1584
	Black	338	329	293	301	249
	Asian	60	57	53	58	52
	American Indian/Other	190	177	188	186	204
Ethnicity	Latino	277	268	306	296	388
	Non-Latino	1892	1834	1845	1769	1701
Nationality	Born In United States	1966	1909	1950	1870	1911
	Immigrant	203	193	201	195	178
Education	Less than HS	149	108	160	146	153
	HS	824	817	786	726	722
	Some College	607	594	608	595	610
	College Degree	329	320	347	341	356
	Post-Graduate School	260	263	250	257	247
Employment Status	Employed	1507	1313	1307	1251	1308
	Retired	290	366	364	372	355
	Disabled	64	101	112	119	103
	Unemployed	33	174	211	185	173
	Homemaker	54	108	128	106	112
	Other	27	39	29	31	37
Income	<$25,000	539	511	534	472	486
	$25,000 – $49,999	591	575	537	520	553
	$50,000 – $74,999	457	443	408	386	398
	$75,000 – $99,999	257	254	264	272	231
	≥$100,000	319	315	405	411	418
Marital Status	Married	1409	1334	1380	1340	1302
	Divorced	254	248	266	244	226
	Separated	29	34	31	31	48
	Widowed	91	98	81	90	99
	Never Married	385	388	392	360	414

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] These numbers represent totals after weighting. Samples are weighted each year to reflect U.S. demographics based on data from the Census Bureau. See "The 2011 and 2012 Surveys of Consumer Payment Choice: Technical Appendix" (Angrisani, Foster, Hitczenko) for details.

[2] For most demographic groups, the rows in each group sum to the total sample size for that year. Some totals differ slightly due to missing values within the given group.

Table 2: Persistence of Payment Behavior over Time

Adoption

	Always Adopters (%)	Never Adopters (%)	Never Changed Adoption Status (%) [1]
Cash	96.37	0.04	96.41
Check	84.03	4.95	88.99
Money Order	6.48	63.61	70.09
Debit	65.84	12.79	78.63
Credit	69.68	13.37	83.04
OBBP	35.35	27.31	62.67
BANP	38.16	13.37	51.53

Shares of Use

	Average Change in Shares per Year (%) [2]	Respondents Who Stay within 5% of their Own Average Share of Use (%)	Respondents Who Stay within 10% of their Own Average Share of Use (%)
Cash	14.06	13.48	39.58
Check	8.28	8.17	65.97
Money Order	4.42	4.78	91.84
Debit	14.10	13.73	43.76
Credit	11.20	11.07	54.24
OBBP	7.59	7.88	77.36
BANP	6.56	6.49	84.33

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] Sum of "Always Adopters and "Never Adopters"

[2] Absolute values, within individuals, includes only years in which the respondent adopted the payment instrument.

[3] Prepaid cards are excluded due to changes in the SCPC Questionnaire in 2012 which redefined prepaid cards.

Table 3a: Check Adoption: Probit Regressions by Year

		2009	2010	2011	2012	2013	2009-2013 Average	
							Coefficient	Standard Error
Age	<25	-0.32	0.13	-0.11	-0.53 *	-0.28	-0.22	0.27
	25 – 34	-0.18	-0.08	-0.39 **	-0.46 ***	-0.26 *	-0.28	0.19
	45 – 54	0.26	0.19	-0.12	-0.14	0.06	0.05	0.19
	55 – 64	0.17	0.23	0.20	0.16	0.59 ***	0.27	0.22
	≥ 65	0.43	0.12	0.47	0.59 *	0.82 ***	0.48	0.33
Gender	Female	0.24	0.26 *	-0.05	0.20	0.17	0.16	0.13
Race	Black	-0.60 ***	-0.68 ***	-0.77 ***	-0.90 ***	-0.69 ***	-0.73	0.17
	Asian	0.10	-0.04	6.08	-0.52	0.85	1.29	0.54
	Other	-0.23	-0.08	-0.21	-0.08	-0.15	-0.15	0.26
Ethnicity	Latino	0.24	-0.09	-0.07	-0.31	-0.43 ***	-0.13	0.23
Education	Less than High School	-0.45	-0.63 *	-1.31 ***	-1.21 ***	-0.79 ***	-0.88	0.31
	High School	-0.35 *	-0.72 ***	-0.63 ***	-0.37 **	-0.74 ***	-0.56	0.19
	Some College	-0.09	-0.54 **	-0.45 ***	-0.38 **	-0.64 ***	-0.42	0.17
	Post-Graduate	0.65 **	-0.11	0.11	0.16	0.36	0.24	0.27
Marital Status	Married	0.14	0.03	0.23	0.22	0.33 **	0.19	0.17
	Divorced	-0.32	-0.14	-0.11	-0.11	-0.20	-0.18	0.20
	Separated	0.55	-0.01	-0.04	-0.14	-0.12	0.05	0.41
	Widowed	0.35	0.31	0.12	0.12	0.42	0.26	0.44
Nationality	Immigrant	-0.46 **	0.29	0.58 **	0.13	0.16	0.14	0.24
Income	<$25,000	-0.63 ***	-0.56 ***	-0.73 ***	-0.89 ***	-1.33 ***	-0.83	0.19
	$25,000 – $49,999	-0.01	-0.14	-0.32 *	-0.35 *	-0.76 ***	-0.32	0.18
	$75,000 – $99,999	0.51 **	0.52	0.01	-0.11	-0.59 **	0.07	0.26
	≥$100,000	0.59 **	0.27	0.01	0.09	-0.30	0.13	0.27
Employment Status	Retired	0.35	0.09	-0.16	-0.13	0.17	0.07	0.28
	Disabled	-0.23	-0.44 *	-0.11	-0.38 *	-0.37 **	-0.31	0.23
	Unemployed	-0.77 **	-0.32	-0.53 ***	-0.11	-0.47 ***	-0.44	0.21
	Homemaker	0.00	-0.47 *	-0.39 *	-0.21	-0.46 **	-0.31	0.27
	Other	0.74	0.19	0.21	0.24	-0.49	0.18	0.48
Geographic Region	Mid-Atlantic	-0.36	0.31	-0.17	0.14	0.06	0.00	0.45
	East North Central	-0.24	-0.30	-0.39	-0.32	0.19	-0.21	0.43
	West North Central	0.55	-0.16	-0.78	-0.30	-0.43	-0.22	0.50
	South Atlantic	-0.19	0.13	-0.46	-0.39	0.06	-0.17	0.43
	East South Central	-0.44	0.06	-0.71	-0.07	0.52	-0.13	0.49
	West South Central	-0.46	-0.37	-0.88	-0.24	-0.21	-0.43	0.43
	Mountain	-0.24	-0.32	-0.72	-0.23	-0.19	-0.34	0.46
	Pacific	-0.47	-0.13	-0.47	-0.18	0.02	-0.24	0.43
Bill Pay Financial Responsibility	None or Almost None	-0.30	0.02	-0.22	-0.59 ***	-0.33	-0.28	0.24
	Some	0.05	0.04	-0.25	-0.24	0.14	-0.05	0.24
	Most	0.03	0.49 *	-0.16	0.39	0.21	0.19	0.26
	All or Almost All	0.23	0.57 **	0.23	-0.05	0.09	0.22	0.21
Household Shopping Responsibility	None or Almost None	0.29	-0.64 *	-0.35	0.24	0.14	-0.06	0.28
	Some	0.41 *	-0.18	-0.08	0.06	0.14	0.07	0.22
	Most	0.05	-0.30	-0.35 *	-0.13	0.10	-0.13	0.21
	All or Almost All	0.20	-0.54 **	-0.18	0.22	0.09	-0.04	0.21
Household Size	Household Size	-0.15 ***	-0.09 **	-0.03	-0.07 *	-0.03	-0.07	0.04
Home Ownership	Owns Home	0.48 ***	0.94 ***	0.52 ***	0.44 ***	0.41 ***	0.56	0.14
Bankruptcy	Within last 12 months	-0.35	-0.20	0.62	0.07	-0.22	-0.01	0.49
	Within last 7 years	na	0.38	0.32	0.02	-0.01	0.18	0.28
Payment Instrument Characteristics	Acceptance	0.11	-0.24	-0.20	0.33 **	0.10	0.02	0.16
	Set Up	na	0.70 ***	0.88 ***	0.43 **	0.54 ***	0.64	0.21
	Cost	0.64 ***	0.11	0.23	0.24	0.24	0.29	0.21
	Convenience	0.02	0.03	0.39 ***	0.24 *	0.03	0.14	0.15
	Records	na	0.59 ***	0.65 ***	0.16	0.71 ***	0.53	0.19
	Security	-0.02	0.43 **	0.32 **	0.34 **	-0.04	0.21	0.15
	N	1909	2012	2057	1957	1842	1955	na
	Pseudo R-squared	0.33	0.43	0.46	0.42	0.44	na	na
	Pseudo R-squared (excluding characteristics)	0.33	0.39	0.39	0.38	0.41	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for check adoption. It is equal to 1 if a respondent has adopted checks and 0 otherwise.

[2] Some survey questions changed from the 2009 to the 2010-2013 versions of the SCPC. In 2009, we did not inquire about the assessment of record-keeping, the assessment of setup, or the occurrence of bankruptcy within the last 7 years. For 2009, these values are reported as "na."

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 3b: Money Order Adoption: Probit Regressions by Year

		2012	2013	2012-2013 Average	
				Coefficient	Standard Error
Age	<25	-0.08	-0.16	-0.12	0.23
	25 – 34	0.12	-0.07	0.02	0.13
	45 – 54	0.13	-0.21 *	-0.04	0.13
	55 – 64	-0.24 *	-0.15	-0.19	0.14
	≥ 65	-0.51 **	-0.42 **	-0.46	0.19
Gender	Female	0.03	0.19 **	0.11	0.08
Race	Black	0.78 ***	0.67 ***	0.73	0.12
	Asian	-0.36	0.10	-0.13	0.30
	Other	0.09	0.14	0.12	0.17
Ethnicity	Latino	0.11	0.15	0.13	0.14
Education	Less than High School	-0.36	-0.13	-0.24	0.24
	High School	0.07	-0.17	-0.05	0.13
	Some College	0.14	0.11	0.13	0.10
	Post-Graduate	0.27 **	0.04	0.15	0.12
Marital Status	Married	0.05	0.02	0.03	0.12
	Divorced	0.17	-0.16	0.01	0.14
	Separated	0.28	0.43 *	0.36	0.27
	Widowed	-0.06	-0.25	-0.16	0.23
Nationality	Immigrant	-0.10	0.09	-0.01	0.15
Income	<$25,000	0.29 **	-0.01	0.14	0.13
	$25,000 – $49,999	0.17	0.14	0.15	0.11
	$75,000 – $99,999	0.04	-0.15	-0.06	0.15
	≥$100,000	-0.01	0.11	0.05	0.13
Employment Status	Retired	0.20	-0.02	0.09	0.15
	Disabled	0.46 ***	0.34 **	0.40	0.17
	Unemployed	0.03	0.03	0.03	0.14
	Homemaker	0.06	-0.11	-0.02	0.19
	Other	-0.32	0.27	-0.03	0.30
Geographic Region	Mid-Atlantic	0.08	-0.33	-0.13	0.21
	East North Central	-0.22	-0.57 ***	-0.40	0.22
	West North Central	-0.05	-0.24	-0.15	0.25
	South Atlantic	-0.29	-0.35 *	-0.32	0.21
	East South Central	-0.56 *	-0.21	-0.38	0.27
	West South Central	0.22	0.12	0.17	0.21
	Mountain	0.03	-0.08	-0.03	0.22
	Pacific	-0.35	-0.35 *	-0.35	0.21
Bill Pay Financial Responsibility	None or Almost None	-0.06	-0.30 *	-0.18	0.17
	Some	0.10	-0.07	0.02	0.17
	Most	0.33 *	-0.19	0.07	0.17
	All or Almost All	0.09	-0.03	0.03	0.13
Household Shopping Responsibility	None or Almost None	-0.34	-0.03	-0.18	0.20
	Some	0.23	0.13	0.18	0.14
	Most	0.23 *	-0.18	0.02	0.13
	All or Almost All	0.09	0.00	0.05	0.12
Household Size	Household Size	0.08 ***	0.02	0.05	0.03
Home Ownership	Owns Home	-0.33 ***	-0.31 ***	-0.32	0.09
Bankruptcy	Within last 12 months	0.17	0.10	0.13	0.35
	Within last 7 years	0.45 **	0.28	0.36	0.18
Payment Instrument Characteristics	Acceptance	0.27 ***	0.31 ***	0.29	0.10
	Set Up	0.11	0.08	0.10	0.13
	Cost	0.30 ***	0.32 ***	0.31	0.11
	Convenience	0.53 ***	0.42 ***	0.48	0.13
	Records	0.07	0.20 **	0.14	0.11
	Security	-0.01	0.17 *	0.08	0.10
	N	1968	1850	1909	na
	Pseudo R-squared	0.22	0.20	na	na
	Pseudo R-squared (excluding characteristics)	0.18	0.15	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for money order adoption. It is equal to 1 if a respondent has adopted money orders and 0 otherwise.

[2] The SCPC did not inquire about money order characteristic assessments prior to 2012. As such, only the regressions from 2012 and 2013 are reported here.

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 3c: Debit Card Adoption: Probit Regressions by Year

		2009	2010	2011	2012	2013	2009-2013 Average	
							Coefficient	Standard Error
Age	<25	0.27	0.34	-0.21	0.02	0.52 **	0.19	0.27
	25 – 34	-0.03	-0.03	-0.45 ***	-0.26	0.02	-0.15	0.16
	45 – 54	-0.16	-0.09	-0.41 ***	-0.22	-0.04	-0.19	0.14
	55 – 64	-0.56 ***	-0.18	-0.48 ***	-0.17	-0.21	-0.32	0.15
	≥ 65	-0.62 ***	-0.02	-0.61 ***	-0.25	-0.35 **	-0.37	0.18
Gender	Female	0.07	0.00	-0.02	0.12	0.03	0.04	0.09
Race	Black	-0.08	-0.03	-0.07	-0.32 **	-0.08	-0.12	0.15
	Asian	-0.16	-0.07	0.22	0.10	0.56 *	0.13	0.32
	Other	0.07	0.22	0.01	-0.06	-0.18	0.01	0.23
Ethnicity	Latino	-0.33	-0.06	0.24	0.22	0.11	0.04	0.19
Education	Less than High School	-0.21	-0.57 **	-1.19 ***	-1.43 ***	-0.89 ***	-0.86	0.25
	High School	-0.16	-0.31 **	-0.27 **	-0.26 **	-0.32 **	-0.27	0.12
	Some College	0.13	-0.06	-0.02	-0.02	-0.10	-0.01	0.10
	Post-Graduate	-0.10	-0.15	-0.28 **	-0.20 *	-0.15	-0.18	0.11
Marital Status	Married	0.05	0.05	0.38 ***	0.30 **	0.42 ***	0.24	0.14
	Divorced	0.38 **	0.20	0.44 ***	0.37 **	0.37 **	0.35	0.15
	Separated	0.36	0.08	0.32	0.14	0.01	0.18	0.31
	Widowed	0.36 *	0.04	0.54 **	0.33	0.15	0.28	0.20
Nationality	Immigrant	-0.09	-0.01	0.02	-0.03	-0.05	-0.03	0.17
Income	<$25,000	-0.23 *	-0.42 ***	-0.44 ***	-0.42 ***	-0.53 ***	-0.41	0.13
	$25,000 – $49,999	0.20 *	0.10	0.19	0.10	-0.10	0.10	0.11
	$75,000 – $99,999	0.11	0.08	0.21	-0.02	-0.06	0.06	0.13
	≥$100,000	0.16	0.19	-0.05	0.04	-0.16	0.03	0.12
Employment Status	Retired	0.23 *	-0.04	0.00	-0.14	-0.12	-0.01	0.13
	Disabled	0.26	0.35	0.15	0.01	-0.13	0.13	0.20
	Unemployed	-0.21	-0.15	-0.25 *	0.14	-0.38 ***	-0.17	0.19
	Homemaker	0.00	-0.16	-0.05	-0.08	-0.41 **	-0.14	0.19
	Other	0.28	-0.02	0.29	0.30	-0.36	0.10	0.35
Geographic Region	Mid-Atlantic	-0.20	-0.04	0.13	-0.02	-0.14	-0.05	0.20
	East North Central	-0.16	-0.18	-0.08	-0.11	-0.02	-0.11	0.20
	West North Central	0.02	-0.27	-0.14	-0.01	-0.15	-0.11	0.23
	South Atlantic	0.03	0.04	0.10	0.17	0.23	0.11	0.20
	East South Central	0.25	0.15	-0.09	0.18	0.04	0.11	0.26
	West South Central	-0.16	-0.19	-0.27	-0.06	-0.07	-0.15	0.21
	Mountain	0.38 *	0.23	0.25	0.32	0.11	0.26	0.23
	Pacific	0.11	0.19	0.17	0.21	0.18	0.17	0.21
Bill Pay Financial Responsibility	None or Almost None	-0.20	0.00	-0.18	0.02	0.01	-0.07	0.16
	Some	-0.08	0.10	-0.25	0.18	0.23	0.04	0.16
	Most	0.01	0.06	0.06	0.28	0.24	0.13	0.17
	All or Almost All	-0.14	0.15	-0.02	0.18	0.22	0.08	0.13
Household Shopping Responsibility	None or Almost None	-0.22	-0.47 **	-0.25	-0.40 **	-0.40 **	-0.35	0.19
	Some	-0.14	-0.42 ***	-0.53 ***	-0.30 **	-0.23	-0.32	0.13
	Most	0.10	-0.09	-0.25 *	-0.21	-0.04	-0.10	0.13
	All or Almost All	-0.05	-0.05	-0.33 **	-0.17	-0.06	-0.13	0.13
Household Size	Household Size	-0.01	0.10 ***	-0.01	0.01	-0.04	0.01	0.03
Home Ownership	Owns Home	0.04	0.02	-0.01	-0.13	0.04	-0.01	0.11
Bankruptcy	Within last 12 months	0.21	0.15	-0.18	0.50	0.02	0.14	0.46
	Within last 7 years	na	0.51 *	0.33	0.23	0.48	0.39	0.26
Payment Instrument Characteristics	Acceptance	0.35 **	0.48 ***	0.68 ***	0.20	0.29 *	0.40	0.17
	Set Up	na	0.43 **	0.84 ***	1.00 ***	0.66 ***	0.73	0.18
	Cost	0.90 ***	0.71 ***	0.86 ***	0.47 ***	0.45 ***	0.68	0.14
	Convenience	1.05 ***	1.00 ***	0.78 ***	1.16 ***	0.68 ***	0.94	0.15
	Records	na	0.45 ***	0.41 ***	0.62 ***	0.62 ***	0.52	0.14
	Security	0.30 ***	0.40 ***	0.23 **	0.28 ***	0.20 **	0.28	0.10
	N	1901	2010	2062	1948	1832	1951	na
	Pseudo R-squared	0.17	0.24	0.27	0.26	0.23	na	na
	Pseudo R-squared (excluding characteristics)	0.07	0.08	0.11	0.10	0.12	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for debit card adoption. It is equal to 1 if a respondent has adopted debit cards and 0 otherwise.

[2] Some survey questions changed from the 2009 to the 2010-2013 versions of the SCPC. In 2009, we did not inquire about the assessment of record-keeping, the assessment of setup, or the occurrence of bankruptcy within the last 7 years. For 2009, these values are reported as "na."

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 3d: Credit Card Adoption: Probit Regressions by Year

		2009	2010	2011	2012	2013	2009-2013 Average	
							Coefficient	Standard Error
Age	<25	-0.58 **	-0.48 **	-0.07	-0.01	-0.33	-0.29	0.23
	25 – 34	-0.28 *	-0.35 **	-0.12	-0.38 ***	-0.31 **	-0.29	0.15
	45 – 54	0.18	0.05	0.06	-0.03	-0.08	0.03	0.14
	55 – 64	0.28 *	0.07	0.15	0.21	-0.03	0.14	0.16
	≥ 65	0.85 ***	0.45 *	0.42 *	0.73 ***	0.12	0.52	0.23
Gender	Female	0.13	0.05	0.12	0.24 **	0.08	0.12	0.10
Race	Black	-0.45 ***	-0.31 **	-0.34 **	-0.36 **	-0.50 ***	-0.39	0.14
	Asian	0.20	0.49	0.49	0.06	0.28	0.31	0.43
	Other	-0.19	-0.49 **	-0.28	-0.11	-0.17	-0.25	0.21
Ethnicity	Latino	0.11	-0.17	-0.16	0.35 *	-0.23 *	-0.02	0.19
Education	Less than High School	-0.76 **	-0.40	-0.89 ***	-0.69 ***	-0.77 ***	-0.70	0.27
	High School	-0.59 ***	-0.39 ***	-0.46 ***	-0.38 ***	-0.53 ***	-0.47	0.14
	Some College	-0.30 **	-0.17	-0.29 ***	-0.17	-0.43 ***	-0.27	0.11
	Post-Graduate	0.22	0.28	0.08	0.17	0.33 *	0.22	0.17
Marital Status	Married	0.06	-0.03	0.41 ***	0.33 **	0.38 ***	0.23	0.14
	Divorced	-0.29 *	-0.09	0.10	0.18	-0.03	-0.02	0.16
	Separated	-0.46	0.33	-0.05	-0.50	-0.02	-0.14	0.30
	Widowed	-0.35	-0.17	-0.03	-0.04	0.45 *	-0.03	0.25
Nationality	Immigrant	0.05	0.29	0.02	0.15	0.03	0.11	0.19
Income	<$25,000	-0.68 ***	-0.64 ***	-0.57 ***	-0.73 ***	-0.76 ***	-0.68	0.14
	$25,000 – $49,999	-0.29 **	-0.30 ***	-0.37 ***	-0.19	-0.20 *	-0.27	0.12
	$75,000 – $99,999	0.23	0.33 **	0.29 *	0.16	0.34 *	0.27	0.17
	≥$100,000	0.39 **	0.37 **	0.13	0.28 *	0.35 **	0.30	0.17
Employment Status	Retired	-0.15	0.05	0.00	-0.08	0.29	0.02	0.18
	Disabled	-0.49 **	-0.32	-0.30	-0.41 **	-0.26	-0.35	0.19
	Unemployed	-0.51	0.06	-0.43 ***	-0.18	-0.37 **	-0.29	0.19
	Homemaker	-0.19	-0.06	-0.32 *	-0.27	-0.33	-0.23	0.20
	Other	1.31 ***	0.63 *	0.19	0.50	-0.34	0.46	0.38
Geographic Region	Mid-Atlantic	-0.11	-0.18	0.00	0.42	-0.21	-0.02	0.27
	East North Central	-0.05	-0.37	-0.22	0.07	-0.51 *	-0.22	0.26
	West North Central	-0.03	-0.48	-0.50 *	-0.19	-0.59 *	-0.36	0.29
	South Atlantic	0.02	-0.42	-0.26	0.06	-0.36	-0.19	0.26
	East South Central	-0.59 **	-0.80 ***	-0.41	0.10	-0.37	-0.42	0.30
	West South Central	-0.27	-0.67 **	-0.26	0.00	-0.50 *	-0.34	0.27
	Mountain	-0.23	-0.43	-0.16	-0.01	-0.46 *	-0.26	0.28
	Pacific	-0.13	-0.41	-0.26	0.04	-0.22	-0.20	0.26
Bill Pay Financial Responsibility	None or Almost None	0.09	0.07	-0.11	-0.24	-0.03	-0.04	0.18
	Some	0.16	0.37 **	-0.11	-0.03	0.07	0.09	0.18
	Most	0.44 **	0.50 ***	-0.12	-0.05	0.17	0.19	0.19
	All or Almost All	0.51 ***	0.34 **	-0.08	0.12	0.30 *	0.24	0.15
Household Shopping Responsibility	None or Almost None	-0.50 **	-0.13	-0.05	-0.23	0.03	-0.17	0.22
	Some	-0.31 *	-0.21	0.06	0.01	0.02	-0.09	0.16
	Most	-0.17	-0.28 *	0.13	-0.30 **	-0.05	-0.13	0.15
	All or Almost All	-0.33 **	-0.22	0.14	-0.12	0.12	-0.08	0.15
Household Size	Household Size	-0.09 **	-0.15 ***	-0.15 ***	-0.14 ***	-0.13 ***	-0.13	0.03
Home Ownership	Owns Home	0.38 ***	0.49 ***	0.48 ***	0.41 ***	0.38 ***	0.43	0.10
Bankruptcy	Within last 12 months	-1.90 ***	-1.06 ***	-0.70 **	-1.04 ***	0.13	-0.91	0.32
	Within last 7 years	na	-0.66 ***	-0.30 *	-0.35 *	-0.81 ***	-0.53	0.18
Payment Instrument Characteristics	Acceptance	0.53 **	0.25	-0.08	0.18	-0.19	0.14	0.21
	Set Up	na	0.75 ***	0.55 ***	0.77 ***	0.70 ***	0.69	0.13
	Cost	0.26 ***	0.12	0.16 *	0.19 **	0.17 **	0.18	0.08
	Convenience	0.83 ***	0.66 ***	0.68 ***	0.65 ***	0.66 ***	0.70	0.17
	Records	na	0.80 ***	0.58 ***	0.74 ***	1.00 ***	0.78	0.18
	Security	0.04	-0.15	0.20 *	0.46 ***	-0.07	0.10	0.11
	N	1904	2016	2072	1968	1852	1962	na
	Pseudo R-squared	0.34	0.40	0.39	0.42	0.42	na	na
	Pseudo R-squared (excluding characteristics)	0.30	0.33	0.33	0.33	0.36	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for credit card adoption. It is equal to 1 if a respondent has adopted credit cards and 0 otherwise.

[2] Some survey questions changed from the 2009 to the 2010-2013 versions of the SCPC. In 2009, we did not inquire about the assessment of record-keeping, the assessment of setup, or the occurrence of bankruptcy within the last 7 years. For 2009, these values are reported as "na."

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 3e: Prepaid Card Adoption: Probit Regressions by Year

		2012	2013	2012-2013 Average	
				Coefficient	Standard Error
Age	<25	-0.22	-0.20	-0.21	0.20
	25 – 34	-0.17	-0.07	-0.12	0.11
	45 – 54	-0.03	-0.21 **	-0.12	0.10
	55 – 64	-0.16	-0.17	-0.17	0.11
	≥ 65	-0.27 *	-0.43 ***	-0.35	0.14
Gender	Female	0.16 **	0.20 ***	0.18	0.07
Race	Black	0.19	-0.07	0.06	0.11
	Asian	0.51 **	0.31	0.41	0.23
	Other	-0.07	-0.22 *	-0.15	0.15
Ethnicity	Latino	-0.06	0.31 ***	0.13	0.12
Education	Less than High School	-0.18	-0.18	-0.18	0.20
	High School	-0.18 *	-0.41 ***	-0.30	0.10
	Some College	-0.06	-0.12	-0.09	0.08
	Post-Graduate	0.13	0.20 **	0.17	0.09
Marital Status	Married	0.23 **	-0.01	0.11	0.10
	Divorced	-0.05	0.01	-0.02	0.12
	Separated	0.22	0.01	0.12	0.24
	Widowed	0.29 *	-0.15	0.07	0.17
Nationality	Immigrant	-0.11	-0.20	-0.15	0.13
Income	<$25,000	0.27 **	0.10	0.19	0.11
	$25,000 – $49,999	0.04	0.00	0.02	0.09
	$75,000 – $99,999	0.01	0.20 *	0.11	0.11
	≥$100,000	0.05	0.41 ***	0.23	0.10
Employment Status	Retired	-0.06	0.08	0.01	0.11
	Disabled	0.24	0.79 ***	0.51	0.16
	Unemployed	0.05	0.18	0.11	0.12
	Homemaker	-0.22	-0.08	-0.15	0.15
	Other	0.44 *	0.09	0.26	0.25
Geographic Region	Mid-Atlantic	-0.10	-0.06	-0.08	0.18
	East North Central	-0.17	-0.30	-0.23	0.17
	West North Central	0.07	-0.12	-0.03	0.20
	South Atlantic	-0.21	-0.17	-0.19	0.17
	East South Central	-0.31	-0.46 **	-0.39	0.22
	West South Central	-0.36 **	-0.49 ***	-0.42	0.18
	Mountain	-0.02	-0.10	-0.06	0.19
	Pacific	-0.05	-0.28	-0.16	0.17
Bill Pay Financial Responsibility	None or Almost None	-0.20 *	-0.03	-0.12	0.13
	Some	0.03	-0.05	-0.01	0.13
	Most	0.03	-0.02	0.01	0.14
	All or Almost All	-0.01	0.05	0.02	0.11
Household Shopping Responsibility	None or Almost None	0.06	-0.30 *	-0.12	0.15
	Some	0.06	-0.10	-0.02	0.11
	Most	0.06	-0.11	-0.02	0.11
	All or Almost All	0.07	0.07	0.07	0.10
Household Size	Household Size	0.03	0.03	0.03	0.02
Home Ownership	Owns Home	-0.08	-0.10	-0.09	0.08
Bankruptcy	Within last 12 months	-0.09	-0.07	-0.08	0.33
	Within last 7 years	0.14	0.00	0.07	0.17
Payment Instrument Characteristics	Acceptance	0.14	0.34 ***	0.24	0.10
	Set Up	0.05	-0.01	0.02	0.10
	Cost	-0.03	-0.10	-0.06	0.08
	Convenience	0.22 ***	0.00	0.11	0.08
	Records	-0.11 *	-0.08	-0.09	0.07
	Security	0.05	-0.05	0.00	0.06
	N	1964	1853	1909	na
	Pseudo R-squared	0.05	0.08	na	na
	Pseudo R-squared (excluding characteristics)	0.04	0.07	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for prepaid card adoption. It is equal to 1 if a respondent has adopted prepaid cards and 0 otherwise.

[2] The SCPC questions regarding prepaid cards changed significantly from the 2011 to the 2012 survey. As such, only the regressions for 2012 and 2013 are reported here.

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 3f: Online Banking Bill Pay Adoption: Probit Regressions by Year

		2009	2010	2011	2012	2013	2009-2013 Average	
							Coefficient	Standard Error
Age	<25	0.19	-0.01	0.34 *	0.48 **	0.44 **	0.29	0.21
	25 – 34	-0.11	0.15	-0.04	0.12	0.17	0.06	0.13
	45 – 54	-0.37 ***	-0.17	-0.16	0.02	-0.08	-0.15	0.11
	55 – 64	-0.54 ***	-0.22 *	-0.24 **	-0.14	-0.08	-0.24	0.12
	≥ 65	-0.75 ***	-0.16	-0.33 **	-0.28 *	-0.22	-0.35	0.16
Gender	Female	-0.13 *	-0.08	-0.15 **	-0.12	-0.08	-0.11	0.07
Race	Black	-0.37 ***	-0.18	-0.09	-0.02	-0.01	-0.13	0.13
	Asian	0.25	0.16	0.19	0.19	-0.06	0.14	0.26
	Other	0.06	0.09	0.01	-0.07	0.11	0.04	0.19
Ethnicity	Latino	0.06	0.18	0.05	0.18	0.16	0.13	0.16
Education	Less than High School	-0.55 *	-0.81 ***	-0.85 ***	-0.68 ***	-0.42 *	-0.66	0.26
	High School	-0.18 *	-0.35 ***	-0.35 ***	-0.28 ***	-0.18	-0.27	0.11
	Some College	-0.05	-0.11	-0.03	0.00	-0.11	-0.06	0.08
	Post-Graduate	0.14	-0.07	0.03	0.00	-0.05	0.01	0.10
Marital Status	Married	0.11	0.07	0.13	0.18	0.01	0.10	0.12
	Divorced	0.14	-0.08	0.08	0.06	0.18	0.08	0.13
	Separated	0.00	-0.09	-0.05	-0.33	-0.33	-0.16	0.27
	Widowed	-0.01	0.16	0.03	0.43 **	0.23	0.17	0.19
Nationality	Immigrant	0.07	0.05	0.04	0.04	0.04	0.05	0.14
Income	<$25,000	-0.33 ***	-0.30 ***	-0.43 ***	-0.29 **	-0.57 ***	-0.38	0.12
	$25,000 – $49,999	-0.10	-0.11	-0.20 **	-0.11	-0.11	-0.13	0.09
	$75,000 – $99,999	0.07	0.12	-0.14	0.02	0.11	0.04	0.11
	≥$100,000	0.19 *	0.18 *	0.00	0.20 **	0.25 **	0.16	0.10
Employment Status	Retired	0.05	0.02	0.06	0.20 *	0.13	0.09	0.12
	Disabled	0.01	0.06	0.21	0.01	-0.04	0.05	0.18
	Unemployed	-0.62 *	-0.05	-0.15	-0.04	-0.12	-0.20	0.17
	Homemaker	0.11	0.08	0.18	0.09	-0.20	0.05	0.16
	Other	0.00	0.30	0.04	0.09	0.17	0.12	0.27
Geographic Region	Mid-Atlantic	-0.01	0.06	0.17	-0.22	-0.22	-0.04	0.18
	East North Central	-0.06	-0.09	0.09	-0.23	-0.09	-0.08	0.18
	West North Central	-0.21	-0.08	-0.20	-0.51 **	-0.35	-0.27	0.20
	South Atlantic	-0.03	0.04	0.15	-0.20	0.12	0.01	0.18
	East South Central	0.00	0.15	0.11	-0.42 *	-0.44 *	-0.12	0.22
	West South Central	-0.04	-0.14	0.01	-0.29	-0.38 *	-0.17	0.19
	Mountain	0.10	0.12	0.12	-0.10	-0.20	0.01	0.20
	Pacific	-0.02	0.00	0.19	-0.18	-0.07	-0.02	0.18
Bill Pay Financial Responsibility	None or Almost None	0.02	0.16	-0.30 **	-0.13	-0.25 *	-0.10	0.14
	Some	0.24 *	0.38 ***	-0.22 *	-0.05	-0.19	0.03	0.14
	Most	0.22 *	0.22 *	-0.02	0.08	-0.11	0.08	0.14
	All or Almost All	0.20 *	0.29 ***	-0.12	-0.07	0.10	0.08	0.11
Household Shopping Responsibility	None or Almost None	-0.19	-0.09	-0.09	-0.23	-0.11	-0.14	0.17
	Some	-0.17	-0.05	-0.02	-0.09	0.14	-0.04	0.12
	Most	-0.11	-0.15	0.07	-0.10	0.03	-0.05	0.11
	All or Almost All	-0.07	0.08	0.03	0.01	-0.01	0.01	0.11
Household Size	Household Size	0.00	0.01	0.01	-0.02	0.04	0.01	0.03
Home Ownership	Owns Home	0.11	0.20 **	0.17 *	0.14	0.20 **	0.16	0.09
Bankruptcy	Within last 12 months	0.29	0.27	0.44	-0.30	-0.27	0.09	0.31
	Within last 7 years	na	0.02	0.04	0.60 ***	0.15	0.20	0.18
Payment Instrument Characteristics	Acceptance	0.07	0.24 ***	0.16 *	0.22 **	0.17 *	0.17	0.09
	Set Up	na	0.67 ***	0.58 ***	0.88 ***	0.46 ***	0.65	0.12
	Cost	0.86 ***	0.59 ***	0.48 ***	0.78 ***	0.55 ***	0.65	0.15
	Convenience	1.02 ***	0.78 ***	0.73 ***	0.82 ***	0.73 ***	0.82	0.11
	Records	na	0.41 ***	0.58 ***	0.64 ***	0.74 ***	0.59	0.14
	Security	0.40 ***	0.22 ***	0.31 ***	0.39 ***	0.40 ***	0.35	0.08
	N	1889	2001	2051	1957	1833	1946	na
	Pseudo R-squared	0.19	0.21	0.21	0.23	0.22	na	na
	Pseudo R-squared (excluding characteristics)	0.07	0.07	0.07	0.07	0.10	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for online banking bill payment adoption. It is equal to 1 if a respondent has adopted online banking bill payment and 0 otherwise.

[2] Some survey questions changed from the 2009 to the 2010-2013 versions of the SCPC. In 2009, we did not inquire about the assessment of record-keeping, the assessment of setup, or the occurrence of bankruptcy within the last 7 years. For 2009, these values are reported as "na."

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 3g: Bank Account Number Payment Adoption: Probit Regressions by Year

		2009	2010	2011	2012	2013	2009-2013 Average	
							Coefficient	Standard Error
Age	<25	0.20	-0.49 **	-0.19	-0.50 **	-0.14	-0.22	0.21
	25 – 34	0.11	-0.08	-0.16	-0.31 **	0.14	-0.06	0.13
	45 – 54	-0.01	-0.04	0.00	-0.11	-0.06	-0.05	0.11
	55 – 64	-0.20 *	-0.36 ***	-0.10	-0.12	-0.05	-0.16	0.12
	≥ 65	-0.32 **	-0.28 *	-0.12	-0.15	-0.18	-0.21	0.16
Gender	Female	0.07	0.19 **	0.15 **	0.03	0.10	0.11	0.07
Race	Black	-0.03	0.04	-0.35 ***	-0.29 **	-0.17	-0.16	0.13
	Asian	0.25	0.09	0.20	0.12	0.20	0.17	0.28
	Other	0.01	-0.31	-0.14	-0.01	0.00	-0.09	0.18
Ethnicity	Latino	0.22	0.18	0.03	0.07	-0.09	0.08	0.16
Education	Less than High School	-0.29	-0.58 **	-0.71 ***	-0.26	-0.71 ***	-0.51	0.23
	High School	-0.22 **	-0.40 ***	-0.19 *	-0.34 ***	-0.27 **	-0.28	0.11
	Some College	0.04	-0.07	-0.16 *	-0.09	-0.15 *	-0.09	0.08
	Post-Graduate	0.17 *	-0.06	0.05	0.17 *	0.13	0.09	0.10
Marital Status	Married	0.24 **	0.12	0.17	0.22 *	0.26 **	0.20	0.12
	Divorced	0.17	0.06	0.10	0.13	0.18	0.13	0.13
	Separated	0.10	0.15	-0.14	-0.05	0.04	0.02	0.26
	Widowed	0.26	0.36 **	0.25	-0.31 *	0.66 ***	0.25	0.18
Nationality	Immigrant	-0.16	0.25	0.19	0.22	-0.10	0.08	0.15
Income	<$25,000	-0.30 ***	-0.24 **	-0.34 ***	-0.48 ***	-0.54 ***	-0.38	0.11
	$25,000 – $49,999	0.04	-0.05	0.02	-0.11	-0.14	-0.05	0.09
	$75,000 – $99,999	0.04	0.07	-0.04	0.06	-0.03	0.02	0.11
	≥$100,000	0.20 **	0.12	0.02	0.02	0.01	0.07	0.10
Employment Status	Retired	-0.11	0.00	-0.02	-0.06	-0.12	-0.06	0.12
	Disabled	0.07	-0.09	-0.09	-0.06	-0.24	-0.08	0.17
	Unemployed	-0.06	-0.33 **	-0.29 **	-0.05	-0.23 *	-0.19	0.16
	Homemaker	-0.11	-0.20	-0.16	-0.23	-0.31 *	-0.20	0.16
	Other	0.18	0.18	0.31	0.11	0.25	0.21	0.28
Geographic Region	Mid-Atlantic	0.10	0.55 ***	0.39 **	-0.01	0.03	0.21	0.18
	East North Central	0.18	0.41 ***	0.34 **	0.20	0.21	0.27	0.17
	West North Central	0.09	0.56 ***	0.35 *	0.26	-0.09	0.24	0.20
	South Atlantic	-0.02	0.35 **	0.34 **	0.07	-0.01	0.14	0.17
	East South Central	-0.06	0.39 *	0.33	0.00	-0.03	0.13	0.22
	West South Central	-0.02	0.37 **	0.32 *	0.29	0.04	0.20	0.18
	Mountain	0.36 **	0.62 ***	0.52 ***	0.20	0.34 *	0.41	0.19
	Pacific	0.06	0.43 ***	0.33 *	0.18	0.29	0.26	0.17
Bill Pay Financial Responsibility	None or Almost None	-0.14	-0.46 ***	-0.25 *	-0.37 ***	-0.27 *	-0.30	0.14
	Some	-0.09	-0.26 **	-0.30 **	-0.20	0.13	-0.14	0.13
	Most	0.10	0.19	0.13	-0.20	0.23	0.09	0.14
	All or Almost All	0.13	0.16	0.03	-0.14	0.31 ***	0.10	0.11
Household Shopping Responsibility	None or Almost None	-0.05	-0.01	-0.35 **	-0.08	0.05	-0.09	0.16
	Some	-0.02	0.00	0.03	0.00	-0.13	-0.02	0.11
	Most	-0.08	-0.09	-0.03	0.09	-0.13	-0.05	0.11
	All or Almost All	0.02	-0.08	-0.06	0.26 **	-0.09	0.01	0.11
Household Size	Household Size	-0.02	0.02	0.01	-0.01	0.01	0.00	0.03
Home Ownership	Owns Home	0.13	0.17 *	0.09	0.08	0.25 ***	0.15	0.09
Bankruptcy	Within last 12 months	0.07	-0.26	0.31	-0.26	-0.34	-0.10	0.32
	Within last 7 years	na	0.34 *	0.25	0.27	0.45 **	0.33	0.19
Payment Instrument Characteristics	Acceptance	0.15 **	0.15 **	0.06	0.01	0.02	0.08	0.07
	Set Up	na	0.29 ***	0.38 ***	0.18	0.14	0.25	0.11
	Cost	0.21 **	0.34 ***	0.47 ***	0.48 ***	0.26 **	0.35	0.12
	Convenience	0.34 ***	0.12	0.12	0.14 *	0.18 **	0.18	0.08
	Records	na	0.25 ***	0.31 ***	0.39 ***	0.30 ***	0.32	0.10
	Security	0.18 ***	0.15 **	0.09	-0.03	0.23 ***	0.12	0.07
	N	1880	1992	2014	1936	1810	1926	na
	Pseudo R-squared	0.07	0.11	0.11	0.11	0.15	na	na
	Pseudo R-squared (excluding characteristics)	0.04	0.08	0.07	0.09	0.12	na	na

Source: Survey of Consumer Payment Choice, 2009 – 2013

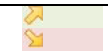
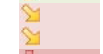
Notes:

[1] The dependent variable is a dummy for bank account number payment adoption. It is equal to 1 if a respondent has adopted bank account number payment and 0 otherwise.

[2] Some survey questions changed from the 2009 to the 2010-2013 versions of the SCPC. In 2009, we did not inquire about the assessment of record-keeping, the assessment of setup, or the occurrence of bankruptcy within the last 7 years. For 2009, these values are reported as "na."

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 4: Adoption Regressions: Summary of Results

		Check	Money Order	Debit	Credit	Prepaid	OBBP	BANP
Age	<25							
	25 – 34							
	45 – 54							
	55 – 64							
	≥ 65							
Gender	Female							
Race	Black							
	Asian							
	Other							
Ethnicity	Latino							
Education	Less than High School							
	High School							
	Some College							
	Post-Graduate							
Marital Status	Married							
	Divorced							
	Separated							
	Widowed							
Nationality	Immigrant							
Income	<$25,000							
	$25,000 – $49,999							
	$75,000 – $99,999							
	≥$100,000							
Employment Status	Retired							
	Disabled							
	Unemployed							
	Homemaker							
	Other							
Geographic Region	Mid-Atlantic							
	East North Central							
	West North Central							
	South Atlantic							
	East South Central							
	West South Central							
	Mountain							
	Pacific							
Bill Pay Financial Responsibility	None or Almost None							
	Some							
	Most							
	All or Almost All							
Household Shopping Responsibility	None or Almost None							
	Some							
	Most							
	All or Almost All							
Household Size	Household Size							
Home Ownership	Owns Home							
Bankruptcy	Within last 12 months							
	Within last 7 years							
Payment Instrument Characteristics	Acceptance							
	Set Up							
	Cost							
	Convenience							
	Records							
	Security							

Note: Red shading (downward facing arrow) indicates negative coefficients and green shading (upward facing arrow) indicates positive coefficients. Shading darkens with more years of significant variables. No shading (right facing arrow) indicates that the variable is insignificant in all years of our analysis.

Legend:	
	Positive effect, significant in all (5) years
	Positive effect, significant in 4 years
	Positive effect, significant in 3 years
	Positive effect, significant in 2 years
	Positive effect, significant in 1 year
	Negative effect, significant in 1 year
	Negative effect, significant in 2 years
	Negative effect, significant in 3 years
	Negative effect, significant in 4 years
	Negative effect, significant in all (5) years
	Insignificant in all (5) years

Table 5: Shares of Use, Controlling for Adoption: Pooled OLS (2009 – 2013)

		Cash	Check	Money Order	Debit Card	Credit Card	Prepaid Card	OBBP	BANP
Age	<25	-0.02	-0.02 ***	-0.01	0.06 ***	-0.03 ***	0.01	-0.01 **	0.00
	25 – 34	-0.01	-0.01 ***	-0.01 **	0.02 *	0.01	0.01 ***	-0.01 **	-0.01
	45 – 54	0.00	0.03 ***	0.00	-0.03 ***	0.00	0.01 *	0.00	0.00
	55 – 64	0.00	0.04 ***	0.00	-0.05 ***	0.01	0.00	0.00	0.00
	≥ 65	-0.01	0.05 ***	0.00	-0.09 ***	0.04 ***	0.00	0.00	0.00
Gender	Female	-0.05 ***	0.01 ***	0.00	0.03 ***	-0.01	0.00 *	0.01 **	0.01 **
Race	Black	0.06 ***	-0.01	0.02 ***	0.00	-0.08 ***	0.03 ***	0.00	0.01 **
	Asian	-0.01	-0.02 **	0.01	-0.09 ***	0.12 ***	0.02 **	-0.01	0.00
	Other	0.05 ***	-0.02 **	0.00	-0.01	-0.01	0.00	-0.01	-0.01
Ethnicity	Latino	0.03 ***	-0.01	0.00	0.01	-0.05 ***	0.01	0.00	0.01
Education	Less than High School	0.12 ***	0.01	0.00	-0.05 **	-0.09 ***	0.02	-0.01	0.01
	High School	0.05 ***	0.01 **	0.00	0.01	-0.09 ***	0.00	-0.01 **	0.01 *
	Some College	0.02 ***	0.01 *	0.00	0.04 ***	-0.07 ***	0.00	0.00	0.01 **
	Post-Graduate	0.01	0.00	0.00	-0.04 ***	0.05 ***	0.00	0.00	0.00
Marital Status	Married	-0.05 ***	0.02 ***	-0.01 *	0.00	0.01 *	0.00	0.01 **	0.00
	Divorced	-0.03 ***	0.01	-0.01 **	0.02 *	-0.03 **	0.00	0.02 ***	0.00
	Separated	-0.05 ***	0.03 **	0.00	0.02	-0.02	0.01	-0.01	-0.01 *
	Widowed	-0.04 ***	0.02	-0.01 **	0.02	-0.01	0.00	0.02 **	-0.01
Nationality	Immigrant	-0.01	0.00	-0.01 **	-0.02	0.03 *	-0.01	0.01	0.01
Income	<$25,000	0.08 ***	0.00	0.01 *	-0.03 ***	-0.02 **	0.01 ***	-0.01 **	0.00
	$25,000 – $49,999	0.02 ***	0.01	0.00	0.00	-0.01 **	0.00	0.00	0.00
	$75,000 – $99,999	0.00	-0.01 **	0.00 *	-0.01	0.02 ***	0.00	0.00	0.00
	≥$100,000	0.01	-0.01 ***	0.00 **	-0.03 ***	0.03 ***	0.00	0.00	0.00
Employment Status	Retired	0.00	-0.01	0.00	-0.04 ***	0.03 ***	0.00	0.00	0.00
	Disabled	0.01	0.00	0.02 **	0.00	0.01	0.01	-0.01 ***	0.00
	Unemployed	0.03 ***	-0.01 ***	0.01	0.00	0.00	0.01	0.00	0.00
	Homemaker	0.02	-0.01	0.02	-0.01	0.01	-0.01 **	0.01	-0.01 **
	Other	0.01	0.00	-0.01	-0.05 **	0.05 ***	-0.01	0.00	-0.01 *
Geographic Region	Mid-Atlantic	0.02	-0.02	-0.01	-0.04 *	0.03	0.01 *	0.00	0.01
	East North Central	-0.01	0.01	0.00	-0.01	0.00	0.01	0.00	0.01 **
	West North Central	-0.04 **	0.02	0.00	0.01	0.00	0.01	-0.01	0.02 ***
	South Atlantic	-0.04 ***	0.00	-0.01	0.03	0.01	0.00	0.01	0.01
	East South Central	-0.05 **	0.00	-0.01 **	0.07 **	-0.04 *	0.00	0.01	0.01
	West South Central	-0.04 **	0.00	-0.01	0.04 *	-0.02	0.00	0.00	0.02 ***
	Mountain	-0.05 ***	0.00	0.00	0.03	0.02	0.01	0.00	0.01 **
	Pacific	-0.02	-0.02	-0.01	0.02	0.00	0.00	0.01	0.01
Bill Pay Financial Responsibility	None or Almost None	0.03 ***	0.00	0.00	-0.02 *	-0.01 **	0.00	0.00	0.00
	Some	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Most	0.00	0.00	0.00	-0.01	0.00	0.01	0.00	0.00
	All or Almost All	-0.02 **	0.00	0.00	-0.02 **	0.01 *	0.01 *	0.00	0.01 **
Household Shopping Responsibility	None or Almost None	0.00	0.00	0.00	-0.01	0.02 **	0.00	0.00	0.00
	Some	-0.01	0.01	0.01 *	0.00	0.00	0.00	0.00	0.00
	Most	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	All or Almost All	-0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Adoption of Other Instruments	Number of Other Instruments Adopted	-0.04 ***	-0.01 ***	-0.01 ***	0.01 ***	-0.01 ***	-0.01 ***	0.00	0.00 ***
Payment Instrument Characteristics	Cost	0.01	0.01 **	0.00	0.05 ***	0.03 ***	0.00	0.01 ***	0.00
	Convenience	0.04 ***	0.04 ***	0.01 ***	0.06 ***	0.04 ***	0.01 ***	0.01 ***	0.01 ***
	Security	0.01 **	0.01 ***	0.00	0.02 ***	0.01 **	0.00	0.01 **	0.00
Inverse Mills Ratio	Significant?	NA	YES	YES	YES	YES	NO	YES	YES
Year Effects	Included?	YES	YES	YES	YES	YES	YES	YES	YES
	N	9838	9682	3750	9701	9707	3747	9712	9697
	Chi-squared	1719	2537	311	2322	4057	207	1159	822
	P-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is the percentage of transactions carried out using the given payment instrument, calculated at the respondent-level (i.e. # of bank account number payment transactions/# of total transactions).

[2] Some survey questions regarding characteristic assessments changed over the course of the 2009 – 2013 panel. In these pooled regressions, we include only cost, convenience and security as these are the 3 characteristics that were consistently asked about each payment instrument during this time period.

[4] Inverse mills ratios are not included in the cash results because cash use is estimated in one step only.

[3] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 6: Bank Account Adoption: Probit Regression

		Pooled Sample (2009-2013)
Age	<25	0.32 *
	25 – 34	-0.06
	45 – 54	0.03
	55 – 64	0.45 **
	≥ 65	0.65 **
Gender	Female	0.06
Race	Black	-0.89 ***
	Asian	0.08
	Other	-0.42 ***
Ethnicity	Latino	-0.23
Education	Less than High School	-1.63 ***
	High School	-0.89 ***
	Some College	-0.65 ***
	Post-Graduate	-0.66 ***
Marital Status	Married	0.14
	Divorced	-0.03
	Separated	-0.18
	Widowed	0.22
Nationality	Immigrant	0.17
Income	<$25,000	-0.95 ***
	$25,000 – $49,999	-0.27 *
	$75,000 – $99,999	0.43
	≥$100,000	0.01
Employment Status	Retired	-0.16
	Disabled	-0.02
	Unemployed	-0.49 ***
	Homemaker	-0.53 ***
	Other	-0.28
Geographic Region	Mid-Atlantic	0.19
	East North Central	0.01
	West North Central	-0.02
	South Atlantic	0.14
	East South Central	-0.04
	West South Central	-0.03
	Mountain	-0.12
	Pacific	0.05
Bill Pay Financial Responsibility	None or Almost None	-0.26 *
	Some	0.22
	Most	0.35 **
	All or Almost All	0.35 ***
Household Shopping Responsibility	None or Almost None	-0.36 **
	Some	-0.28 **
	Most	-0.19
	All or Almost All	-0.21
Household Size	Household Size	-0.01
Home Ownership	Owns Home	0.55 ***
Bankruptcy	Within last 12 months	0.35
	Within last 7 years	0.16
Year Effects	YES	
	N	7996
	Pseudo R-squared	0.44

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

[1] The dependent variable is a dummy for bank account adoption. It is equal to 1 if a respondent has adopted a bank account and 0 otherwise.

[2] *Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 7: Predicted Payment Behavior of Selected Demographic Groups, 2009 – 2013 Average (weighted)

Adoption Rate (%)			
	Income <$25,000, Education less than High School, Black	**Income ≥$100,000, Education Post-Graduate, White**	**Difference**
Check	85.11	99.62	14.51
Debit	77.86	77.82	-0.04
Credit	71.48	98.31	26.84
Prepaid	44.65	50.63	5.98
OBBP	52.57	70.24	17.67
BANP	61.01	78.16	17.15

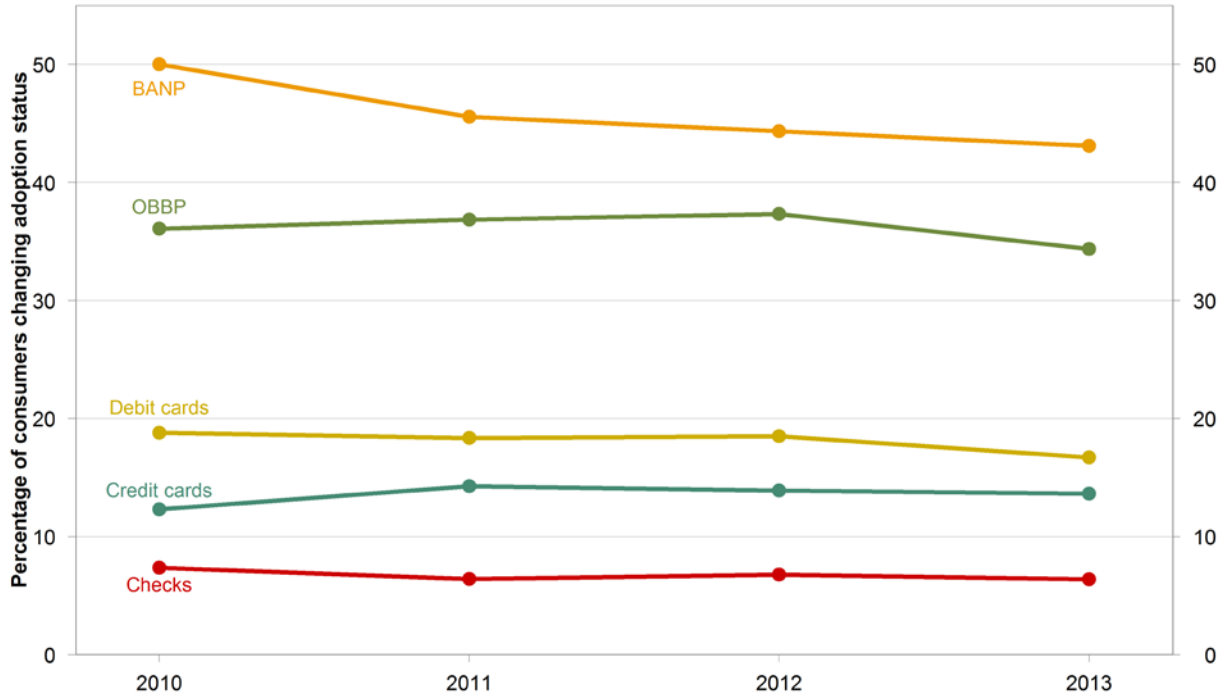
Shares of Use (%)			
	Income <$25,000, Education less than High School, Black	**Income ≥$100,000, Education Post-Graduate, White**	**Difference**
Cash	57.67	20.51	-37.16
Check	2.13	10.82	8.69
Debit	20.52	18.87	-1.65
Credit	-3.00	33.59	36.59
Prepaid	8.50	0.70	-7.80
OBBP	0.74	6.75	6.01
BANP	2.27	5.71	3.44

Source: Survey of Consumer Payment Choice, 2009 – 2013

Notes:

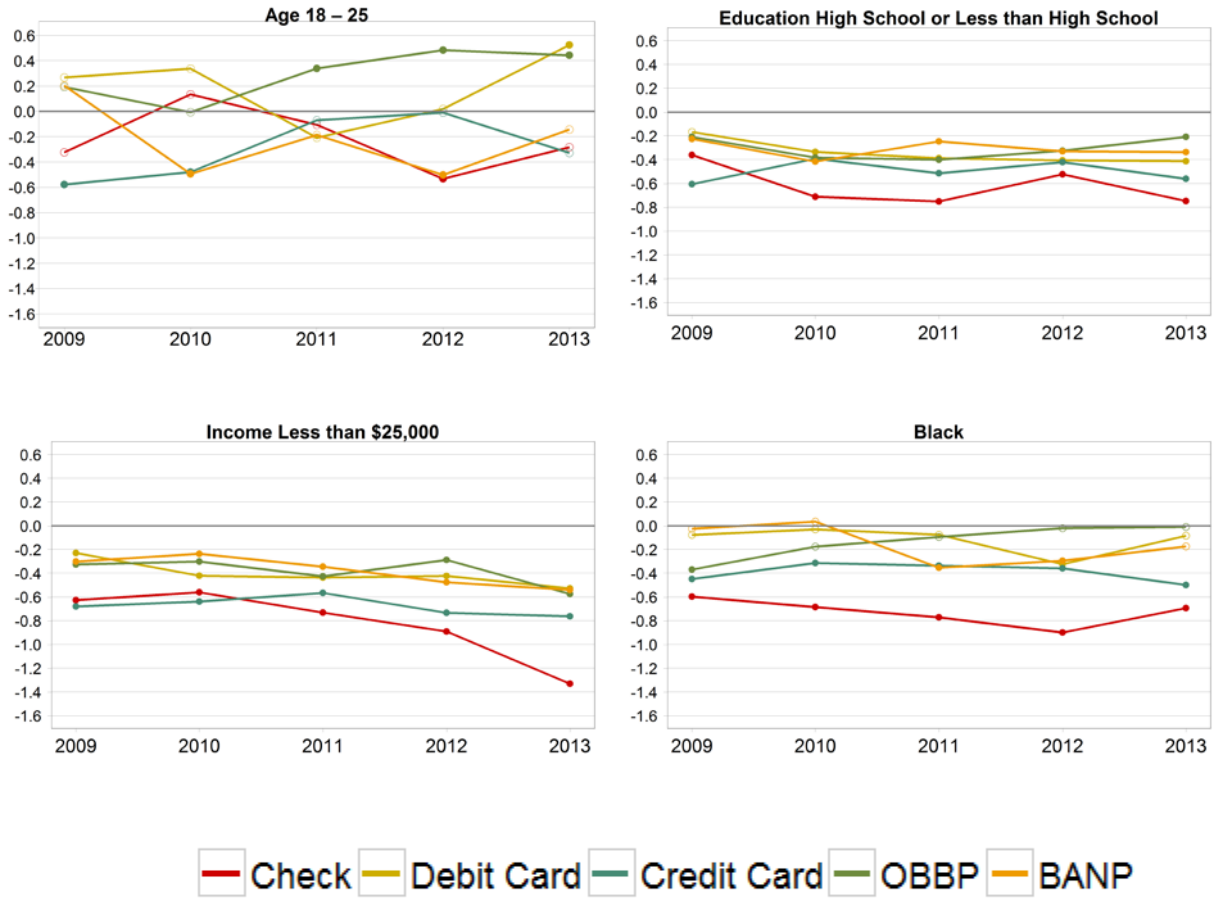
[1] Money order is excluded due to changes in survey methodology over the course of the panel.

Figure 1: Percentage of Consumers Who Switched from Adopter to Non-Adopter or Vice Versa, by Payment Instrument by Year



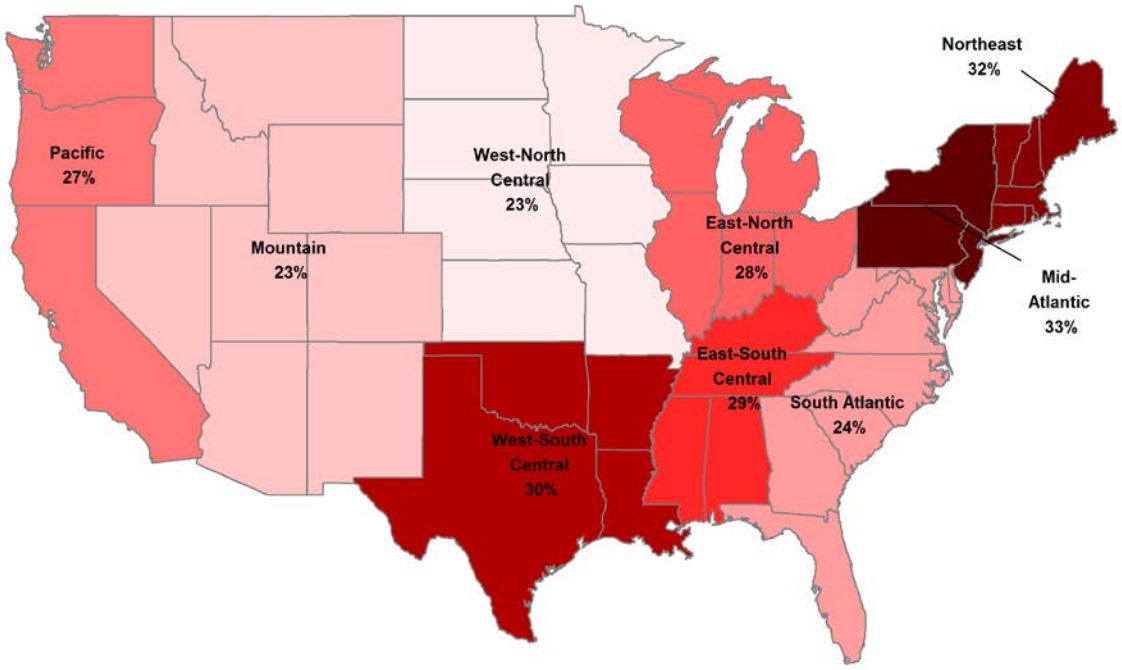
Source: Survey of Consumer Payment Choice, 2009 – 2013.

Figure 2: Estimated Coefficients on Selected Variables (Adoption)



Source: Authors' calculations based on the Survey of Consumer Payment Choice, 2009 – 2013.
Note: Filled circles indicate that the coefficient is statistically significant, and empty circles indicate that the coefficient is not statistically significant.

Figure 3: Cash Share by Census Region: Average Share, 2009 – 2013



Source: Survey of Consumer Payment Choice, 2009 – 2013.

Appendix Table 1: Number of Respondents in the 2008 – 2013 SCPC

	2008	2009	2010	2011	2012	2013
Number of respondents	1,010	2,173	2,102	2,151	2,065	2,089
2008–2009 panelists	876	876	—	—	—	—
2008–2010 panelists	788	788	788	—	—	—
2008–2011 panelists	679	679	679	679	—	—
2008–2012 panelists	615	615	615	615	615	—
2008–2013 panelists	320	320	320	320	320	320
2009–2010 panelists	—	1,913	1,913	—	—	—
2009–2011 panelists	—	1,657	1,657	1,657	—	—
2009–2012 panelists	—	1,515	1,515	1,515	1,515	—
2009–2013 panelists	—	1,132	1,132	1,132	1,132	1,132
2010–2011 panelists	—	—	1,801	1,801	—	—
2010–2012 panelists	—	—	1,631	1,631	1,631	—
2010–2013 panelists	—	—	1,164	1,164	1,164	1,164
2011–2012 panelists	—	—	—	1,926	1,926	—
2011–2013 panelists	—	—	—	1,328	1,328	1,328
2012–2013 panelists	—	—	—	—	1,330	1,330