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Adopting, Using, and Discarding Paper and Electronic Payment Instruments: Variation by Age and Race

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Abstract:

This paper uses data from the 2008 *Survey of Consumer Payment Choice* to discuss the adoption, use, and discarding of various common payment instruments. Using a nationally representative sample of individual-level data, it presents evidence in unparalleled detail about how consumers use different payment instruments. Most interestingly, it displays robust evidence of significant age- and race-related differences in payments choices. Among other things, it suggests that the range of payment instruments adopted and regularly used by blacks is narrower than that chosen by whites, presumably because of relatively limited access to financial institutions. With regard to age, it documents pervasive (and complex) age-related patterns at every step of the decisions to adopt, use, and discard payment instruments.

JEL Classifications: D12, D14, E42

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This paper, which may be revised, is available on the web site of the Federal Reserve Bank of Boston at http://www.bostonfed.org/economic/ppdp/index.htm.

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CPRC CONSUMER PAYMENTS Research Center

1 Introduction

The most important development in payments in the last half century is the steady shift from paper to electronic payments. The increased use of credit cards has made retail payments much more efficient, especially for those seeking to make purchases with borrowed funds (Evans and Schmalensee 2005; Mann 2006). More recently, the shift from checks to debit cards has lowered the transaction costs of processing and accelerated the clearing process (Evans and Schmalensee 2005). More generally, the shift away from cash to more sophisticated payment instruments has facilitated a shift in the way that households hold their assets—from cash (vulnerable to loss or theft and bearing no interest) to assets that are much safer and much more likely to produce a return for those that hold them.

Unfortunately, the limitations of existing survey instruments have made it difficult to understand the details of the ongoing shift from paper to electronic payment instruments. This paper presents data from the Boston Federal Reserve's 2008 *Survey of Consumer Payment Choice* (SCPC), the first publicly available, nationally representative survey with comprehensive and detailed information about consumer payments choices.

Data from the 2008 survey document the growing dominance of electronic payment instruments. To offer some of the most telling points, in addition to cash and checks, more than 80 percent of consumers have now adopted credit cards or debit cards. With respect to retail payments, the share of plastic (credit cards, debit cards, and prepaid cards) is now 53 percent, as opposed to only 37 percent for paper-based payment methods (predominantly cash and checks). And in the category of bill payments, once overwhelmingly dominated by checks, payment cards and other electronic methods (electronic bank account deductions (EBAD),[1] online-banking bill-pay (OBBP), or automatic deduction) now are used for 75 percent of all bill payments.

The shift to electronics is not uniform, however, for the data document marked differences in payments choices throughout the population. Among other things, the data suggest that the range of payment instruments adopted and regularly used by blacks is narrower than that chosen by whites, apparently because of relatively limited access to financial institutions. Most importantly, the data suggest pervasive (and

[1] Because of difficulties in applying the EBAD concept, the 2009 survey replaces "EBAD" with the concept of the "bank account number payment" or BANP.

complex) age-related patterns at every step of the decisions to adopt, use, and discard payment instruments.

The body of the paper is organized as follows. Section 2 briefly discusses the SCPC—how it was collected, what it includes, and how it compares with other nationally representative surveys such as the SCF. Section 3 summarizes the data about adoption of payment instruments. The data show stark race- and age-based variation, much of which persists even in multivariate analysis. Section 4 summarizes the data about the success of payment instruments—how often they are used and how often consumers decide to stop or limit their use. As with Section 3, multivariate analysis suggests that race- and age-based variation is important in understanding consumer payments choices. Finally, Section 5 discusses the most novel data from the SCPC—data about which payment instruments are used for which types of payments. The data in this section show that the shift from paper to electronics has proceeded in quite different directions for different types of payments, and that identifiably distinct groups of consumers are making quite different types of payments choices. Section 6 briefly concludes.

2 Data and Methods

2.1 Survey Methods

The SCPC is a nationally representative survey of consumer payment behavior, using an instrument developed by the Consumer Payments Research Center (CPRC) of the Federal Reserve Bank of Boston. The RAND Corporation administered the SCPC in the fall of 2008 to 1,010 respondents as a module of its American Life Panel. The survey was administered online, either by computer or by Web TV, and took approximately one-half hour to complete.

Recognizing the likely differences between the respondent sample and the general population, RAND constructs sampling weights designed to make the sample as representative of the population as possible. As discussed in more detail in Foster, Meijer, Schuh, and Zabek (2009), RAND uses benchmark distributions derived from the March 2008 *Current Population Survey* (CPS), which should cause the weighted SCPC data to match the population with respect to gender, age, race, education, and income.

The survey instrument includes detailed questions about the adoption, use, and discarding of nine different payment instruments: cash, checks, money orders, traveler's checks, debit cards, credit cards, prepaid cards, OBBP, and EBAD. For purposes of the SCPC, OBBP includes transactions in which a bill payment is made directly from a bank account, without using a check or a debit card, and initiated by a consumer using the bank's online banking bill pay application. EBAD, by contrast, involves an electronic payment in which the consumer provides a bank account number and routing information to a third party that uses the information to obtain funds without the use of a check. Transactions processed by an intermediary (such as PayPal) are treated as made by the underlying payment system that the intermediary accesses (usually credit card, debit card, or EBAD).

The survey also includes questions about which payment instruments are used for which types of transactions (paying bills, retail purchases, online purchases, and services). Finally, of particular interest to scholars interested in understanding the development and success of emerging payment instruments, the survey asks a set of detailed questions about the importance consumers attribute to various characteristics of payments (ease of acquisition, acceptance, timing, cost, security, etc.).

2.2 Relation to the SCF

Because the purpose of the SCPC is to permit inferences about the use of payment instruments in the general population, it is important at the outset to consider the quality of the sample with respect to financial characteristics. A useful way to consider this is to compare the results with those of the Federal Reserve's *Survey of Consumer Finances* (SCF), a triennial survey of the balance sheet, pension, income, and other demographic characteristics of U.S. families that has been conducted since 1983 and currently has a staff and budget an order of magnitude greater than those of the SCPC. As scholarship about the SCF emphasizes, high levels of U.S. income and wealth inequality make it quite difficult to obtain a sample that accurately reflects the population's distribution on those characteristics (Bucks et al. 2009; Kennickell 2008), making it especially important to attempt to validate the quality of the SCPC data.

To be sure, the comparison is at best rough. For example, the SCPC is a consumer-level survey, while the SCF collects information at the household level. Therefore, direct comparisons of financial information between the surveys are necessarily at least slightly misleading. The variable that is most useful to compare is

income, because the SCPC takes advantage of other RAND panel data to "gross up" consumer-level income data to the household level.

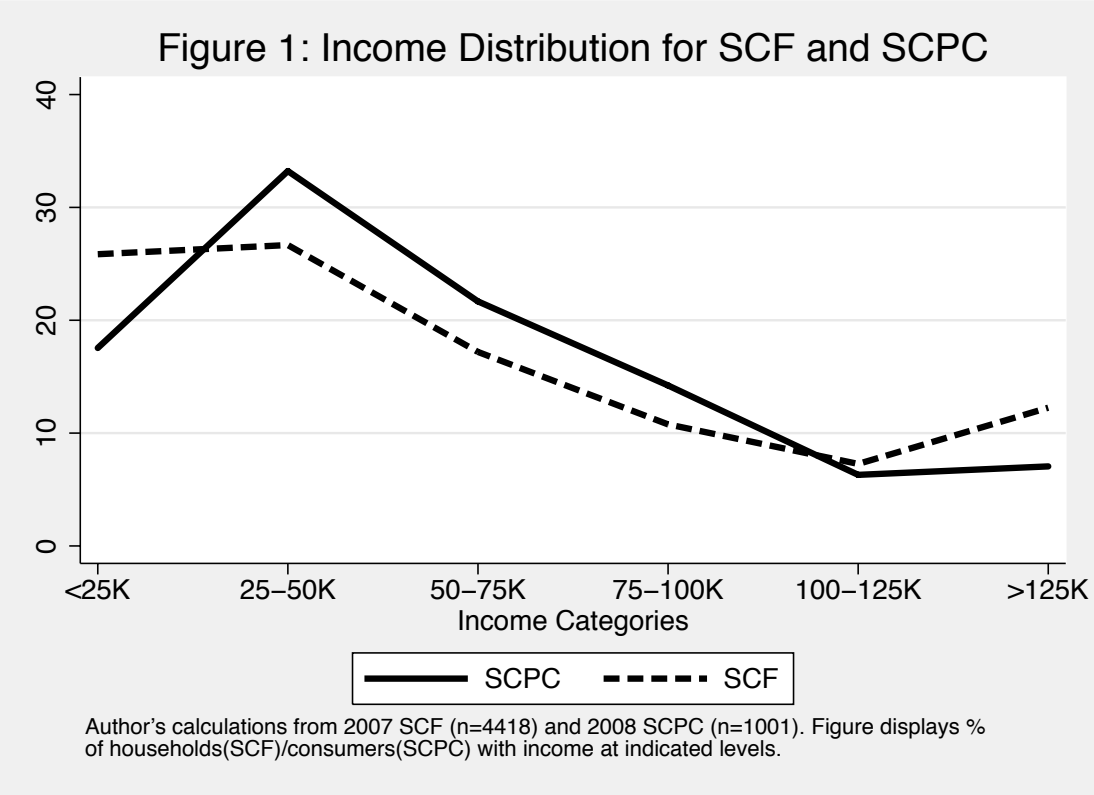


Figure 1 suggests that the lower and upper ends of the distribution are underrepresented, at least as compared with the SCF, while the middle part of the distribution is overrepresented. It is not surprising that the SCPC distribution diverges from the SCF at the ends of both tails, given the intense effort SCF investigators expend in locating and obtaining information from individuals in those positions (including obtaining assistance from the IRS in locating high-income individuals) (Bucks et al. 2009; Kennickell 2008).

Given the difference in timing (the last SCF was administered in 2007, while the SCPC discussed in this paper was administered in 2008) and the differences in the definition of income (discussed in Foster et al. 2009), it is not surprising that there would be some divergence. However, the distributions appear sufficiently similar to validate exploring the SCPC data, particularly across the interior part of the income breakdown, for which payment choices are most important. This is particularly true when we consider some of the advantages that the SCPC has over the SCF. Most obviously, because it is administered yearly and uses a panel of continuing respondents, in

subsequent years it will enable relatively short-term longitudinal analysis that cannot practicably be conducted with the SCF. Moreover, even with the first year's data (the subject of this paper), the consumer-level data on payments are much more detailed than the parallel data available in the SCF.

3 Adoption of Payment Instruments

Logically, the first topic to address about the choices consumers make with regard to payments is which instruments they have adopted and why.

3.1 The Extent of Adoption

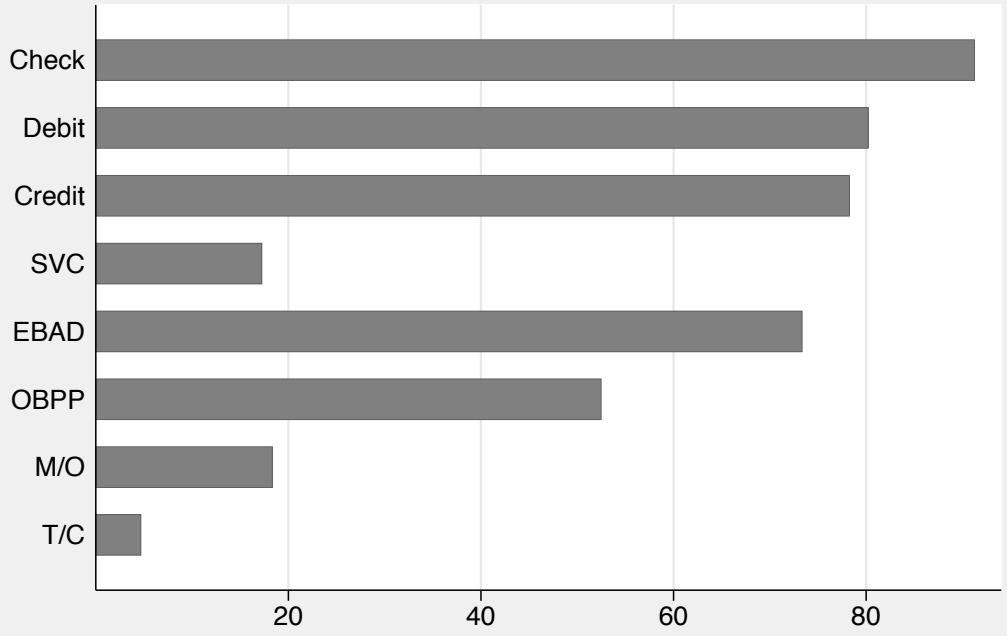
This section analyzes the SCPC data on adoption by presenting summary descriptive data, simple cross-tabulations to document the relevance of demographic variation, a summary of the data on reasons for payment choice, and finally a logistic regression estimating the significance of the demographic and reasons data. It begins by noting the contribution of the SCPC dataset to understanding the adoption of various payment instruments.

Given the ongoing policy controversies about credit cards (Bar-Gill and Warren 2008; Mann 2006; Mann 2007) and the obvious cost savings associated with the ongoing decline in check use (Federal Reserve 2010; Mann 2011), it is surprising how little information is available about the success of various payment instruments in penetrating the market. Several data sources offer reliable estimates of the total volume for particular instruments—the Federal Reserve for checks and the Nilson Report for credit and debit cards being the most prominent. And the SCF includes data about financial participation that summarize adoption of a few of the most common payments instruments. But the SCPC is the first dataset to collect in a single place comparable data for all commonly used payment instruments. And the fact that it is being collected annually, using a panel of respondents, makes it an invaluable contribution to our understanding of even the most basic comparative data about all of the instruments.

3.1.1 Summary Descriptive Data

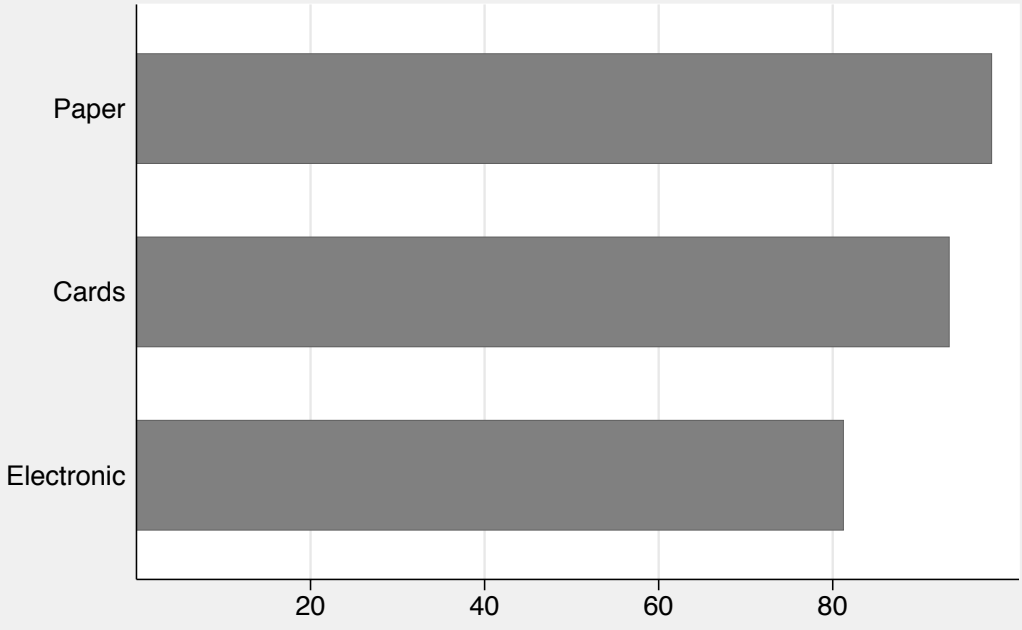
Figure 2 displays the aggregate adoption data for each of the eight instruments other than cash (on the assumption that all consumers have adopted cash as a payment instrument). Figure 3 aggregates these data (plus data on cash) into three groups of instruments: paper (cash, check, money order, traveler's check), cards (debit, credit, stored value), and electronic (OBBP, EBAD).

Figure 2: Adoption of Payment Instruments



Source: 2008 SCPC. Percentage of consumers adopting the listed instrument. N=977–1002

Figure 3: Adoption of Payment Instrument Categories



Source: 2008 SCPC. Percentage of consumers adopting the listed category of instrument. N=996–1002

Several points of interest are apparent. For one thing, the rapid rise of debit cards—rarely used just 15 years ago[2]—has led to their adoption by even more consumers than those who have adopted credit cards. This is particularly surprising given the first-mover advantage the existing payment systems had when debit cards first became generally available. As Evans and Schmalensee (2007) (among others) have explained, the logistics of gaining market share among both cardholders and merchants at roughly the same time present an enormous challenge that many entrepreneurs have failed: to successfully deploy a new payment system. Two-sided networks necessary for the successful deployment of new payment instruments give existing instruments a powerful first-mover advantage. Although a complete discussion of the rise of debit is beyond the scope of this paper, a big part of the explanation lies in the ability of Visa and MasterCard to leverage their existing credit card networks to accelerate the market deployment of debit cards; that is why signature debit (issued by Visa and MasterCard members) rose much more rapidly than PIN debit (processed predominantly on the smaller regional ATM networks). Also, in recent years at least, rising consumer concerns about problems associated with credit card use (discussed in the next section) surely have accelerated the move toward debit card adoption. To be sure, regulatory hostility to debit cards as reflected in the Dodd-Frank Act may lessen the attractiveness of debit cards to consumers, especially if it leads to more limited issuance of debit cards or increased fees for their use, but for now at least their penetration is remarkable.

Similarly, the burgeoning use of ACH transactions has pushed EBAD into the top tier of payment instruments. Recognizing that this is a payment system that makes sense only for consumers with bank accounts, an adoption rate of 73.4 percent reflects a remarkably high level of penetration. The fact that more than 80 percent of consumers use either OBBP or EBAD suggests an impressive uptake of ACH-based payments since the reforms of the last decade broadened the permissible uses of ACH.[3] Finally, the low

[2] Nilson Report data indicate that in 1996 Americans used debit cards in only eight transactions per capita, compared with 59 credit card transactions per capita.

[3] SCPC researchers have explained to me that there also is a possibility that the 2008 results overstate the extent of EBAD adoption because of some confusion in responding to the survey instrument. The 2009 results support this conjecture, as they show a 56 percent adoption rate for BANP (bank account number payment, which replaced EBAD in the 2009 survey) in 2009, much lower than the 73 percent reported here for EBAD in 2008. At least in part, however, the decline seems to relate to security concerns driving consumer abandonment of EBAD/BANP, rather than measurement error in 2008.

levels of money orders and traveler's checks document the marginalization of these once systemically important instruments by the rise of the payment card.[4]

3.1.2 Demographic Variation

Because the SCPC includes consumer-level data from a nationally representative sample, it is useful to examine how adoption rates differ based on demographic characteristics of the consumer. The SCPC encompasses a wide variety of demographic information, including information about age, race, gender, education, income, net worth, employment, homeownership, marital status, and structure of the household. Given the size of the dataset (approximately 1000 observations), it is not practical to distinguish definitively the relative effects of each of these characteristics. For purposes of this introductory paper, I emphasize age and race.

The existing literature offers obvious reasons why race might be associated with payments-related choices. Among other things, it seems likely that limited access to banking services for blacks is at least a partial explanation (Scholz and Seshadri 2009: 43–46; Barr 2009: 71–76; Osili and Paulson 2007; Mann 2009: 272–78; Mann and Mann 2011). This could be so either because blacks have less access to conventional deposit relationships (and thus turn to nondeposit products, including money orders, stored-value cards, and traveler's checks) or because they have less robust relationships with the banks where they deposit their funds (and therefore are less likely to use the deposit-related products available to them—checks and debit cards).

The literature also suggests obvious reasons why people of different ages might make different payments choices. This could be a cohort effect—if payments choices are driven in large part by habits formed in youth, older consumers will be less likely than younger consumers to use instruments that became common in recent decades (Ching 2010). Or it could be an artifact of age itself, reflecting differing attitudes to risk or the like related to the differing positions in the life course (Aguiar and Hurst 2007; Mann and Mann 2011).

Although the choice is inherently a judgment call, the limitation of the scope of this paper to these characteristics rests on the sense that disparities related to age and race are analytically important even when they reflect underlying variations in other characteristics such as income, net worth, or education (Mann and Mann 2011). I note

[4] To get a sense of how far these systems have fallen, consider Nilson Report data indicating 41 million transactions with traveler's checks and 890 million transactions with money orders in 1990 (Nilson Report 1995).

the decision not to analyze gender separately. Although a substantial literature supports the likelihood of gender-related differences in risk aversion (Sapienza et al. 2009; Jianakoplos and Bernasek 1998; Byrnes et al. 1999; Borghans et al. 2009; Bajtelsmit and Bernasek 1996), it seems likely that many payments choices are made at the household level. To get a crisp look at gender-related differences, we would need a sample limited to single-person households of different genders. Given the size of the SCPC sample, it is not practical to analyze gender in that way. Accordingly, I have adopted the strategy of analyzing only age and race, and using household composition as a control.

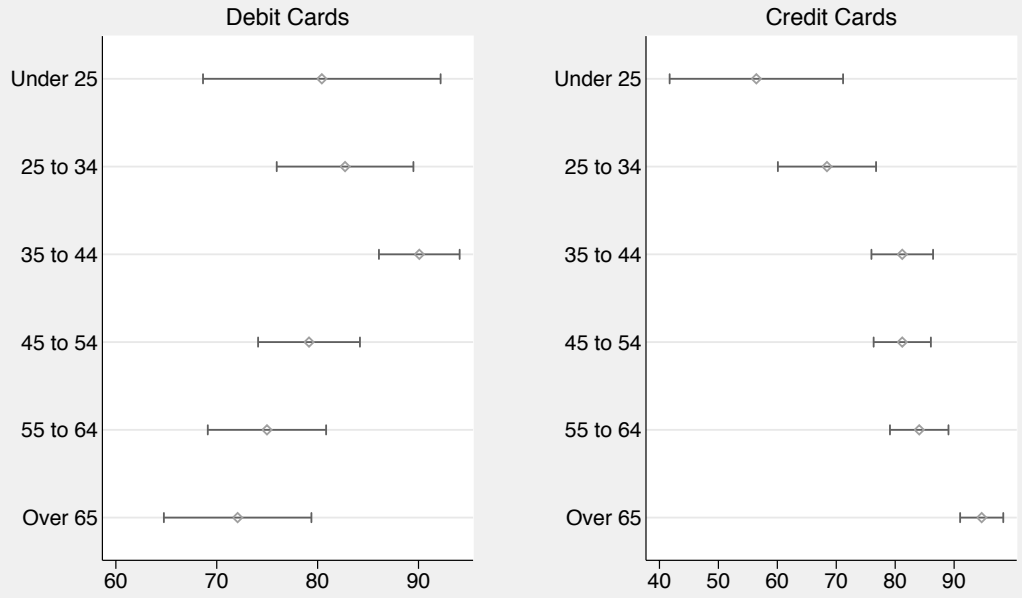
For illustrative purposes, the panels of Figure 4[5] summarize the adoption of the various instruments by race; the panels of Figure 5 summarize the adoption of credit and debit cards by age. As Figure 5 shows, age is apparently quite important in explaining payment card adoption.

Figure 4: Adoption of Payment Instruments by Race

Source: 2008 SCPC. Graphs show weighted mean percentage of consumers adopting the listed instrument with 5% confidence intervals. N ranges from 977–1002.

[5] The bivariate tabulations in Figures 4 and 5 (and the similar figures later in the paper) reflect confidence intervals generated by Stata's "ci" command, which calculates Clopper-Pearson binomial confidence intervals based on the weights in the SCPC dataset.

Figure 5: Adoption of Payment Cards by Age

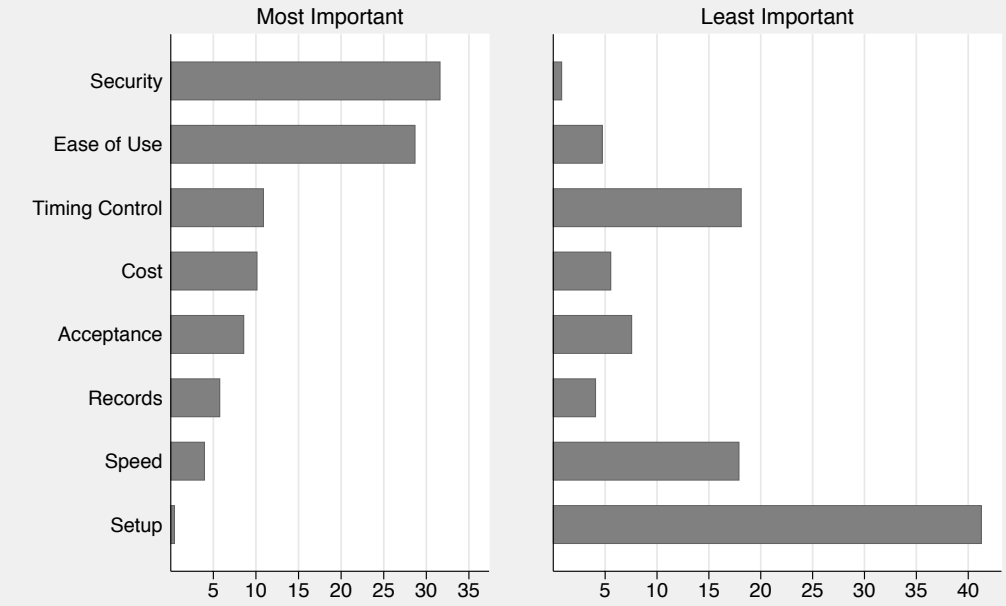


Source: 2008 SCPC. Graphs show weighted mean percentage of consumers adopting the listed instrument with 95% confidence intervals. N=1001 (DC), 1000 (CC).

3.2 Reasons for Payments Adoption

To help make sense of the data on adoption, it is useful to consider the most innovative aspect of the SCPC data, information about the importance consumers attribute to various aspects of payment functionality. This information is unequalled in its breadth and detail. See Bucks et al. (2009) (parallel data about checks based on the 2007 SCF). Figure 6 displays data about the percentage of consumers who regard each of the listed characteristics as most—and least—important.

Figure 6: Consumer Ranking of Importance of Attributes of Payment Instruments



Source: 2008 SCPC. Weighted percentage of consumers identifying the listed attribute as most (or least) important. N=1003 (most), 1005 (least)

Taken together, the information about how often particular attributes are at the top or the bottom of consumers' preferences tells us a great deal about how payment instruments compete against one another. Most obviously, it is clear that consumers care a great deal about security: this is selected by most respondents as most important and almost never (by fewer than 1 percent) selected as least important

Close behind security is ease of use—which is selected by almost as many consumers as the most important characteristic and rarely selected (by fewer than 5 percent) as the least important characteristic. Conversely, it is noteworthy how little consumers care about difficulties of acquiring and setting up an instrument and about acceptance. Collectively, this suggests that consumers are much more interested in a simple payment experience (the plastic card probably being the leader on this characteristic), even if it requires carrying multiple instruments for different purposes.

3.3 Multivariate Analysis

Multivariate analysis helps to illuminate the substance of the relationships involved. Although I experimented with models that included a wide range of demographic controls (income, net wealth, education, marital status, and the like), ultimately (as discussed above) I settled on estimating relationships that include only

race and age, with household status, education, income, and adoption of other instruments as controls. I also estimated models with interactions of the demographic variables, and with a linear age variable, but none of them significantly changed the simpler models summarized below. The reference category for the model is a white individual between the ages of 35 and 44. Although I estimated equations for all eight of the noncash payment instruments, I report here only results for five instruments: checks, debit cards, credit cards, stored-value cards, and OBBP. I omit cash, traveler's checks, and money orders (for which adoption is either almost universal or quite uncommon) and also EBAD (which is quite similar to OBBP). Table 1 summarizes the results of logistic regression of adoption of the various payments instruments on limited demographic controls.[6] The reference category is a white individual aged 35–44, married with no children, with a college education and an annual income of about $60,000.

TABLE 1: LOGISTIC REGRESSION OF ADOPTION RATES OF LEADING PAYMENT INSTRUMENTS ON DEMOGRAPHIC VARIABLES

Demographic Variables	Check[7]	Debit Card	Credit Card	Stored-Value Card	OBBP
Black	**-.08 (.02)****	-.03 (.04)	**-.06 (.03)**#	**-.12 (.06)**#	**-.11 (.06)**#
<25	.03 (.04)	.09 (.08)	-.03 (.04)	.06 (.07)	-.01 (.09)
25-34	-.01 (.03)	-.03 (.05)	.02 (.03)	-.01 (.05)	-.01 (.06)
45-54	.01 (.03)	**-.13 (.04)****	**.06 (.03)**#	-.01 (.04)	**-.17 (.05)****
55-64	.03 (.03)	**-.15 (.05)****	**.09 (.03)****	.01 (.04)	**-.20 (.05)****
65+	**--**	**-.18 (.05)****	**.17 (.04)****	-.01 (.05)	**-.19 (.06)****
N	497	952	951	932	947

*Dependent variable is adoption of the listed instrument. The table displays average marginal effects for an estimation using robust standard errors. Controls for household structure, income, and education omitted. # - 0.10, * - 0.05, ** - 0.01. Bold-faced type—significance at 0.1 level or better.*

In general, the models provide evidence consistent with the existing literature. Most obviously, consistent with the discussion above related to financial participation, blacks are significantly less likely to use all of the products summarized here except for debit cards. Cross-tabulation with use of a checking account strongly suggests the accuracy of this intuition: when I reran the models in the last four columns of Table 1 limited to those with checking accounts, blacks did not differ significantly from whites

[6] Because of the size of the sample, the regressions in this paper omit all races except white and black, use white as the reference class, and include black as an independent variable. A complete set of the output is available upon request.

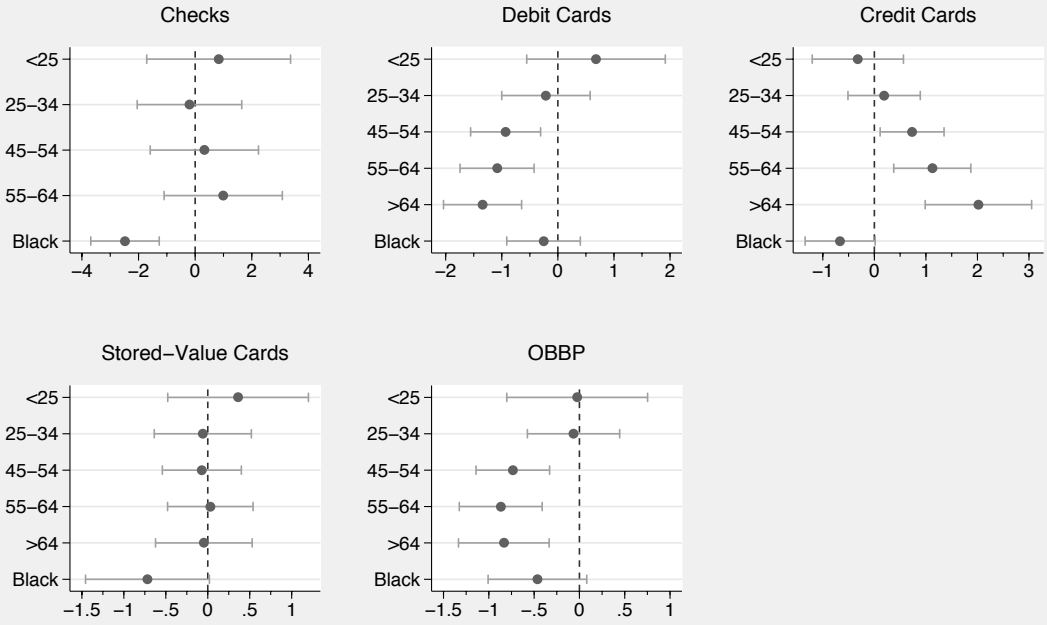
[7] The number of observations for the check regression is small because several classes of data are dropped for collinearity (including those over 65 and those with income over $100,000).

for any instrument. I also estimated an alternate set of models controlling for the type of institution at which the primary bank account is located. The coefficients on the race variable in those models were substantially the same as those in the models shown in Table 1, suggesting that it is not the type of institution that blacks use that causes this differential access. I also explored the possibility that attitudinal variations related to payment instruments might explain the differential, by estimating models that included as controls the information related to affinity for particular characteristics of payment instruments (security, control, ease of use, etc.). Again, the coefficients on race in those models were similar to those in the models summarized below. In the end, the analysis sheds relatively little light on precisely what is causing blacks to shy away from noncash payment instruments, but it does suggest that it is closely related to whatever is keeping them from using mainstream institutions like checking accounts (a subject explored in detail by Caskey 1996).

With respect to age, the models suggest significant age-related variation for several of the instruments. Figure 7 provides a graphic coefficient display illustrating the substantial size of the effects. Specifically, consumers over the age of 45 appear significantly less likely to use debit cards and OBBP, even controlling for race, household status, income, and education (second and fifth panels of Figure 7). This suggests that mainstream adoption of debit cards and OBBP is still largely cohort-based, and is only now reaching those over 45.

The contrary age-related effect on credit cards (third panel of Figure 7) is particularly noteworthy in light of the persistent efforts of credit card issuers to market their products to the young, especially college students (Mann 2006; Manning 2000). Although this effect might in part reflect the limited share of those at younger ages to whom credit cards are marketed, it still suggests at least the possibility of a cohort effect —the younger generation is more attracted to debit cards than their elders are and more cautious about the perils of using credit cards.

Figure 7: Age, Race, and Adoption of Payment Instruments



Source: 2008 SCPC. N ranges from 497–952. Graphs display unexponentiated logistic coefficients with 95% confidence intervals.
Reference class is white, married with no children, 35–44, college education, $60K annual income.
Omitting household structure, educational, and income controls.

Perhaps the most interesting finding from this regression is that checking use, once we include the controls, is not nearly so age-sensitive as debit card and OBBP use. To put it another way, variations in race, household status, income, and education largely explain the limited variation in access to checking accounts at various ages.

4 Success of Payment Instruments

Data about adoption tell us a great deal about the market penetration of various products, but they tell us relatively little about the success of a payment instrument. For that, we need to know the extent to which it is used: it is not enough for a consumer to have a checkbook if he or she uses it only on rare occasions. Therefore, I turn now to the SCPC data about how often consumers use particular instruments and, having started to use them, how often they become disaffected and substantially limit their further use.

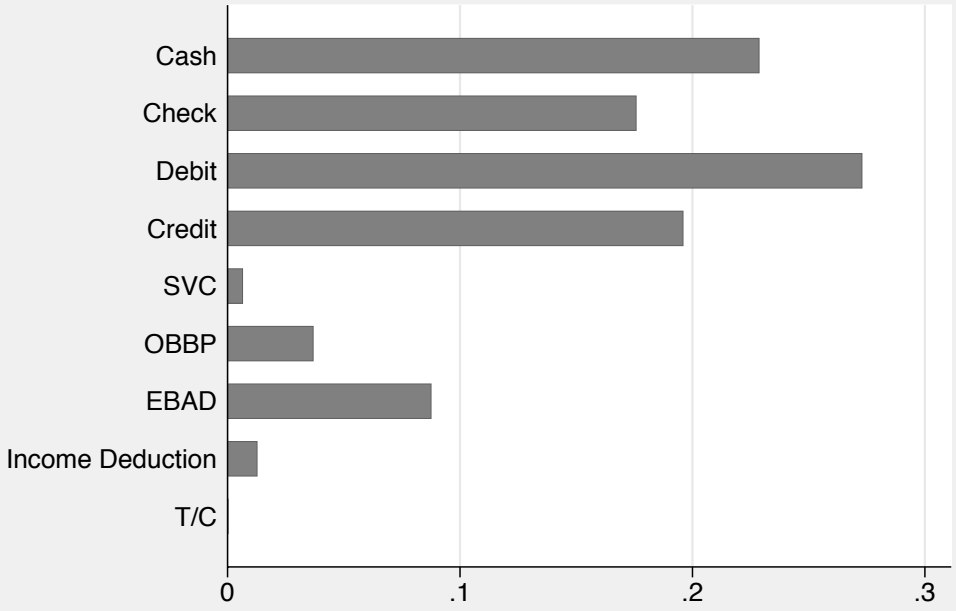
4.1 Use of Payment Instruments

4.1.1 Summary Descriptive Data

I considered a number of different metrics to analyze the intensity of consumer use of particular payment instruments. The simplest metric probably would be the

number of transactions for which each instrument is used in a typical month. For a number of reasons, however, I rejected that measure. One problem is that it necessarily will weight more heavily use by people with more economic activity (because they make more payments). Another problem is that it would be likely (especially in regressions) to give undue weight to outliers with extreme levels of use. More generally, because the purpose of this analysis is to assess the relative levels of consumer demand for the different instruments, analysis of shares (rather than transaction volume) is likely to provide a more reliable estimate (see Schuh & Stavins 2010). Accordingly, I decided to use a variable that measures the share of all payments made with any particular instrument. Thus, this measure sums to 1.0 for each consumer for all payments together; a consumer who uses only cash and credit cards might have 0.4 for cash and 0.6 for credit cards. I report first (Figure 8) the share of transactions for each instrument. I include not only the eight systems discussed under adoption, but also cash and direct deductions from income. Cash is not considered in the adoption section because all consumers (presumably) have adopted it. Salary deduction is not included in the SCPC adoption data, presumably, because a consumer does not "adopt" it in the same way as he adopts mainstream instruments.

Figure 8: Shares of Use of Payment Instruments



Source: 2008 SCPC. Weighted mean share of payments made with listed instrument. N=894–988

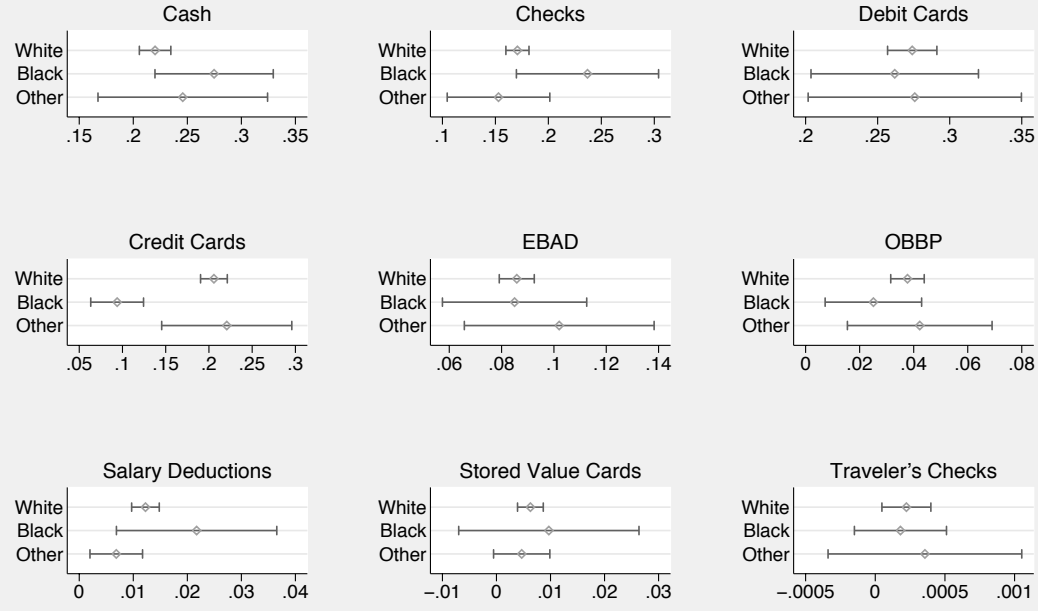
These data start to show what the adoption data obscure, the dominance that electronic payment instruments (payment cards in particular) have developed in recent years. Although the data discussed in Section 3 show that almost all consumers still adopt checks, we see here clearly that the share of check use is not only smaller than the share of cash, but also smaller than the share of either debit cards or credit cards.

Another interesting data point relates to check use as compared with the use of OBBP and EBAD payments that might serve as substitutes. The mean share of checks is now down to 17.5 percent. The mean share of OBBP and EBAD is now up to 12.5 percent—still less, but not by much. The question is not whether, but when, use of these developing instruments will surpass use of checks.

4.1.2 Demographic Variation

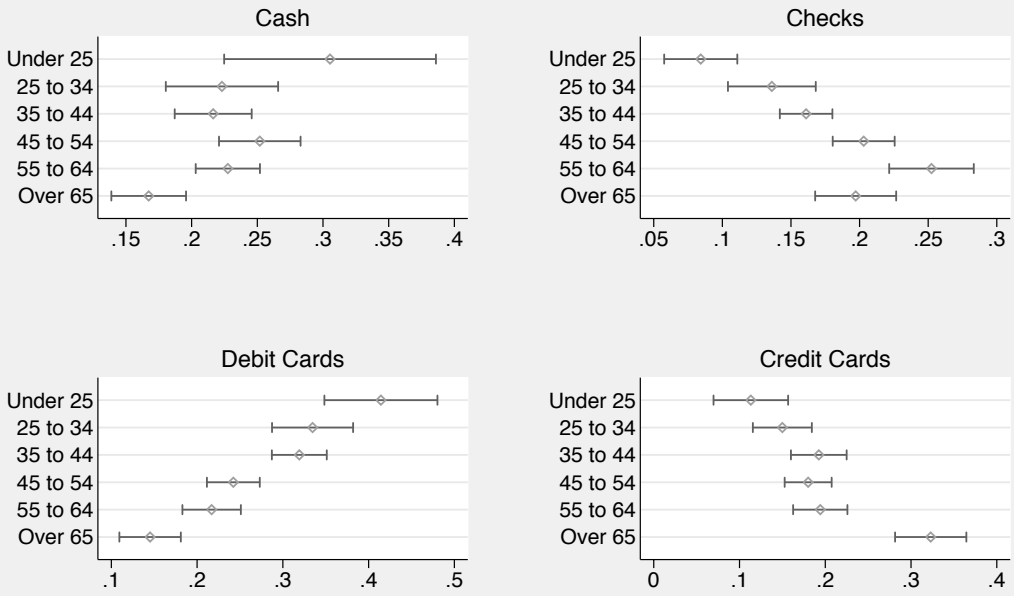
As with the adoption of payment instruments, there is good reason to expect demographic variation in the intensity of use. To illustrate the point as a prelude to the multivariate analysis below, Figures 9 and 10 summarize the shares of the different payment systems by race and age, respectively.

Figure 9: Shares of Use of Payment Instruments by Race



Source: 2008 SCPC. Graphs show weighted mean shares of payments made with the listed instrument with 95% confidence intervals. N ranges from 894–988.

Figure 10: Shares of Use of Selected Payment Instruments by Age



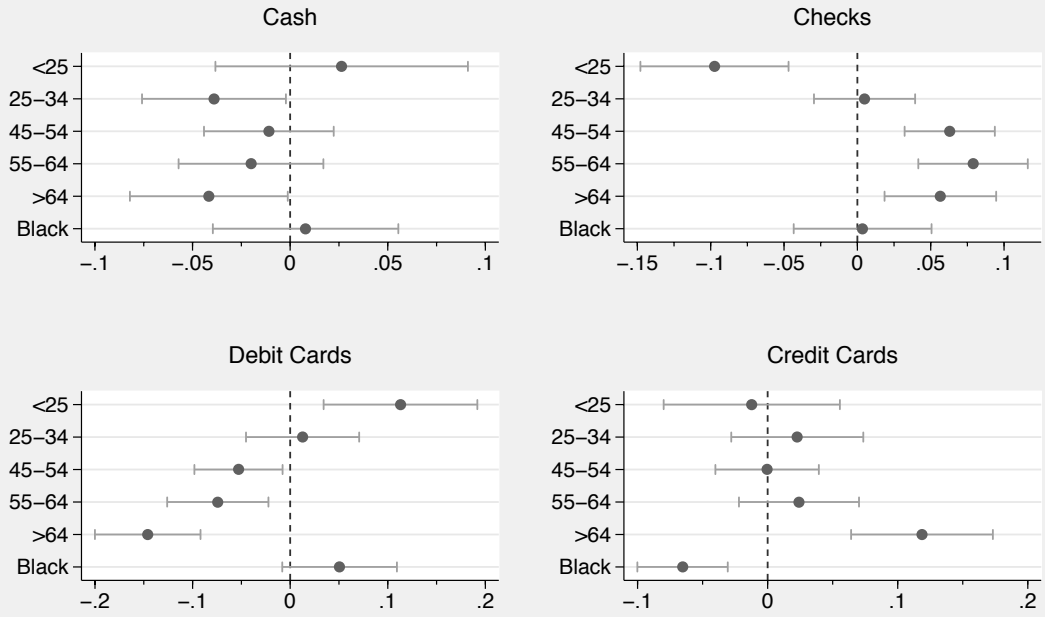
Source: 2008 SCPC. Graphs show weighted mean share of payments made with the listed instrument, with 95% confidence intervals. N= 965–987.

4.1.3 Multivariate Analysis

As with the analysis of adoption, multivariate analysis illuminates the extent to which the bivariate patterns apparent above (especially in Figure 10) are artifacts of the sample or instead reflect substantial variations. As with the regressions above, the reference category is a white individual aged 35–44, married with no children, with a college education and an annual income of about $60,000. To deal with the apparent effects of the share of adoption of other instruments on payments, the regressions include as additional controls dummies for the number of other instruments adopted by each user (see Schuh & Stavins 2010 [methodological discussion]).[8] Although the regressions summarized in Figure 11[9] suggest that the variation in the use of cash related to age and race is unimportant, each of the other instruments shows significant substantive effects related to age and race.

[8] To account for the possibility of selection effects related to adoption, I, like Schuh & Stavins, also estimated a set of Heckman two-step equations.
[9] A complete set of the output is available on request.

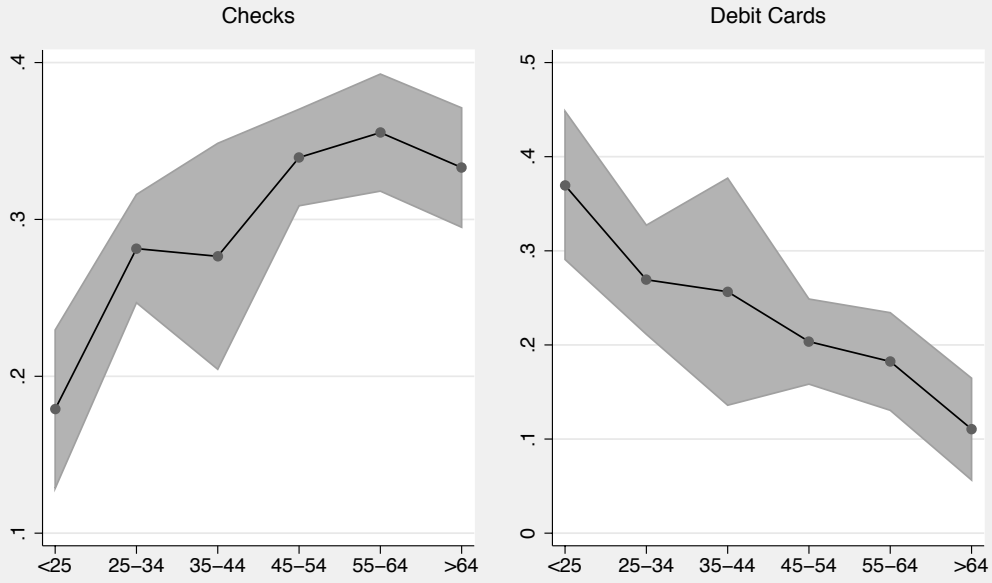
Figure 11: Age, Race, and Shares of Use of Payment Instruments



Source: 2008 SCPC. N ranges from 920–940. Graphs display OLS coefficients with 95% confidence intervals.
Reference class is white, married with no children, 35–44, college education, $60K annual income.
Omitting household structure, educational, income, and use of other instrument controls.

The working hypothesis, drawn from the steady decline of checks in recent years, would be that age is the most important predictor, with older age brackets showing higher rates of check use. As summarized in the second panel of Figure 11, the data show a strong connection between age and check use, even when controlling for race, income, household structure, education, and other instrument adoptions. Individuals ages 35–44 use checks significantly more than those who are younger, and those above middle age use checks even more. Although the model does not explain a large share of the variation in check use (the R-squared is less than 5 percent), the size of the age effects is substantial. The first panel of Figure 12 displays the predicted shares of check use, by age, with 95 percent confidence intervals, to illustrate the substantiality of the shift through the life course. As the figure shows, the share of payments made by check rises from less than 20 percent for individuals under 25 to almost 35 percent for those 55–64 years of age; conversely, the share made with debit cards falls from more than 35 percent for those under 25 to just over 10 percent for those over 64.

Figure 12: Predicted Share of Payments (By Age)



Source: 2008 SCPC. N = 938 (checks), 937 (debit cards). Graphs display predicted payment shares with 95% confidence intervals.
Reference class is white, married with no children, 35–44, college education, $60K annual income.
Omitting household structure, educational, income, and use of other instrument controls.

Turning to electronic payments, the two bottom panels of Figure 11 show the age and race coefficients for debit and credit cards, respectively. Blacks' use of debit cards is higher than whites'; blacks' use of credit cards is lower. The age pattern of credit cards, however, is much less stable than the bivariate shares in Figure 10 suggest: the increasing share of payments made with credit cards by older consumers is explained, to a large degree, by race, income, and education controls. But for debit cards, the opposite is true. If anything, the age effect is even clearer in the multivariate analysis illustrated in Figure 11 than in the cross-tabulation illustrated in Figure 10. The contrast with checks in Figure 12 shows the major point: check share increases markedly with age, while debit card share declines. If we accept the premise that debit cards are socially preferable to checks (because of the lower external costs, shorter clearance time, and lower fraud losses), then it is noteworthy that the "better" social choice for both instruments is made by the younger and the "worse" choice is made by the older.

I explored the possibility that debit card use is operating largely as an age-related substitute for checks—so that the sum of debit card and check shares would be flat over age. Although the size of the dataset makes it difficult to investigate the hypothesis

comprehensively, it appears that a considerable portion of the debit-card variation by age is not explained by check use.[10]

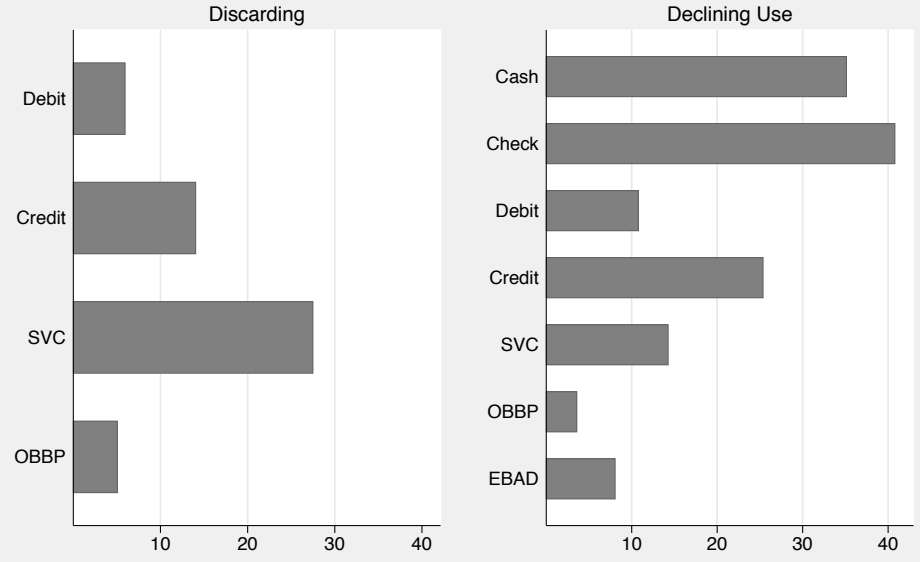
4.2 Discarding Payment Instruments

One of the most interesting features of the SCPC data is information about consumers who have become disenchanted with a particular payment instrument. The SCPC collects two pieces of information on this point: whether users have discarded a particular payment instrument, and whether they report decreased use of the instrument during recent years. The two data points are likely to reflect different types of an individual's dissatisfaction: discarding an instrument might reflect an affirmative concern about negative attributes; decreased use might reflect a more passive determination that superior alternatives are available. Together they help to illuminate the choices consumers make about payments.

4.2.1 Summary Descriptive Data

Figure 13 starts by showing two metrics of dissatisfaction. The first panel reports the ratio of those discarding an instrument to the total number of users; the second, the ratio of those decreasing their use of the instrument to the total number of users.

Figure 13: Declining Use of Payment Instruments



Source: 2008 SCPC. Weighted ratio of (a) consumers reporting specified decline in use of listed instrument to (b) users of listed instrument. N=977–1010

[10]A parallel effort related to cash (exploring the possibility that check share plus cash share would equal debit card share) was similarly inconclusive. It may well be that longitudinal data available in future years from the SCPC will shed more light on the substitution question.

The data suggest three distinct groups based on consumer satisfaction. The first group comprises the instruments with which consumers responding to the 2008 survey generally seemed satisfied: debit cards, EBAD, and OBBP, with few users reporting that they were discarding or decreasing their use. The second group includes the instruments with which consumers indicated that they were particularly dissatisfied: cash, checks, and stored value cards. Even heavy users of these instruments were likely to have reported that their use was declining. Among this group, the decline in check use is not surprising, because it is well known. What is more interesting is that consumers reported that they were decreasing their use of cash as well. Whether this is because of the increased ease of using payment cards for small retail transactions or because of concerns about crime and safety (see Mann 2006) is hard to say.

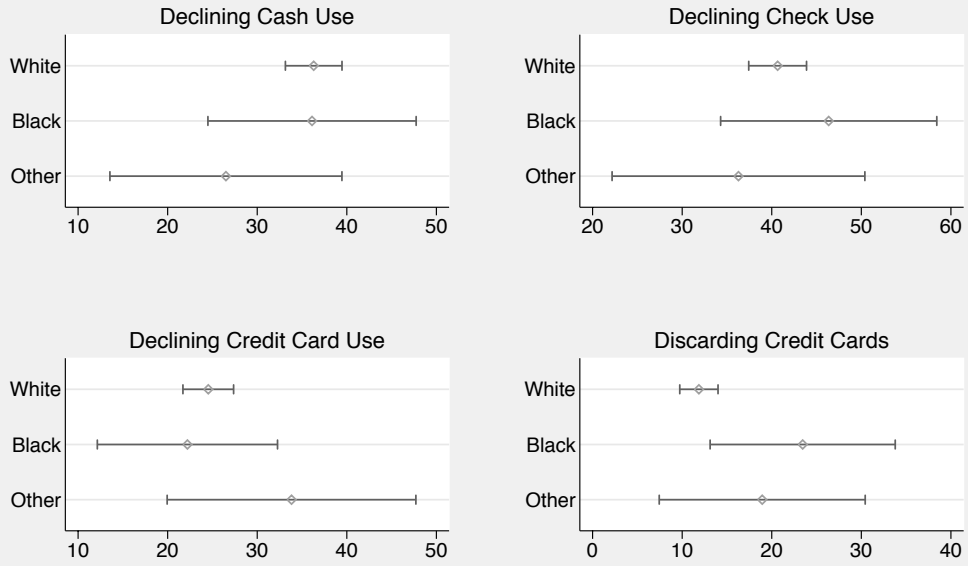
Similarly, the dissatisfaction with stored value cards is surprising because this instrument is so new that its adoption has been growing rapidly. Apparently, a large share of those who starting to use this product rapidly stopped using it, presumably because they decided that the fees associated with use were too high (Chakravorti and Lubasi 2006). It is also possible, though, that the reported decreasing use is an artifact of nonreloadable gift cards; the recipient of such a card might use it heavily then stop using the instrument when the card was fully redeemed. Therefore, these data may overstate the extent of dissatisfaction with stored value cards. Because of these concerns I do not explore further the data about dissatisfaction with stored-value cards.

The most interesting item is credit cards, which seem to belong to a group of their own: A high share of users reported discarding and decreasing use, suggesting that many users were actively disaffected, but intense users were not decreasing their use significantly. The contrast between credit cards and all other payment systems warrants closer attention.

4.2 Demographic Variation

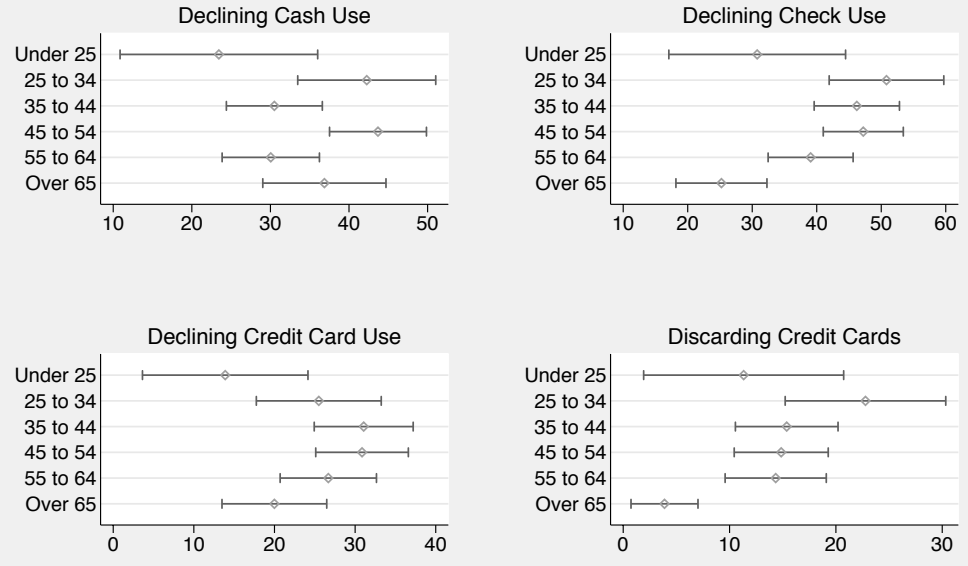
Demographic breakdowns (summarized in Figures 14 and 15) help to illuminate the groups that are driving the decreasing use of cash, checks, and credit cards summarized above. The data suggest the possibility of important variation by race and age, which motivates exploration by multivariate regression.

Figure 14: Declining Use of Payment Instruments by Race



Source: 2008 SCPC. Graphs show weighted mean percentage of consumers with declining use of (or discarding) the listed instrument, with 5% confidence intervals. N ranges from 1000–1010.

Figure 15: Declining Use of Payment Instruments by Age

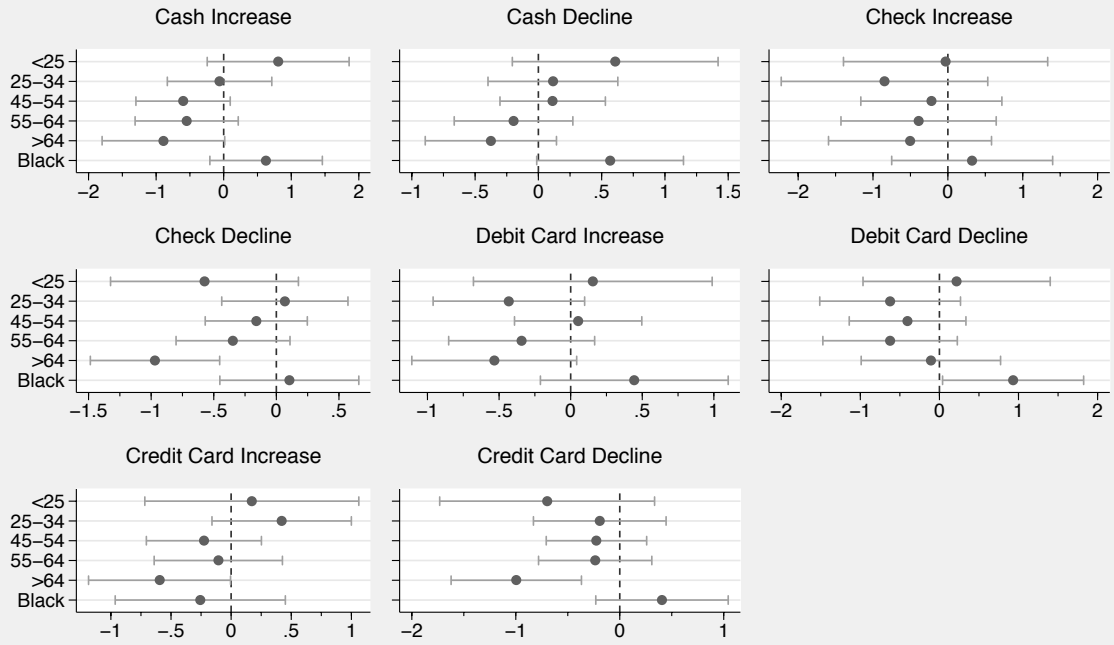


Source: 2008 SCPC. Graphs show weighted mean percentage of consumers with declining use of (or discarding) the listed instrument, with 5% confidence intervals. N ranges from 999–1009.

Multivariate analysis helps to illuminate the relationships among the various patterns noted above. Because the relevant survey question asked respondents to

indicate whether their use of each particular instrument was increasing, staying the same, or decreasing, it seems appropriate for purposes of multivariate analysis of dissatisfaction with instruments to include the full range of responses. Although I considered an ordered logit model, it quickly became apparent that the three responses are not, strictly speaking, ordered; older consumers, for example, seem less likely to have reported any change (whether increase or decrease). Accordingly, I settled on a multinomial logit model, summarized in Figure 16.[11] Because these models include data on increased use and decreased use, I added debit cards for comparison. The panels of Figure 16 display first the coefficients for increased use and then the coefficients for decreased use (both relative to the baseline of no change). As with the regressions above, the reference category is a white individual, married with no children, with a college education and an annual income of about $60,000; controls for income, education, household structure, and adoption of other instruments are omitted.

Figure 16: Multinomial Analysis of Age, Race, and Changes in Use of Payment Instruments



Source: 2008 SCPC. N ranges from 950–960. Graphs display unexponentiated logistic coefficients with 95% confidence intervals. Multinomial logistic regression of increased use, constant use, and declining use. Reference class is white, married with no children, 35–44, college education, $60K annual income. Omitting household structure, educational, and income controls.

The multivariate analysis suggests little in the way of substantial relationship to race and age. As suggested above, change of any kind is more common for young

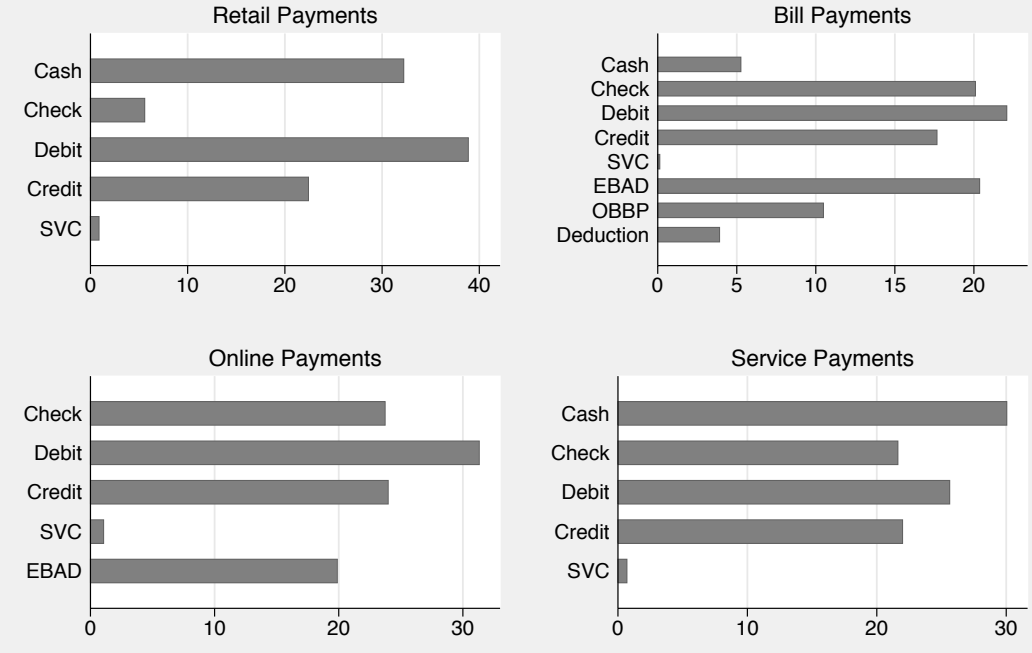
[11] A complete set of the output is available on request.

households than for the old: the coefficient is marginally or significantly negative for consumers over 64 in each of the models. This suggests that declining use relates more to a settled pattern of use than to any particular taste for (or against) particular instruments. With respect to race, whites are less likely to increase (or decrease) use than blacks: the coefficients for blacks are marginally or significantly positive for each of the models with the exception of credit cards; and there the large standard error makes it difficult to discern any substantial race effect in the changing use of credit cards.

5 Payments Choices

Another novel type of information in the SCPC relates to the types of transactions in which different payment instruments were used, according to the 2008 survey. For purposes of this paper, I distinguish four types of payment transactions: bill payments, online purchases, retail purchases, and services. Figure 17 illustrates how frequently each of the different instruments was used to make each of those four types of payments. The principal hypothesis to investigate is the significance of demographic variation in the continuing use of checks for bill payments and retail purchases. The discussion above suggests a likelihood of significant race and age effects.

Figure 17: Payment Instrument Use by Transaction Type



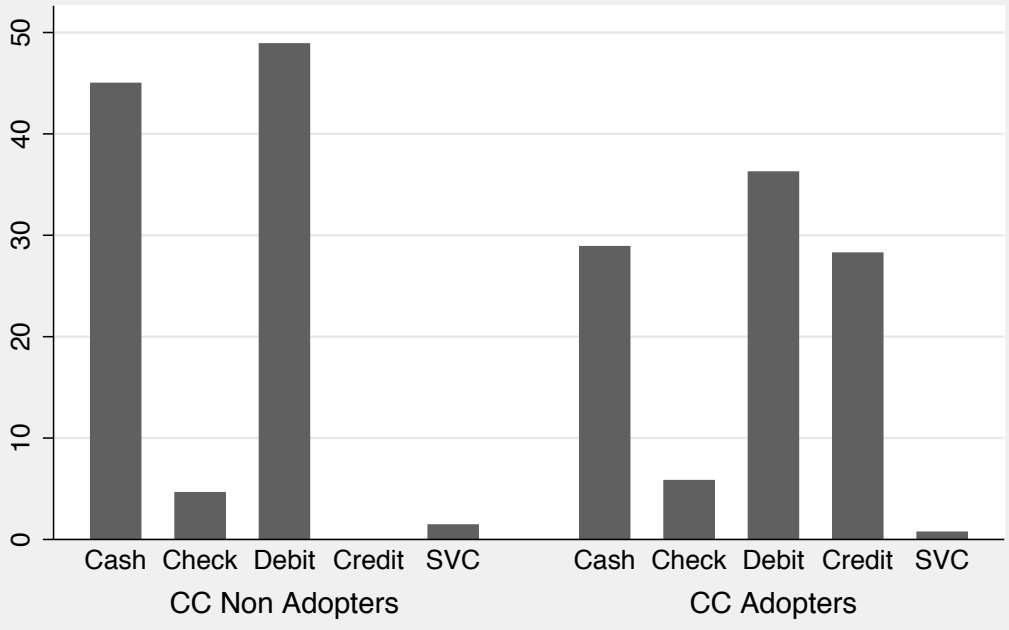
Source: 2008 SCPC. Weighted percentage of specified transaction type using listed instrument. N=1010

Several things about Figure 17 are interesting. The first relates to checks. As the retail panel shows, checks were used quite rarely (5 percent) in retail transactions—the type of transaction where pressures of time and convenience are most important. They are, to be sure, still much more common in other contexts, but they are now rare at the retail counter where they once dominated (Federal Reserve 2010). The second point of interest relates to paper bill payments. In that context, paper (including checks and cash) was used for only a quarter of bill payments, a remarkable shift from a generation ago. One oddity of the data is the report that checks were used for 25 percent of online payments. Based on the survey questions, this apparently represents offline use of checks mailed to pay for online purchases. The final point of interest relates to the rise of debit cards, both online and at retail. Where credit cards dominated online purchases only 10 years ago (when they were the only practical option), the successful deployment of signature-based debit cards spurred their use online to such an extent that in 2008 debit cards were used about 40 percent more often for those transactions than credit cards (30 percent versus 22 percent). The same was true at retail, where debit cards were used almost twice as often (39 percent versus 22 percent) as credit cards. Given the complex policy concerns raised by the routine use of credit cards (Mann 2006), and reflected in the CARD Act, the relative dominance of debit cards in those contexts is noteworthy. As with the declining use data above, this underscores the shift by consumers away from credit in contexts where the debit alternative is practical. It remains to be seen whether the adverse effects of Dodd-Frank on the debit card market will reverse that trend.

It is also interesting to consider how the breakdown of use for different transaction types relates to credit card adoption (Figures 18 and 19). The most surprising point is the concentration of retail[12] check use among those who did not adopt credit cards. I would have expected those who did not use credit cards to be primarily debit card users. Interestingly, however, where check use was an order of magnitude larger for non-adopters (19.5 percent versus 1.3 percent), debit card use was roughly the same (45 percent versus 38 percent). This suggests that many people have never adopted either credit cards or debit cards and continue to pay only with paper.

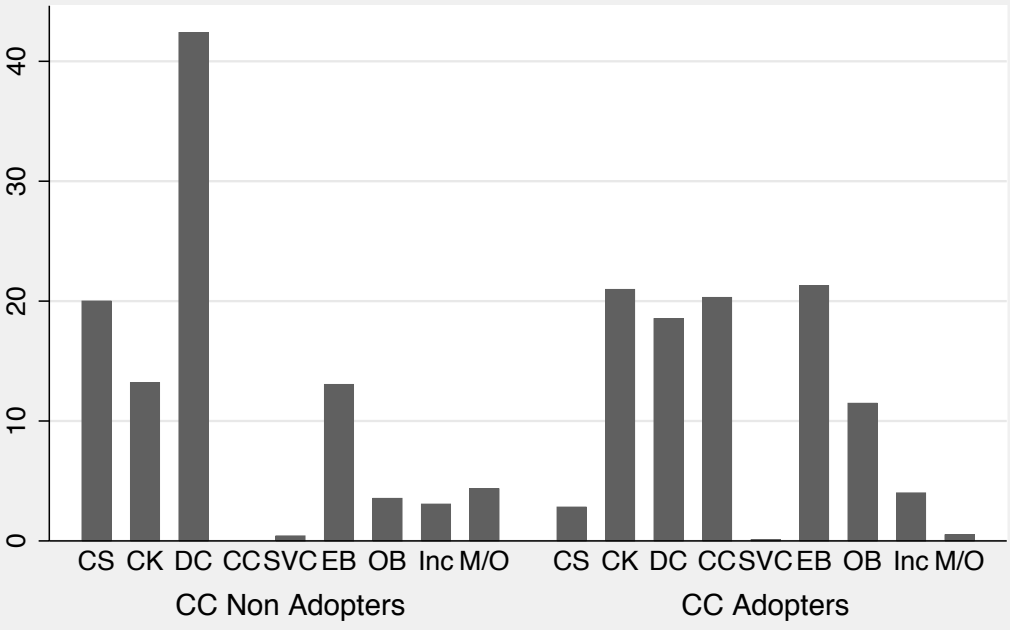
[12] The analysis of retail payment instruments in this section does not include online payments. The choice of venue itself of course is likely to be related to age and race.

Figure 18: Payment Instrument Shares by Credit Card Adoption (Retail)



Source: 2008 SCPC. Weighted percentage of retail payments made using listed instrument.
N=1010

Figure 19: Payment Instrument Shares by Credit Card Adoption (Bill Payment)

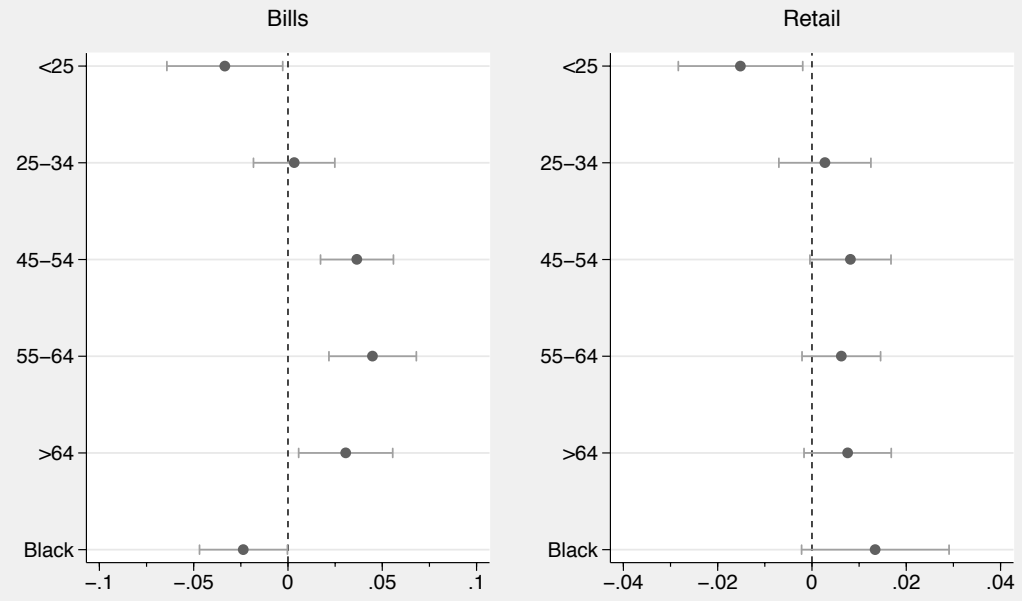


Source: 2008 SCPC. Weighted percentage of bill payments made using listed instrument.
N=1010

The pattern of check use was similar for bill payments, where credit card adopters paid their bills with checks less than 4 percent of the time but non-adopters

paid their bills with checks almost half (46 percent) of the time. Here, however, debit card use also was much larger (40 percent versus 12 percent). What is most interesting is the strikingly high share of EBAD and OBBP use among adopters (both more than five times as large as among non-adopters). No reason for this disparity is apparent.

Figure 20: Age, Race, and Share of Check Use by Transaction Type



Source: 2008 SCPC. N 903 (Bills) 922 (Retail). Graphs display OLS coefficients with 95% confidence intervals.
Reference class is white, married with no children, 35–44, college education, $60K annual income.
Omitting controls for household structure, education, income, and adoption of other instruments.

To explore the continuing use of checks more thoroughly, Figure 20 summarizes[13] the results of an ordinary least squares regression of the share of check use for retail and bill payments, with controls for household structure, income, education, and adoption of other payment instruments. As with the regressions above, the reference category is a white individual, aged 35–44, married with no children, with a college education and an annual income of about $60,000.

The results suggest two things. The most interesting is the relative importance of age in explaining check use for bill payments as compared with retail. The first panel of Figure 20 looks much more like Figure 12 than the second panel does. Although the age effect remains discernible for retail payments, it is (surprisingly) much diluted. The regression also suggests substantial race effects. Where Figure 12 suggested no race

[13] A complete set of the output is available on request.

effect at all for check use in the aggregate, blacks were substantially less likely to use checks for bill payments, but for retail payments they were substantially more likely to use checks. To get an understanding of the size of the effects, the typical share of check use for bill payments was about 20 percent; the share for blacks was about 2.5 percentage points (13 percent) lower; for retail, where the typical share was about 6 percent, blacks' share was about 1.4 percentage points (more than 20 percent) higher. Because the regressions control for income, education, household structure, and adoption of other instruments, the distinction is difficult to understand. The retail effect is not, for example, likely to reflect lack of access to debit cards. Perhaps the longitudinal data available from the SCPC in the years to come will shed more light on the problem.

6 Conclusion

This paper, of course, only scratches the surface of demographic variation in the choices consumers make about payments. Much more work remains to be done to understand the underlying causes of the demographic variations documented above. The SCPC itself doubtless will contribute to further understanding of all of these questions as longitudinal data become available in the years to come.

For me, the most intriguing of these questions, because it is directly related to future developments, is the effect of age. I have emphasized elsewhere the way in which the use and risks of credit are patterned by age (Mann and Mann 2011). Each section of the paper documents substantial and significant age effects related to payments. But the paper does not undertake to determine whether the effects relate to age—the position in the life course—or whether they are instead cohort effects—differences in payments choices that depend on the nature of payments institutions during the early years of the life course for each generation of consumers. Although the different options that become available as later cohorts enter the mainstream economy make cohort effects plausible, there are strong arguments to support a timeless life-course effect. Most obviously, whatever else has changed about financial services in the last three decades, it remains true that the young have less access to mainstream financial services than those farther along the life course. If anything, the burgeoning use of credit by the young (especially college students) increases the share of those under 30 whose credit situation makes it harder for them to get full access to mainstream financial services. Although I find these questions fascinating, I cannot explore them here, but must be content to hope that this paper shows the way to continuing inquiry in this area.

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