

CREDIT CARDS AND CONSUMERS

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Although most Americans now carry credit cards, the microeconomic effects of cards are not well-understood. This paper draws upon data from the Surveys of Consumer Finances from the 1970s to the 1990s. It documents three findings. First, credit cards allow households to reduce their transactions demand for money (so fewer dollars sit idle in checking account balances.) The size of the effect is large. Our instrumented estimates suggest that having a bank credit card allows the average consumer to hold up to \$2200 less in checking balances (in 1995 dollars.) Second, credit-card balances are a hump-shaped function of consumers' age, peaking approximately five years before a similar peak in their earnings. This suggests that credit cards are used in conjunction with other forms of credit to bring forward future income to help smooth consumption. Third, the number of cards that people hold depend systematically on personal characteristics, and is especially high for self-employed people, which is consistent with earlier evidence that credit cards help small U.S. entrepreneurs to finance their activities.

I. INTRODUCTION

Credit cards are a modern phenomenon. Rare only a quarter of a century ago, they are now part of everyday life, and carried by more than seven out of ten Americans. While credit cards are clearly popular with, and highly valued by, the public, the economic effect of widespread use of credit cards is not yet well-understood. In this paper we study changes in credit card possession and use over time. In addition we explore ways in which the diffusion of credit cards has helped consumers by reducing the need for money balances and the relaxing of liquidity constraints.

An obvious benefit provided by credit cards is that they reduce the need for consumers to hold liquid financial assets. A person who has a credit card does not need as much ready cash as someone without a card, whether it be shopping at the local mall or taking a Florida vacation. Consumers also hold liquid assets for precautionary reasons; again credit cards reduce the need to carry large money balances. We test the hypothesis that checking account balances are lower, other things held constant, among those who have a credit card. This would imply that credit cards save consumers the interest that would otherwise be forgone with low yield checking account balances. We further study the relationship between account balances and credit card charge volume.

Alternatively, access to a credit card may allow a person to change his or her consumption behavior. The permanent income hypothesis says that people will smooth consumption by borrowing against future earnings. However, that is easier said than done with traditional bank loans. Young people in particular may find themselves constrained by asset based lending even though they may have high permanent income. However, credit cards may enable people to supplement borrowing forward on the strength of future earnings. In this paper we assess the idea that credit cards help people to overcome current-income constraints.

The paper is organized as follows. Section 2 provides relevant background information. Section 3 describes the data and presents simple statistics while Section 4 presents a multivariate analysis of changes in card possession and use over time. Section 5 estimates the transactions demand for money. The timing of consumption is studied in Section 6. Multiple card holding is studied in Section 7 and Section 8 gives our conclusions.

II. BACKGROUND

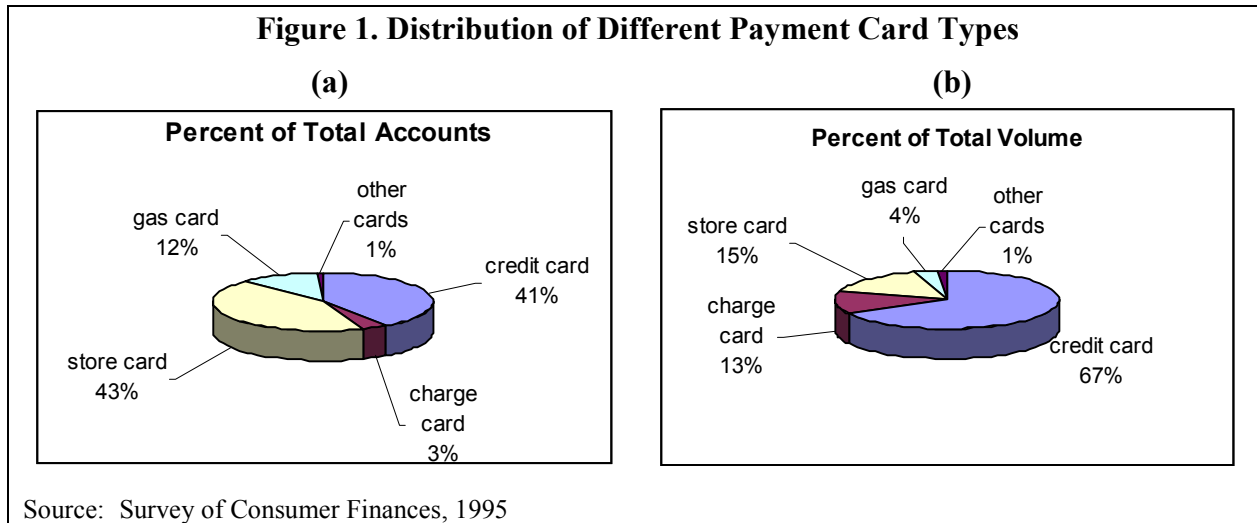
Credit cards can be used at many individual merchants for payment and financing.¹ They are available from two associations of banks and two proprietary companies. The bank associations are MasterCard and Visa. Member banks of these associations issue cards under those brand names.² Novus Services is a proprietary company that issues the Discover, Private Issue, and Bravo credit cards. American Express is a proprietary company that issues the Optima credit card.

Credit cards are only one species in the greater genus of cards known as payment cards. In addition to credit cards, there are also charge cards such as American Express and Diners Club, store cards such as those offered by nationwide department stores, gas cards such as those offered by Mobil, and other credit cards which can be used to rent cars or purchase airline tickets. Figure 1(a) shows the relative number of each type of card. Figure 1(b) shows the relative magnitude of payments charged on each type of card. Credit cards account for

¹ Credit cards that can be used at many merchants are sometimes called “general-purpose” credit cards to distinguish them from “store” credit cards that can only be used at the retailer that issued the card. For brevity, we refer to general-purpose credit cards simply as credit cards.

² The term “bank cards” refers to credit cards issued by MasterCard and Visa.

approximately 41 percent of the total payment-card accounts used by consumers and nearly 70 percent of the dollars charged on cards.³ When we refer to credit cards, we do not include store cards, gas cards, charge cards or other cards.



Most consumers have the choice of using cash, checks, credit cards or charge cards for many of their day to day transactions.⁴ There are also costs inherent in choosing one type of payment over the other. For instance, holding large money balances to facilitate the use of cash or checks over credit cards means consumers forego holding other financial assets that provide a higher rate of return, e.g. stock and bonds. This simple framework leads economists to believe that consumers who have access to credit cards will have smaller demand deposits. People also hold money in case of unforeseen emergencies; credit cards should have a negative effect on this precautionary demand for money. It can be pointed out that consumers still need cash to pay their monthly credit card bills—which may actually cause money balances to be higher. However, consumers can easily manage their cash flow in one of two ways. First, they may hold funds in higher yielding assets until it comes time to pay their bill. Second, they can synchronize their income flow with bill payment: when their paycheck arrives they channel

³ In 1995, the Survey of Consumer Finances started including questions regarding a specific type of bank card known as a debit card. Because debit card information is so limited however, we restrict our discussion to credit, charge, gas, store and “other” cards.

⁴ Recently, consumers have also been able to use ATM/debit cards. These cards were not important payment devices for the 1970-1995 period that we focus on in this paper.

funds to bill payment and to high yielding financial assets minimizing the need for extended demand deposits.⁵

Previous empirical work has tested this hypothesis. Duca and Whitesell provide cross-sectional evidence from the 1983 Survey of Consumer Finance (SCF) that shows that credit card ownership is associated with lower levels of transactions deposits.⁶ They report large effects: a 10 percent increase in the probability of holding a card is associated with a reduction in checking deposits of 8 percent and money fund balances of 11 percent. White, using data from a single bank, found that credit card possession led to a significant reduction in the level of demand deposits.⁷

In addition to transactional convenience, credit cards also provide consumers with a flexible term loan. With sophisticated credit scoring techniques, credit card companies issue cards based on an individual's proven income and payment history and then monitor the individual's monthly transaction and payment records; this screening is much different from traditional asset based lending. This credit instrument is, however, priced at higher rates of interest than, for example, home equity loans. But people in need of liquidity, constrained by traditional channels, may choose to use their available credit card balances anyway. Credit cards potentially help credit-constrained consumers by providing a nontraditional source of funds.

III. DATA

Our data come from the Surveys of Consumer Finances (SCF) and cover the years 1970, 1977, 1983, 1989, 1992, and 1995. The Federal Reserve Board has been conducting the SCF since the end of World War II. The SCF is a highly-regarded and oft-published source of information on the saving, spending and financing habits of American households. As with

⁵ Noted by Edward Marcus, "The Impact of Credit Cards on Demand Deposit Utilization," *Southern Economic Journal* 26 (April 1960), 314-16 and Kenneth White "The Effect of Bank Credit Cards on the Household Transactions Demand for Money," *Journal of Money, Credit and Banking*, 8, 1976, 51-61. As cited in Duca, J.V. and Whitesell, W.C. "Credit Cards and Money Demand: A Cross-sectional Study," *Journal of Money, Credit and Banking*, 27, 1995, 604-623.

⁶ Duca and Whitesell, *supra* note 5.

⁷ White, K.J., *supra* note 5.

most surveys, the SCF has both strengths and weaknesses. Its strength is that it provides data on the use of credit cards from a random sample of the population along with much detail on the socioeconomic characteristics of these households. Its weakness is that the data people report to survey takers are not completely reliable. Not surprisingly, for example, people tend to understate the amount of debt they have. So the SCF is not the best source of data on, for example, the total credit card debt of the American public—Visa and MasterCard have more reliable information. But the SCF is the best source available for making comparisons between different segments of the public. In Appendix A, we provide a more rigorous technical background of the surveys and present some comparisons between SCF and other reliable sources.

The SCF started including detailed questions on credit card use in 1970. The exact wording of the questions has changed over time, and the definition of credit cards has expanded to include new brands such as Discover (which was first issued in 1986) and American Express Optima (which was first issued in 1989). Generally, the SCF asks reasonably consistent questions concerning the number of credit cards people have, how much they charge on those cards and how much they owe of their cards. After combining the available SCFs from 1970 to 1995, we obtain a usable sample of slightly more than 18,500 households. The SCFs provide cross-sections of households rather than longitudinal (panel) data, though later in the paper we look at averaged data over lifetimes.

Table 1 presents the average number of cards of each type held, and the number of cards of each type over time. Only a quarter of Americans, according to the data, now manage without a credit or charge card. The proportion of households with credit cards has grown strongly over the years of the sample. Use of credit cards, especially, has increased. In 1970, 16.3 percent of households had access to a credit card. By 1995, the figure had increased to 66.5 percent. Store cards are also widespread: 35.4 percent of people had them in 1970 and 57.7 percent by 1995. Charge cards and gas cards are less common but still carried by a tenth and a quarter of the sample, respectively. The far-right column in panel (a) of Table 1 reveals that 50.6 percent of people had at least one kind of card in 1970, and that this had risen to 74.2 percent by the middle of the 1990s.

Panel (b) of Table 1 provides data on payment card possession over time. Not only has the number of payment card holders increased, but overall the number of payment cards per person has increased as well. There is a noticeable upward trend in the possession rate of bank cards over time. This has approximately doubled from 1.25 cards in 1970 to 2.42 in 1995. Interestingly, however, charge cards and gas cards are now less common. They exhibit lower possession rates in the 1990s than the 1970s (down from 1.65 and 2.33 to 1.13 and 1.85, respectively). Store-card numbers have been flat for most of the period. The option of revolving credit that bank cards give consumers coupled with the breadth of their acceptance has reduced the need for consumers to hold these more restrictive cards.

Conditional on having any kind of payment card, the typical American cardholder had four cards in 1970 and more than five cards in mid-1990s. In addition the number of households with payment cards overall has increased while the number of households with credit cards has more than tripled. These two factors have increased the importance of payment cards, particularly credit cards, over time.

Panel (c) of Table 1 shows the median volume (in 1995 dollars) of monthly charges to payment cards. The median amount of new charges has increased steadily over time from \$0 in 1970 and \$70 in 1977 to \$150 in 1995. The median charges made on charge cards has increased along with credit cards. While the usage of credit cards has increased sharply, the volume of gas card and store card usage has declined since the 1970's. Recently however, median new charges on store cards increased to \$20 in 1995 from \$0 in 1989 and 1992. The last column of panel (c) shows the median volume of charges for all payment cards indicating that the median payment card charge volume has doubled since 1970. The last panel of numbers in Table 1 shows the median level of balances carried over on the different payment cards over the period 1970 to 1995. The median of households' balances on bank cards has increased steadily from \$0 in 1970 to \$200 in 1995. While the majority of charge card, gas card, and store card holders had no carryover balances on these accounts over this period, overall the median household balances on any card has steadily increased over time.

IV. MULTIVARIATE ANALYSIS OF CARD POSSESSION AND USE

Next we study the probability of holding each type of card conditional on a household's economic and demographic characteristics. Table 2 provides a set of probit equations exploring factors that determine the possession of different types of cards. Covariates include employment status, year, income, education, age, gender, race, housing tenure, marital status, and household composition. The omitted dummy for employment status is self-employment. It can be seen that—for all but store cards—self-employed people consistently use payment cards more than any other group. The unemployed and those out of the labor force are less likely to hold any of the various types of payment cards.

Credit cards—shown in the first column of Table 2—are of particular interest. Consistent with the raw data, the probability of holding a credit card, other things equal, has grown by approximately one half over the period studied (the numbers in the Table have been scaled to be interpretable as proportionate changes). As expected, the higher is the person's income quintile, the larger the chance that he or she has a card. Education acts in a similar way: college graduates are more likely to have a card. There is a strongly increasing, concave shape in age. The change in the probability becomes flat around age 64. Women and whites have a higher probability of being a credit-card holder, as do home owners and married people. Those in homes with large numbers of adults or children are less likely to have a card. The pseudo R-squared on column 1 of Table 2 is fairly high and the coefficients are well-determined.

Broadly similar patterns emerge across the coefficients in columns 2 to 5 of Table 2. The time trend is not as pronounced, however, for the use of gas cards. In contrast to the results for credit cards, charge cards are less likely to be used by married people, and more likely to be used by men and blacks.

Having explored the possession of payment cards, we now turn to the volume of their use. Table 3 contains this information. The dependent variable is the dollar amount billed in the previous month. Holding constant the amount of income, self-employed people run up much larger amounts. With credit cards they spend on average \$700 (1995 dollars) more than the non-self employed. It can be seen from the table that the pattern is the same for each kind of card. Strikingly, in column 5 of Table 3, the self-employed charge to some kind of payment

card roughly \$1266 more than others. This is after controlling for the income and other characteristics listed in Table 3. For credit cards, relatively large amounts are spent by those who are highly educated, older, male, white, home-owning, married, with few children, and with a large number of adults in the house.

V. PAYMENT CARDS AND THE TRANSACTIONS DEMAND FOR MONEY

People are usually believed to hold cash and checking deposits both for transactions and precautionary reasons. While this is likely to be costly (because of the low levels of interest paid on highly liquid funds), it is rational in any economy without idealized payment systems. A central question is whether carrying a payment card allows people to hold less money. Standard money-demand theory suggests such an effect.

More generally, payment cards may reduce the need for a whole range of liquid assets. Surprisingly little empirical work has been done to test for and chart such effects. The most comprehensive existing study appears to be that of Duca and Whitesell,⁸ although their paper uses only one early year of data.

Table 4 reports regression equations where the dependent variable is the ratio of a person's checking balances to his or her total financial assets. This appears to be the natural normalization. Here the measure is based on the survey answer:

B3401 The total balance in checking accounts (no money market funds).

The mean of the dependent variable in Table 4 is approximately 0.2, which is indirectly an indication of how small are the typical American's financial asset holdings. Both OLS and Tobit equations are given in the Table (the latter because twenty percent of households in the sample said they have no checking balances). As will be seen, both estimation techniques lead to the same broad findings. Columns 3 and 4 of Table 4 switch to equations explaining checking account balances relative to the sum of savings plus financial assets. This change of denominators alters the results only marginally.

⁸ Duca and Whitesell, *supra* note 5.

The main finding from Table 4 is that people who hold payment cards have less money in their checking accounts (measured relative to their entire stock of financial assets). In each specification, the three dummy variables “credit card”, “charge card” and “gas card” enter negatively. In most cases the null of zero can be rejected at the normal five percent level. The robustness across specifications is quite strong. The credit-card variable is especially large and well-determined. A number of 0.035 here, for example, implies that— with other factors held constant—checking balances relative to financial assets are three and one half percentage points lower among those with bank credit cards. “Store card”, however, is less robust in Table 4. It is not easy to speculate on why. Perhaps they are usable in such a narrow range of outlets that they do not make a substantial difference to people's precautionary holdings.

A feel for the size of the payment-card effect, rather than simply its statistical significance, can be obtained from the coefficients in Table 4. Someone who holds each type of card will, as the first two columns of Table 4 show, have approximately 5.6 percentage points lower checking account balances (measured relative to his or her stock of financial assets.) Someone who holds just a credit card will have approximately 3.5 percentage points lower checking account balances (again measured relative to his or her stock of financial assets.) Based on the median total financial assets of households with credit cards—\$22,000—a 3.5 percentage point decrease in balances corresponds to a reduction of approximately \$800 in checking account balances for the median household.

It might be thought that the significance of the payment-card variables could stem from the omission of a financial wealth variable (perhaps aided by some non-linearity in the process governing the ratio of checking accounts to financial assets). Experiments along these lines suggested otherwise: the basic result was never affected. For example, the inclusion of financial assets as an extra explanatory variable in Table 4 did not change the coefficients on credit cards, and the financial-assets variable was itself poorly determined.

Other variables in the equations of Table 4 work in interesting ways. There is a powerful convex-shape in age, but this occurs around a downward sloping relationship. Hence it is older people who have a relatively low ratio of checking-account balances to assets. The greater a person's education, the lower the ratio of checking balances. Male-headed households hold more checking balances than women. Income quintile has a strong negative effect, which

may be a consequence of high-earners' other methods of paying for goods. This sign is not necessarily what would have been predicted—for the simple reason that higher-income consumers could be expected to hold higher transactions balances to finance what is presumably their greater expenditure.

Home-owners carry lower money balances, as do married people. More adults in the household means greater money holdings. Race dummies are generally statistically significant. The number of children in a house has no robust effect.

It is not impossible that our estimates of the effect of payment cards on money balances are understated. The reason is that we have treated payment card ownership as a pre-determined variable rather than endogenous. Although a correction for possible simultaneity would be desirable, finding persuasive instruments is not straightforward. One study to tackle the problem is Duca and Whitesell.⁹ The authors begin by noting that early work, such as Mandell¹⁰ and White¹¹ found small or non-significant effects from credit cards. They point out that these authors do not adjust for the endogeneity of the payment-card variables. Using a single year of the SCF, 1983, Duca and Whitesell estimate selection-corrected models of money holding. The credit-card variables work poorly without a selection term, but have a statistically significant negative effect after that correction.

Our earlier tables did not adopt this methodology—for two reasons. First, the results appear rather robust using only simple estimation methods. Second, the direction of bias would tend to strengthen the conclusions from our regression equations, and it is unclear that there are plausible exclusion restrictions to allow payment cards to be endogenized. It may be that our larger data set allows us to obtain the key result more easily than could the Duca-Whitesell study.

Nevertheless, a natural objection to the estimates of Table 4 is that use of payment cards is not exogenously determined. In principle, what is needed is a variable that shifts the probability of having a payment card, but does not itself enter the money-balances equation.

⁹ Duca and Whitesell, *supra* note 5.

¹⁰ Mandell, L., *Credit Card Use in the United States*, Ann Arbor, MI: Institute for Social Research, 1972.

¹¹ White, K.J., *supra* note 5.

To pursue this further, Table 5 presents instrumented results for the impact of credit cards (the main form of card, and the one that had the strongest coefficient in the earlier table) upon money holdings. Two variables from the SCF seem to offer themselves as suitable instruments; they are the answers to:

Have you ever been late or missed payment on a loan?

Have you ever been dissuaded from applying for a loan for fear of being turned down?

These should be informative about the person's credit rating, and therefore about people's ability to obtain a credit card. Moreover, they are correlated in the expected way with possession of a card (calculations not shown.) It may be reasonable to believe the two satisfy the necessary exclusion restriction.

Column 1 of Table 5 provides the baseline ordinary least squares estimates. As before, "credit card" enters negatively. It has a coefficient of approximately -0.04, with a small standard error. Hence money holdings are four percentage points lower, other things equal, among those people with a card (where the denominator continues to be total financial assets). Columns 2 and 3, estimated with two-stage least squares, provide strikingly larger estimates. Both instruments are used in column 2 on Table 5; only the latter instrument is used in column 3. In each case, the coefficient on bank credit card rises in absolute terms to more than -0.2, and is well-determined. This is a six- or seven-fold increase in size over the OLS result.

Thus the instrumented estimates of Table 5 suggest that having a credit card is associated with holding significantly lower checking balances. As a generalization, Americans with credit cards are estimated, other things equal, to have approximately \$2200 less in their checking accounts than those without a card. To put it differently, as the mean transactions-balance in the SCF data set is itself approximately \$2700 in 1995, the ceteris paribus effect on a hypothetical representative individual who owns no credit card and switches to having one, is on average to eliminate his or her need to hold money in a checking account. Evidence of benefits of this magnitude could be viewed as complementary to earlier theoretical defenses of

credit-card use—as consumers' rational choice in the face of transactions costs—by authors such as Brito and Hartley.¹²

Although these kinds of dollar gains appear large at first glance, they are not necessarily surprising. A world where supermarkets and department stores did not take credit cards would be one where people used checks a great deal more than is common in the late 1990s. Those people would, in turn, have to keep much larger checking-account balances.

VI. CREDIT CARDS AND THE TIMING OF CONSUMPTION

If utility functions are strictly concave in consumption, a rational consumer will tend to spread her spending over time in an attempt to equate the marginal utility of income in each period. If capital markets are less than perfect, so that people are constrained in their borrowing, credit cards may help consumers maximize lifetime utility.

Much research by economists has gone into the examination of liquidity constraints on consumer purchasing decisions. A person is usually said to be liquidity-constrained when lenders refuse to make the household a loan, or offer the household less than they wished to borrow.¹³ A variety of studies have suggested that roughly twenty percent of US families are constrained.¹⁴ As might be expected, constrained households are typically younger, with less wealth and accumulated savings.¹⁵ There is also evidence that capital constraints are particularly large for blacks. Fairlie uses data from the 1968-89 Panel Study of Income Dynamics (PSID) to study why African-American men are one-third as likely to be self-employed as white men.¹⁶ Fairlie finds that capital-constraints—measured by interest income

¹² Brito, D.L. and Hartley, P., “Consumer Rationality and Credit Cards,” *Journal of Political Economy*, 103, 1995, 400-433.

¹³ Ferri, G. and Simon, P., “Constrained Consumer Lending: Exploring Business Cycle Patterns Using the Survey of Consumer Finances,” mimeo, Princeton University, December 1997.

¹⁴ Hall, R. E. and Mishkin, F. S. “The Sensitivity of Consumption to Transitory Income: Estimates from Panel Data on Households,” *Econometrica*, 50, 1982, 461-481, and Jappelli, T., “Who is Credit Constrained in the U. S. Economy?” *Quarterly Journal of Economics*, 105, 1990, 219-234.

¹⁵ Hayashi, F., “The Effect of Liquidity Constraints on Consumption: A Cross-Section Analysis,” *Quarterly Journal of Economics*, 100, 1985, 183-206.

¹⁶ Fairlie, R. W., “The Absence of the African-American Owned Business: An Analysis of the Dynamics of Self-Employment,” *Journal of Labor Economics*, forthcoming, 1998.

and lump-sum cash payments—significantly reduce the flow into self-employment from wage work. The effect is nearly seven times larger for black-owned firms.

Some idea of how payment cards influence consumption can be gleaned from Table 6. Here a sample of 13,365 individuals is available. The dependent variable is their credit-card balance owed at the end of the month. Columns 1 to 5 depict separate equations for the balances on, respectively, credit cards, charge cards, gas cards, store cards, and any cards.

Table 6 estimates OLS equations for dollar balances using the same kinds of personal-characteristic variables as for other tables. Column 1 is for credit cards. Intriguingly, there is an approximate hump-shape in income quartile. In other words, balances are lowest among those in income quartiles 1, 2 and 5 (the first of these being the omitted category). Balances also rise and then fall with respect to age; we return to this shortly. There are no well-determined effects on credit-card balances from gender, employment-status or education. Race is close to significant at the five percent level. Variables for home-ownership, number of adults, and number of children, all enter positively. Similar patterns are found for charge and other kinds of cards (columns 2-5 of Table 6.) Store cards occasionally exhibit slightly different patterns compared to other cards.

The hump-shape in age in Table 6 is of interest. For a credit card (column 1 of Table 6), for example, balance is a concave function of age, with a turning point at approximately age forty. Later columns in Table 6 give information about other types of cards. The turning-point age for charge cards and gas cards is older, at between fifty and sixty years old. For store cards, it is younger, near the mid-thirties.

Ideally a data set would contain longitudinal information on spending and payment-card use. That is not possible with the SCFs. Therefore it is not feasible to study whether someone who knows he or she will eventually earn a lot relies on their credit card to raise consumption expenditure in the current period. An alternative approach, however, is to study how the representative American behaves at different ages.

From the first column of Table 6, it can be seen that the age profile of credit-card-balance is measured by $\text{balance} = 54.7 \text{ age} - 0.68 \text{ age squared}$. This has its turning point at age

40. From the last column of Table 6, the age profile of 'any-card-balance' is measured by $\text{balance} = 59.07 \text{ age} - 0.73 \text{ age squared}$. This also has its turning point at age 40.

Is there a matching hump-shape in earnings some time after age 40? The SCFs are not well-suited to answering such a question. Instead, we examined the weekly earnings of workers in the Outgoing Rotation Group files of the Current Population Survey to explore the age/earnings profiles of heads of households. We used data from the same four years as in Table 6 (namely 1983, 89, 92, 95). Sample size equaled 348,946 individuals distributed as follows: 1983 (88,202), 1983 (87,716), 1992 (88,047), 1995 (84,981).

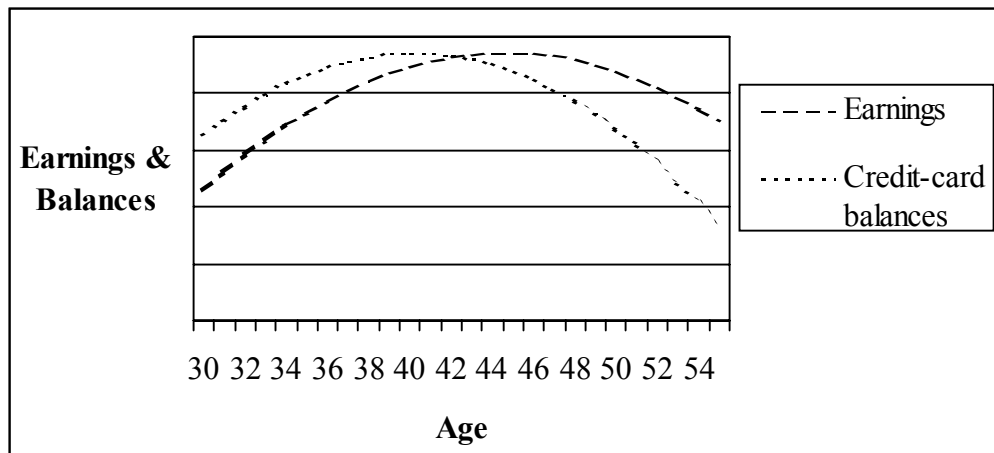
We ran an earnings regression using the log of weekly earnings as the dependent variable. Controls were a white dummy, a male dummy, three year dummies, and 34 schooling and education dummies. The nature of the schooling variable changed in the 90s, so the first 18 dummies relate to schooling in the 1980s and the second group of 15 to the 1990s.

The estimated age-profile in the earnings regression from the CPS was as follows, where both age terms had t-statistics of over 200:

$$y = 0.10181 \text{ age} - 0.00114 \text{ age-squared}$$

This reaches its maximum at age 44.5. When the regression was estimated for the 1980s and 1990s as two separate sub-samples, the maximum turning-point age levels were essentially identical, at 44.4 years and 44.7 years, respectively.

Figure 2. Anticipating Earnings: The Hump-Shaped Patterns of Transactions Balances and Later Earnings



Source: Survey of Consumer Finances

Hence credit-card balances have the same hump-shaped age-profile as earnings. As Figure 2 reveals, four or five years divide the two humps. It is not possible to place a definitive interpretation on such a pattern, but it is suggestive of a link between cards and consumption; the finding is consistent with the view that credit cards allow spending to be brought forward.

VII. MULTIPLE CREDIT CARDS

As the US payment-card industry flourished in the post-war era, the number of extant cards grew. The typical individual came to possess many payment cards. However, there is almost no literature by economists on multiple card-holding, even though the phenomenon seems of interest.

Regression equations for the number of credit cards held by individuals are reported in Table 7. These explain, in a statistical sense, the number of cards held by randomly sampled people in the years from 1970 (when holding any cards at all was rare) up to the 1990s (when holding one is routine and many people have multiple cards). That the number of people with multiple payment cards has risen is revealed by the year-dummy coefficients in column 1 running from 0.3362 to 1.4449.

Most of the detailed patterns in Table 7 make intuitive sense. The higher a person's income, the greater the likelihood they will have multiple cards. Greater education has the same effect: college graduates have an average 0.6 extra bank cards and 2.8 extra cards of some kind (other things held constant) than those without a high school diploma. Although quantitatively less important, home owners are more likely to be multiple holders. Whites are also more likely; blacks carry 0.5 less cards, on average. Older people tend to have more cards (though on average this age-effect flattens out in a person's sixties). Finally, Table 7 tells us, in column 5, that self-employed people typically have approximately one more credit card than others. More starkly, a self-employed, high-income, college graduate will have eight more credit and charge total cards than a low-income employee with few years of schooling.

The strong association between self-employment and multiple cards is reminiscent of related work on entrepreneurial capital-constraints by Blanchflower and Oswald,¹⁷ Evans and Jovanovic,¹⁸ and Holtz-Eakin, Joulfaian and Rosen.¹⁹ The paper's correlation even emerges in raw data. For example: the number of bank credit cards held by the average American employee in the 1990s is 1.8 cards. The number of bank credit cards held by the average self-employed American in the 1990s is 2.5 cards. Moreover, if we look at those people who hold more than six bank and other charge cards, a remarkable one third are self-employed.

A natural interpretation of this result is that self-employed people find credit cards a valuable way to get around borrowing and liquidity constraints. If so, by affecting the flow of entrepreneurial activity in the economy, it is possible that the existence of cards has macroeconomic consequences.²⁰

VIII. CONCLUSIONS

This paper examines the links between credit-card use and consumer activity. It pools the Surveys of Consumer Finances from 1970 to the present day. These surveys provide a sample of approximately 18,500 randomly chosen American heads of household. The years covered by the data are interesting ones because they span a period over which credit cards changed from being rare to nearly ubiquitous.

There are three main empirical findings. First, credit cards allow households to reduce their transactions and precautionary demand for money (as measured by checking-account balances). The size of the reduction is large. Even our smallest estimates suggest that at the mean it is approximately \$800 in 1995 dollars. Instrumental variable estimates are predictably greater: someone with a credit card is estimated to hold on average up to \$2200 less in their

¹⁷ Blanchflower, D. G. and Oswald, A. J., "What Makes an Entrepreneur?" *Journal of Labor Economics*, 16, 1998, 26-60.

¹⁸ Evans, D. and Jovanovic, B., "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints," *Journal of Political Economy*, 97, 1989, 808-827.

¹⁹ Holtz-Eakin, D., Joulfaian, D., and Rosen, H. S., "Entrepreneurial Decisions and Liquidity Constraints." *Rand Journal of Economics*, 25, 1996, 334-347.

²⁰ This phenomenon is explored further in David Blanchflower, David Evans, and Andrew Oswald, "Credit Cards and Entrepreneurship," NERA Working Paper, 1998 and David Evans and Matthew Leder, "The Growth and Diffusion of Credit Cards," NERA Working Paper, 1998.

checking account than an identical individual without a credit card. Such numbers are consistent with large benefits from credit cards. Second, payment-card balances are a hump-shaped function of people's age, and peak approximately five years before their earnings do. While true longitudinal data on households would be desirable, our results, using pooled cross-sections, suggest that cards allow U.S. consumers to bring forward consumption that is justified by future earnings. Third, the numbers of cards that people hold depend in systematic ways on their personal characteristics. Most noticeably, self-employed people own and use credit cards far more than other people, which is consistent with the hypothesis that cards are of particular value to entrepreneurs.

TABLES

Table 1. Use of Credit Cards

(a) Percentage of households with each type of card

	Credit Cards	Charge Cards	Gas Cards	Store Cards	Any Cards
1970	16.3	9.3	34.0	35.4	50.6
1977	38.3	8.2	34.3	54.5	63
1983	43.0	10.0	28.5	57.9	65.3
1989	55.8	12.8	27.6	60.6	69.2
1992	62.2	11.1	27.0	57.5	71.7
1995	66.5	11.2	24.8	57.7	74.2

(b) Number of cards conditional on possessing a card

	Credit Cards	Charge Cards	Gas Cards	Store Cards	Any Cards
1970	1.3	1.7	2.3	2.6	4.1
1977	1.4	1.3	2.4	3.1	5.0
1982	1.5	1.2	2.2	3.1	4.9
1989	2.0	1.1	2.0	3.5	5.6
1992	2.0	1.1	1.9	3.0	5.1
1995	2.4	1.1	1.9	3.0	5.3

(c) median monthly charge volume

	Credit Cards	Charge Cards	Gas Cards	Store Cards	All Cards
1970	0	0	77	53	109
1977	70	39	68	30	125
1989	120	89	36	0	216
1992	108	92	43	0	204
1995	150	95	40	20	220

(d) median balances carried over from last month

	Credit Cards	Charge Cards	Gas Cards	Store Cards	All Cards
1970	0	0	0	0	0
1977	0	0	0	0	65
1982	62	0	0	0	147
1989	120	0	0	0	180
1992	108	0	0	0	183
1995	200	0	0	0	270

Notes: c) and d) in 1995 dollars. Median value for those who have the specified card.

Table 2 Use of credit cards regressions (dep var =1 if the respondent has a card, zero otherwise - dprobit)

	(5)	(1)	(2)	(3)	(4)
	Any cards	Bank credit card	Charge card	Gas card	Store
Employee		-0.036 (0.014) ***	-0.081 (0.007) ***	-0.049 (0.010) ***	0.064 (0.012) ***
Unemployed	-0.008 (0.011)	-0.182 (0.026) *	-0.064 (0.009) ***	-0.094 (0.019) ***	-0.107 (0.023) ***
Out of Labor Force	-0.164 (0.024) ***	-0.037 (0.020) ***	-0.082 (0.007) ***	-0.045 (0.014) ***	0.027 (0.016) *
1977	-0.021 (0.015)	0.264 (0.013) ***	-0.029 (0.010) ***	-0.015 (0.014)	0.188 (0.013) ***
0.085 (0.009) ***					
1983		0.297 (0.013) ***	-0.023 (0.009) **	-0.095 (0.012) ***	0.216 (0.012) ***
0.099 (0.008) ***					
1989		0.406 (0.009) ***	0.026 (0.011) **	-0.111 (0.012) ***	0.254 (0.012) ***
0.135 (0.008) ***					
1992		0.456 (0.009) ***	0.009 (0.010)	-0.124 (0.012) ***	0.207 (0.013) ***
0.155 (0.007) ***					
1995		0.495 (0.009) ***	0.002 (0.010)	-0.160 (0.011) ***	0.185 (0.013) ***
0.171 (0.007) ***					
Income quintile 2		0.203 (0.014) ***	0.050 (0.017) ***	0.170 (0.018) ***	0.179 (0.013) ***
0.124 (0.007) ***					
Income quintile 3		0.281 (0.013) ***	0.097 (0.018) ***	0.224 (0.018) ***	0.253 (0.012) ***
0.174 (0.006) ***					
Income quintile 4		0.356 (0.012) ***	0.184 (0.022) ***	0.306 (0.019) ***	0.317 (0.011) ***
0.211 (0.006) ***					
Income quintile 5		0.460 (0.013) ***	0.333 (0.021) ***	0.348 (0.018) ***	0.346 (0.014) ***
0.293 (0.009) ***					
High school		0.135 (0.012) ***	0.047 (0.011) ***	0.111 (0.013) ***	0.148 (0.011) ***
0.106 (0.007) ***					
Some College		0.233 (0.012) ***	0.134 (0.014) ***	0.237 (0.014) ***	0.209 (0.011) ***
0.158 (0.006) ***					
>=College		0.353 (0.012) ***	0.197 (0.013) ***	0.292 (0.013) ***	0.252 (0.012) ***
0.244 (0.007) ***					
Age		0.013 (0.002) ***	0.003 (0.001) ***	0.010 (0.015) ***	0.009 (0.002) ***
0.008 (0.001) ***					
Age ²		-0.000 (0.000) ***	-0.000 (0.000) ***	-0.000 (0.000) ***	-0.000 (0.000) ***
-0.000 (0.000) ***					
Male		-0.082 (0.015) ***	0.029 (0.009) ***	-0.008 (0.014)	-0.197 (0.012) ***
-0.088 (0.009) ***					
Black		-0.122 (0.017) ***	0.039 (0.012) ***	-0.111 (0.012) ***	-0.090 (0.014) ***
-0.097 (0.013) ***					
Hispanic		-0.081 (0.024) ***	0.042 (0.018) **	-0.021 (0.021)	-0.029 (0.021)
-0.068 (0.019) ***					
Other		-0.021 (0.028)	-0.002 (0.013)	-0.045 (0.020) **	-0.057 (0.024) **
-0.039 (0.023) *					
Own home		0.145 (0.011) ***	0.010 (0.006)	0.064 (0.009) ***	0.122 (0.010) ***
0.116 (0.009) ***					
Married		0.138 (0.015) ***	-0.025 (0.009) ***	0.071 (0.012) ***	0.198 (0.014) ***
0.135 (0.012) ***					
Number adults		-0.025 (0.007) ***	0.002 (0.004)	-0.003 (0.005)	0.008 (0.006)
-0.009 (0.005) *					

Number of children	-0.043 (0.004) ***	-0.013 (0.002) ***	-0.021 (0.003) ***	-0.023 (0.004) ***
-0.029 (0.003) ***				
N	18511	18502	18509	18488
Pseudo R ²	.3847	.2709	.1532	.1949
Chi square	6075.61	3662.02	3113.17	
	4101.97	5164.82		
Log likelihood ratio	-7780.1	-6432.4	-10059.1	-
10052.9	-7100.8			

Notes: Excluded categories: white, 1970, self-employed, income quintile 1, <high school. Standard errors in parentheses. *** is statistically significant at the 1% level, ** is statistically significant at the 5 percent level and * is statistically significant at the 1 percent level.

Source: Surveys of Consumer Finances

Table 3 Amount billed last month to cards regressions (not available 1983)

	(1)	(2)	(3)	(4)	(5)
	Bank credit card	Charge card	Gas card	Store card	Any cards
Employee	-704.96 (95.98)***	-502.32 (151.70)***	-72.23 (10.93)***	-208.43 (29.72)*	-1265.99 (128.78)***
Unemployed	-619.67 (161.27)***	-1025.34 (297.08)***	-73.89 (16.48)***	-202.55 (36.20)***	-1210.35 (160.50)***
Out of Labor Force	-627.48 (145.37)***	-118.26 (336.51)	-78.42 (12.93)***	-250.42 (43.76)***	-1214.44 (184.96)***
1977	128.90 (49.74)***	147.62 (141.22)	17.40 (8.52)**	6.53 (18.98)	192.91 (46.50)***
1989	447.02 (62.35)***	513.48 (133.23)***	24.90 (10.16)**	96.12 (25.50)***	638.12 (78.91)***
1992	373.07 (75.82)***	304.28 (128.49)**	24.39 (10.28)**	-47.64 (20.78)**	340.43 (83.38)***
1995	809.73 (72.26)***	1082.11 (212.25)***	44.30 (7.40)***	-43.06 (19.54)**	946.97 (95.66)***
Income quintile2	-151.21 (96.17)	772.08 (1131.56)	-7.80 (7.64)	3.13 (16.31)	-52.97 (136.07)
Income quintile 3	-166.09 (98.46)*	-345.62 (460.67)	22.52 (11.49)**	-0.82 (18.06)	-143.19 (103.55)
Income quintile 4	-255.54 (106.22)**	-330.02 (465.53)	27.48 (11.67)**	-3.53 (20.80)	-233.02 (117.09)**
Income quintile 5	654.29 (121.98)***	456.58 (481.89)	48.75 (11.32)***	177.92 (24.56)***	1233.91 (139.07)***
High school	120.65 (70.77)*	-69.14 (236.41)	18.74 (8.44)**	35.56 (16.44)**	128.17 (68.97)*
Some College	251.91 (60.09)***	245.38 (260.43)	27.96 (10.50)***	64.54 (19.37)***	350.02 (80.99)***
>=College	736.00 (68.53)***	619.08 (290.85)**	26.47 (9.71)***	158.02 (23.48)***	1172.69 (107.80)***
Age	28.04 (15.39)*	47.59 (27.97)*	0.67 (2.20)	1.87 (3.49)	34.52 (16.64)**
Age squared	-0.23 (0.16)	-0.37 (0.28)	-0.00 (0.23)	.01 (0.38)	-0.25 (0.18)
Male	15.90 (71.30)	-171.93 (444.20)	29.62 (17.78)*	-47.39 (18.03)***	-50.65 (112.31)
Black	-271.32 (48.47)***	-605.57 (197.61)	-6.32 (8.51)	9.51 (17.66)	-287.07 (58.55)***
Hispanic	-126.72 (71.83)*	-447.51 (173.35)***	27.59 (26.33)	51.08 (31.70)	-145.00 (96.22)
Other	44.42 (156.22)	-42.35 (369.35)***	134.43 (72.71)*	12.08 (43.69)	60.10 (239.77)
Own home	190.00 (47.88)***	214.56 (208.48)	8.12 (8.14)	-7.80 (16.13)	240.35 (73.16)***
Married	154.20 (89.95)*	-198.43 (247.83)	-18.38 (18.27)	92.27 (21.39)***	199.87 (134.14)
Number adults	105.56 (46.75)**	204.88 (113.17)*	9.73 (6.52)	35.32 (17.91)**	184.52 (71.08)***
Number of children	-97.33 (24.20)***	-53.15 (54.37)	2.72 (3.13)	-24.64 (6.95)***	-132.49 (30.20)***
Constant	-811.37 (374.29)**	-1322.02 (812.79)	56.48 (42.13)	41.93 (75.41)	-750.31 (399.92)*
R ²	.0920	.0454	.0363	.0584	.1170
N	9044	3044	5304	8896	9020
F	42.91	15.12	13.85	15.17	53.72

Notes: Excluded categories: white, 1970, self-employed, income quintile 1, <high school. Standard errors in parentheses. Sample is conditional upon having one or more of the relevant card(s.) *** is statistically significant at the 1% level, ** is statistically significant at the 5 percent level and * is statistically significant at the 1 percent level.

Source: Surveys of Consumer Finances

Table 4 Transactions balances as % of financial assets regressions

	checking/ financial assets		(checking+savings)/ financial	
	assets			
	(1)	(2)	(3)	(4)
	OLS	Tobit	OLS	Tobit
Bank credit card	-0.035 (0.008)***	-0.025 (0.008)***	-0.045 (0.010)***	-0.040 (0.009)***
Charge card	-0.011 (0.005)**	-0.016 (0.008)***	-0.024 (0.006)***	-0.029 (0.001)
Gas card	-0.011 (0.005)**	-0.010 (0.007)	-0.019 (0.006)***	-0.020 (0.007)***
Store card	0.000 (0.007)	0.011 (0.007)	-0.001 (0.008)	0.005 (0.005)
Employee	-0.009 (0.006)	-0.009 (0.008)	0.006 (0.007)	0.009 (0.009)
Unemployed	-0.010 (0.019)	-0.024 (0.017)	0.003 (0.020)	0.001 (0.018)
Out of Labor Force	-0.011 (0.009)	-0.008 (0.011)	-0.008 (0.010)	-0.006 (0.012)*
1989	-0.005 (0.008)	-0.014 (0.009)	-0.111 (0.010)***	-0.122 (0.010)***
1992	0.004 (0.008)	-0.007 (0.009)	-0.099 (0.009)***	-0.111 (0.009)***
1995	0.015 (0.008)*	0.011 (0.008)	-0.118 (0.009)***	-0.128 (0.009)***
Income quintile2	-0.060 (0.015)***	-0.054 (0.012)***	-0.062 (0.016)***	-0.058 (0.013)***
Income quintile 3	-0.111 (0.015)***	-0.105 (0.012)***	-0.123 (0.015)***	-0.121 (0.013)***
Income quintile 4	-0.154 (0.015)***	-0.147 (0.013)***	-0.169 (0.016)***	-0.165 (0.014)***
Income quintile 5	-0.220 (0.015)***	-0.221 (0.014)***	-0.260 (0.016)***	-0.263 (0.015)***
High school	-0.059 (0.010)***	-0.056 (0.010)***	-0.063 (0.012)***	-0.062 (0.011)***
Some College	-0.054 (0.011)***	-0.046 (0.010)***	-0.088 (0.013)***	-0.086 (0.012)***
>=College	-0.073 (0.011)***	-0.068 (0.010)***	-0.125 (0.012)***	-0.125 (0.011)***
Age	-0.006 (0.001)***	-0.006 (0.001)***	-0.010 (0.013)***	-0.010 (0.001)***
Age squared	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***
Male	0.029 (0.011)***	0.025 (0.010)**	0.023 (0.012)*	0.020 (0.011)*
Black	0.004 (0.013)	-0.028 (0.011)**	0.048 (0.014)***	0.042 (0.012)***
Hispanic	0.077 (0.020)***	0.066 (0.016)***	0.126 (0.020)***	0.124 (0.017)***
Other	0.058 (0.016)***	0.056 (0.016)***	0.059 (0.017)***	0.058 (0.017)***
Own home	-0.045 (0.008)***	-0.040 (0.008)***	-0.054 (0.008)***	-0.053 (0.008)***
Married	-0.020 (0.010)**	-0.018 (0.010)*	-0.025 (0.011)**	-0.023 (0.011)**
Number adults	0.013 (0.004)***	0.015 (0.004)***	0.015 (0.005)***	0.017 (0.005)*
Number of children	-0.000 (0.003)	-0.001 (0.003)	0.003 (0.003)	0.004 (0.003)
Constant	0.595 (0.033)***	0.560 (0.032)***	1.024 (0.037)***	0.099 (0.034)*
R ²	1433		.2495	
F	72.23		166.47	
N	13045	13045	13045	13045
Chi Square		1470.4		2884.5
Log likelihood		-4652.1		6446.7

Notes: Excluded categories: white, 1983, self-employed, income quintile 1, <high school. Standard errors in parentheses. Sample is conditional upon having one or more of the relevant card(s.) *** is statistically significant at the 1percent level, ** is statistically significant at the 5 percent level and * is statistically significant at the 10 percent level.

Source: Surveys of Consumer Finances

Table 5 Transactions balances as % of financial assets regressions

(Dependent variable = checking account balance/financial assets)

	(1) OLS	(2) 2SLS	(3) 2SLS
Bank credit card	-0.038 (0.008) ^{***}	-0.285 (0.068) ^{***}	-0.211 (0.072) ^{***}
Employee	-0.007 (0.006)	-0.007 (0.007)	-0.007 (0.006)
Unemployed	-0.008 (0.019)	-0.030 (0.021)	-0.023 (0.020)
Out of Labor Force	-0.008 (0.009)	-0.005 (0.009)	-0.006 (0.009)
1989	-0.004 (0.008)	0.036 (0.013) ^{***}	0.024 (0.014)
1992	0.005 (0.008)	0.057 (0.017) ^{***}	0.042 (0.017) ^{**}
1995	0.017 (0.008) ^{**}	0.077 (0.019) ^{***}	0.059 (0.020) ^{***}
Income quintile 2	-0.060 (0.015) ^{***}	-0.023 (0.018)	-0.034 (0.018) [*]
Income quintile 3	-0.111 (0.015) ^{***}	-0.053 (0.022) ^{**}	-0.071 (0.022) ^{***}
Income quintile 4	-0.156 (0.015) ^{***}	-0.075 (0.027) ^{***}	-0.100 (0.028) ^{***}
Income quintile 5	-0.224 (0.015) ^{***}	-0.132 (0.029) ^{***}	-0.160 (0.031) ^{***}
High school	-0.059 (0.011) ^{***}	-0.026 (0.014) [*]	-0.036 (0.015) ^{**}
Some College	-0.056 (0.011) ^{***}	-0.001 (0.018)	-0.017 (0.020)
>=College	-0.076 (0.011) ^{***}	-0.007 (0.022)	-0.028 (0.023) ^{**}
Age	0.006 (0.012) ^{***}	-0.003 (0.015) [*]	-0.004 (0.015) ^{**}
Age squared	0.000 (0.000) ^{***}	0.000 (0.000)	0.000 (0.000)
Male	0.029 (0.011) ^{***}	0.014 (0.012)	0.019 (0.012)
Black	-0.004 (0.013)	-0.031 (0.015) ^{**}	-0.023 (0.015)
Hispanic	0.076 (0.019) ^{***}	0.062 (0.021) ^{***}	0.067 (0.020) ^{***}
Other	0.058 (0.016) ^{***}	0.056 (0.016) ^{***}	0.057 (0.016) ^{***}
Own home	-0.045 (0.008) ^{***}	-0.021 (0.010) ^{**}	-0.028 (0.010) ^{***}
Married	-0.020 (0.009) ^{**}	0.000 (0.012)	0.006 (0.012)
Household size	0.012 (0.004) ^{***}	0.009 (0.004) ^{**}	0.010 (0.004) ^{**}
Number of children	-0.000 (0.003)	-0.007 (0.004) ^{**}	-0.005 (0.004) ^{***}
Constant	0.596 (0.033) ^{***}	0.545 (0.037) ^{***}	0.560 (0.037) ^{***}
R ²	.1429	.0576	.1012
F	90.44	82.24	85.58
N	13045	13045	13045

Notes: Excluded categories: white, 1983, self-employed, income quintile 1, <high school. Instruments in column 2 are a) if ever had been late or missed payment on a loan and b) whether had been dissuaded from applying for a loan for fear of being turned down. In column 3 only the dissuade (b) variable is used. Standard errors in parentheses. Sample is conditional upon having one or more of the relevant card(s.) *** is statistically significant at the 1% level, ** is statistically significant at the 5 percent level and * is statistically significant at the 1 percent level.

Source: Surveys of Consumer Finances, 1983, 1989, 1992, 1995.

Table 6 Balance owing at the end of last month to cards regressions

	(1)	(2)	(3)	(4)	(5)
	Bank credit card	Charge card	Gas card	Store card	Any cards
Employee	46.85 (88.50)	127.17 (82.79)	-2.73 (9.51)	82.29 (22.47)***	122.86 (88.48)
Unemployed	401.24 (300.48)	187.05 (118.84)	-7.80 (13.16)	-3.07 (45.76)	252.19 (236.41)
Out of Labor Force	-62.52 (151.91)	79.10 (73.77)	-5.23 (13.08)	-18.41 (22.64)	-16.47 (139.41)
1977	201.13 (41.33)***	74.83 (100.92)	21.16 (8.70)**	119.76 (32.77)***	336.55 (42.12)***
1983	464.65 (44.65)***	-33.59 (54.07)	-9.19 (7.18)	119.45 (22.52)***	486.12 (37.94)***
1989	919.16 (66.50)***	-7.07 (65.11)	-14.91 (6.86)**	131.88 (27.30)***	951.06 (65.21)***
1992	1043.39 (69.73)***	203.85 (155.12)	0.60 (11.48)	99.03 (24.88)***	1120.09 (74.93)***
1995	1408.61 (86.99)***	2.88 (73.92)	-5.06 (7.89)	109.02 (24.53)***	1422.37 (84.98)***
Income quintile 2	-37.27 (152.81)	-41.36 (69.12)	-9.30 (8.08)	29.81 (26.34)	-0.48 (92.44)
Income quintile 3	48.87 (157.72)	71.54 (68.46)	11.55 (16.71)	39.24 (27.04)	98.98 (101.98)
Income quintile 4	57.94 (161.51)	-27.41 (62.92)	-4.19 (10.31)	106.25 (31.96)***	216.51 (109.34)**
Income quintile 5	-79.21 (171.91)	79.03 (54.55)	-10.45 (9.74)	5.34 (29.75)	89.50 (123.91)
High school	-184.14 (115.44)	107.17 (135.56)	10.79 (11.41)	7.83 (23.56)	-70.37 (78.19)
Some College	-49.67 (129.02)	42.78 (84.81)	4.81 (6.27)	10.34 (28.32)	81.22 (93.58)
>=College	-169.29 (131.58)	-73.08 (72.40)	-2.66 (6.26)	-95.30 (24.02)***	-81.89 (96.74)
Age	55.68 (11.90)***	4.33 (7.38)	0.66 (1.00)	2.20 (2.90)	57.57 (10.32)***
Age squared	-0.69 (0.12)***	-0.04 (0.07)	-0.01 (0.01)	-0.05 (0.03)**	-0.71 (0.10)***
Male	101.54 (0.92)	123.62 (78.24)	37.43 (24.45)	19.18 (29.59)	97.34 (93.46)
Black	310.61 (122.70)**	79.95 (79.56)	43.64 (19.63)**	252.93 (38.48)***	382.62 (106.60)***
Hispanic	338.70 (171.54)**	-101.23 (98.44)	0.12 (10.61)	234.86 (59.99)***	407.53 (157.85)***
Other	104.53 (173.43)	-28.41 (64.73)	-5.09 (8.49)	35.32 (89.90)	113.63 (186.04)
Own home	-210.46 (110.55)*	-62.25 (69.01)	-4.57 (7.63)	-48.35 (18.96)**	-152.00 (92.27)*
Married	-199.68 (114.63)*	-100.82 (110.32)	-34.90 (26.32)	-20.03 (31.17)	-184.34 (105.29)*
Number adults	127.22 (48.51)***	36.43 (60.70)	9.91 (4.15)**	67.33 (14.57)***	157.37 (48.88)***
Number of children	172.28 (32.26)***	75.20 (54.33)	4.73 (1.87)**	36.32 (8.34)***	158.56 (29.96)***
Constant	-924.89 (364.01)**	-258.48 (228.00)	-2.75 (34.87)	20.28 (82.90)	-1226.10 (301.79)***
R ²	.0463	.0103	.0091	.0476	.0516
N	10508	3381	6277	10884	13365
F	20.35	1.40	2.30	21.69	29.02

Notes: Excluded categories: white, 1970, self-employed, income quintile 1, <high school. Standard errors in parentheses. Sample is conditional upon having one or more of the relevant card(s). *** is statistically significant at the 1% level, ** is statistically significant at the 5 percent level and * is statistically significant at the 1 percent level.

Source: Surveys of Consumer Finances

Table 7 Number of Credit cards regressions

	(1)	(2)	(3)	(4)	(5)
Employee	Bank credit card -0.246 (0.037)***	Charge card -0.180 (0.014)***	Gas card -0.199 (0.034)***	Store card -0.161 (0.064)**	Any cards -0.782 (0.102)***
Unemployed	-0.403 (0.049)***	-0.174 (0.017)***	-0.216 (0.042)***	-0.435 (0.080)***	-1.223 (0.133)***
Out of Labor Force	-0.165 (0.044)***	-0.204 (0.016)***	-0.230 (0.042)***	-0.226 (0.080)***	-0.822 (0.124)***
1977	0.336 (0.022)***	-0.038 (0.016)**	0.007 (0.040)	0.642 (0.055)***	0.952 (0.089)***
1983	0.391 (0.019)***	-0.052 (0.014)***	-0.240 (0.033)***	0.658 (0.045)***	0.771 (0.074)***
1989	0.891 (0.031)***	0.016 (0.016)	-0.318 (0.038)***	1.311 (0.064)***	1.914 (0.101)***
1992	1.090 (0.030)***	-0.024 (0.016)	-0.375 (0.039)***	0.667 (0.059)***	1.373 (0.096)***
1995	1.445 (0.032)***	-0.036 (0.015)**	-0.525 (0.035)***	0.509 (0.053)***	1.409 (0.088)***
Income quintile2	0.151 (0.026)***	-0.002 (0.008)	0.002 (0.022)	0.394 (0.042)***	0.645 (0.069)***
Income quintile 3	0.298 (0.030)***	0.011 (0.010)	0.181 (0.027)***	0.690 (0.050)***	1.182 (0.082)***
Income quintile 4	0.536 (0.036)***	0.062 (0.013)***	0.371 (0.032)***	1.026 (0.058)***	2.001 (0.096)***
Income quintile 5	0.875 (0.042)***	0.335 (0.016)***	0.659 (0.037)***	1.753 (0.065)***	3.628 (0.110)***
High school	0.095 (0.023)***	0.014 (0.008)*	0.210 (0.023)***	0.469 (0.040)***	0.769 (0.065)***
Some College	0.366 (0.030)***	0.085 (0.011)***	0.483 (0.031)***	0.921 (0.051)***	1.850 (0.085)***
>=College	0.611 (0.031)***	0.204 (0.013)***	0.646 (0.031)***	1.358 (0.055)***	2.817 (0.089)***
Age	0.035 (0.003)***	0.004 (0.001)***	0.026 (0.031)***	0.026 (0.006)***	0.090 (0.010)***
Age squared	-0.000 (0.000)***	-0.000 (0.000)***	-0.000 (0.000)***	-0.000 (0.000)***	-0.001 (0.001)***
Male	-0.103 (0.035)***	0.019 (0.010)*	0.011 (0.026)	-0.838 (0.053)***	-0.914 (0.090)***
Black	-0.153 (0.028)***	0.055 (0.013)***	-0.157 (0.021)***	-0.212 (0.045)***	-0.462 (0.076)***
Hispanic	-0.150 (0.053)***	0.056 (0.017)***	0.007 (0.037)	0.003 (0.076)	-0.078 (0.128)
Other	0.229 (0.081)***	-0.008 (0.023)	-0.106 (0.053)**	-0.324 (0.110)***	-0.207 (0.189)***
Own home	0.212 (0.024)***	0.013 (0.009)	0.107 (0.021)***	0.427 (0.038)***	0.758 (0.064)***
Married	0.127 (0.038)***	-0.010 (0.012)	0.174 (0.029)***	0.742 (0.055)***	1.031 (0.094)***
Number adults	0.024 (0.017)***	-0.000 (0.006)	-0.012(0.014)	0.027 (0.028)	0.037 (0.045)***
Number of children	-0.064 (0.009)***	-0.015 (0.003)***	-0.041 (0.008)***	-0.107 (0.014)***	-0.229 (0.024)***
Constant	-0.907 (0.094)***	0.080 (0.033)**	-0.310 (0.085)***	-0.893 (0.160)***	-2.037 (0.257)***
R ²	0.328	0.195	0.151	0.235	0.361
N	18511	18502	18509	18488	18469
F	360.35	179.3	130.9	227.1	416.5

Notes: Excluded categories: white, 1970, self-employed, income quintile 1, <high school. Standard errors in parentheses. Sample is conditional upon having one or more of the relevant card(s). *** is statistically significant at the 1% level, ** is statistically significant at the 5 percent level and * is statistically significant at the 1 percent level.

Source: Surveys of Consumer Finances

SELECTED REFERENCES

- Ausubel, L. M., "The Failure of Competition in the Credit Card Market," *American Economic Review*, 81, 1991, 50-81.
- Blanchflower, D. G. and Oswald, A. J., "What Makes an Entrepreneur?" *Journal of Labor Economics*, 16, 1998, 26-60.
- Brito, D. L. and Hartley, P., "Consumer Rationality and Credit Cards," *Journal of Political Economy*, 103, 1995, 400-433.
- Calem, P. S. and Mester, L. J., "Consumer Behavior and the Stickiness of Credit Card Interest Rates," *American Economic Review*, 85, 1995, 1327-1336.
- Duca, J. V. and Whitesell, W. C., "Credit Cards and Money Demand: A Cross-sectional Study," *Journal of Money, Credit and Banking*, 27, 1995, 604-623.
- Evans, D. and Jovanovic, B., "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints," *Journal of Political Economy*, 97, 1989, 808-827.
- Fairlie, R. W., "The Absence of the African-American Owned Business: An Analysis of the Dynamics of Self-Employment," *Journal of Labor Economics*, forthcoming, 1998.
- Hall, R. E. and Mishkin, F. S., "The Sensitivity of Consumption to Transitory Income: Estimates from Panel Data on Households," *Econometrica*, 50, 1982, 461-481.
- Hayashi, F., "The Effect of Liquidity Constraints on Consumption: A Cross-Section Analysis," *Quarterly Journal of Economics*, 100, 1985, 183-206.
- Holtz-Eakin, D., Joulfaian, D. and Rosen, H. S., "Entrepreneurial Decisions and Liquidity Constraints," *Rand Journal of Economics*, 25, 1996, 334-347.
- Jappelli, T., "Who is Credit Constrained in the US Economy?" *Quarterly Journal of Economics*, 105, 1990, 219-234.
- Jappelli, T. and Pagano, M., "Saving, Growth and Liquidity Constraints," *Quarterly Journal of Economics*, 109, 1994, 83-109.

Mandell, L., *Credit Card Use in the United States*, Ann Arbor, MI: Institute for Social Research, 1972.

White, K. J., "The Effect of Bank Credit Cards on the Household Transactions Demand for Money," *Journal of Money, Credit and Banking*, 8, 1976, 51-61.

APPENDIX A: DETAILS OF THE SURVEY OF CONSUMER FINANCE

The Federal Reserve first sponsored a survey of consumer finances just after World War II. The first such survey was conducted in 1946 for the Federal Reserve by the Bureau of Agricultural Economics of the United States Department of Agriculture. Surveys of consumer finances were conducted by the Survey Research Center of the University of Michigan annually from 1947 through 1970, but then were discontinued. In 1977, balance-sheet data were collected as part of a survey of consumer credit sponsored by the federal banking agencies. In addition, the Federal Reserve Board sponsored the one-time Survey of Financial Characteristics of Consumers in 1962, which obtained consumer balance-sheet data that were more detailed than those available from the surveys of consumer finances. The 1983 Survey of Consumer Finances updates balance-sheet information from the 1977 survey. The latest surveys provide much new information that can be used to identify important trends in income and wealth distribution, asset ownership, and household borrowing patterns, and it affords a comprehensive understanding of the financial state of households. The recent survey provides a unique opportunity to link data on consumer assets and liabilities, income, and financial behavior.

The Survey of Consumer Finances (SCF) is a survey of the balance sheet, pension, income, and other demographic characteristics of U.S. families. The survey also gathers information on use of financial institutions. The SCF is conducted to provide detailed information on the finances of U.S. families. Data from the SCF are widely used, from analysis at the Federal Reserve and other branches of government to scholarly work at the major economic research centers. The study is sponsored by the Federal Reserve Board in cooperation with the Department of the Treasury. Since 1992, data have been collected by the National Opinion Research Center at the University of Chicago (NORC).

To ensure the representativeness of the study, respondents are selected randomly using procedures described in the technical working papers on the Federal Reserve Board web site. A strong attempt is made to select families from all economic strata. Participation in the study is strictly voluntary. However, because only about 4,500 families are interviewed in the main study, every family selected is very important to the results. To retain the scientific validity of the study, interviewers are not allowed to substitute respondents for families that do not

participate. Thus, if a family declines to participate, it means that families like theirs may not be represented clearly in national discussions.

The survey begins by collecting basic demographic information on all household members, including their age, sex and marital status. The respondent is then asked to list the financial institutions at which household members have accounts or loans, including the type of institution, the way of doing business with the institution and the distance between the institution and the home or workplace of the person who uses it most. As respondents describe particular accounts or loans during the course of the survey, this "institution roster" is used to identify the institution at which each item is held.

The survey then goes on to collect detailed information on the household's financial assets, nonfinancial assets and liabilities. The section on financial assets includes checking, saving, money market, and call accounts; certificates of deposit; IRA and Keogh accounts; stocks; bonds; mutual funds; savings bonds; cash value life insurance; and trusts, annuities and other managed assets. For each item the respondent mentions, he or she is asked about its value and the institution at which it is held. Nonfinancial assets include the household's principal residence, investment real estate, vehicles, business interests, and other valuable assets like art and precious metals. Liabilities specifically mentioned in the survey include mortgages, home equity loans and lines of credit, loans for investment real estate, vehicle loans, student loans, consumer installment loans, and debt on credit cards. For each loan, the respondent is asked about the balance outstanding and other aspects of the loan's terms, including its duration, the interest rate, the typical payment, and the institution.

In addition to the core questions on assets and liabilities, the survey also collects information on other topics relevant to understanding households' financial situations, including the employment and pension coverage of the respondent and spouse; household income and tax filing status; coverage by health, life and disability insurance; the educational attainment of the respondent and spouse; the health status of the respondent and spouse; experience in applying for loans in the past five years; recent problems making payments on loans; and attitudinal data on risk, borrowing and saving.

APPENDIX B: DATA COMPARISONS

Table A-1. Total Quantity of Credit Cards (millions)

year	SCF	VISA	Faulkner & Gray	
	Total Accounts	Total Accounts (Visa+MC)	Total Cards (Visa+MC+ Discover)	Total Discover Cards
1983	54.6	82.3	N/A	N/A
1989	101.9	145.4	223.9	32.7
1992	122.0	183.9	275.4	39.2
1995	160.0	301.0	397.8	36.1

Source: Board of Governors of the Federal Reserve, *Surveys of Consumer Finance*, various years; Visa USA, Inc.; and Faulkner and Gray, *Card Industry Directory*, 1997 edition.

Note: Estimates from SCF and Visa are based on credit-card accounts, while Faulkner & Gray estimates are based on total cards.

Table A-2. Total Credit-Card Charge Volume (\$ billions)

Year	SCF	VISA	Faulkner & Gray
	Total Volume	Total Volume (Visa+MC)	Total Volume (Visa+MC+ Discover)
1989	209.3	189.8	221.7
1992	233.4	264.1	318.8
1995	376.6	450.8	585.7

Source: Board of Governors of the Federal Reserve, *Surveys of Consumer Finance*, various years; Visa USA, Inc.; and Faulkner and Gray, *Card Industry Directory*, 1997 edition.

Table A-3. Total Credit-Card Balances (\$ billions)

year	SCF	VISA
	Total balances	Total balances (Visa+MC)
1983	14.7	31.7
1989	49.1	133.2
1992	69.3	166.9
1995	108.8	294.9

Source: Board of Governors of the Federal Reserve, *Surveys of Consumer Finance*, various years; and Visa USA, Inc.

Table A-4. Median Household Income (\$)

year	SCF		Census Bureau	
	Current dollars	1994 Dollars	Current dollars	1994 Dollars
1970	8,871	33,884	8,734	33,360
1983	19,676	29,277	20,885	31,076
1989	25,000	29,879	28,906	34,547
1992	26,000	27,464	30,636	32,361
1995	30,000	29,173	34,076	33,137

Source: Board of Governors of the Federal Reserve, *Surveys of Consumer Finance*, various years; and U.S. Bureau of the Census, *Statistical Abstract of the United States*, Washington, DC, various years.

Table A-5. Households (000s)

Year	SCF	Census Bureau
1983	83,919	83,918
1989	92,698	92,830
1992	95,870	95,669
1995	99,198	98,990

Source: Board of Governors of the Federal Reserve, *Surveys of Consumer Finance*, various years; and U.S. Bureau of the Census, *Statistical Abstract of the United States*, Washington, DC, various years.

Table A-6. Unemployment Rate

Unemployment Rate		
Year	SCF	Census Bureau
1970	3.5	4.90
1977	2.9	6.90
1983	7.7	9.60
1989	4.9	5.30
1992	6.3	7.50
1995	4.5	5.60

Source: Board of Governors of the Federal Reserve, *Surveys of Consumer Finance*, various years; and U.S. Bureau of the Census, *Statistical Abstract of the United States*, Washington, DC, various years.