Determinants of Debit Card Use: A Study from the Consumers' Perspective

Debit cards have become increasingly popular in the United States. However, studies of debit card use have focused primarily on the supply side. This study investigated debit card use from the perspective of the demand side, the consumers. The impact of consumers' demographic, socio-economic, and credit-related characteristics on debit card use was examined by using data from the 2001 Survey of Consumer Finances (SCF). Logistic regression analysis showed that household heads that were younger, with more education, and more income were more likely to use debit cards. In addition, household heads who were Hispanic, renters, and credit card revolvers were more likely to use debit cards than household heads who were white, home owners, and convenience users of credit cards.

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Introduction and Purpose

In recent years, the payment system in the U.S. has undergone dramatic changes. The use of traditional paper-based instruments (e.g. cash and checks) is waning, whereas electronic forms of payment are growing among customers, businesses and governments (Hayashi, Sullivan and Weiner, 2003). Debit cards are the centerpiece of the new payment world (Caskey and Sellon, 1994).

Debit cards are machine-readable and encoded plastic cards which resemble credit cards in appearance (Carow and Staten, 1999). Debit cards first appeared in the U.S. in the 1980s when the transaction volume was too low to be noticeable. Since the mid-1990s, debit cards have become the fastest growing type of payment in the U.S. (Hayashi, Sullivan and Weiner, 2003; Hovanesian, 2003; Keenan, 2004; Swan, 2003). Debit card transactions totaled $700 billion in 2002, and are expected to rise to $1.45 trillion by 2007, a 107 percent jump from 2002 (Keenan, 2004). At Visa USA Inc., one of the giants in the credit card business, the number of debit card transactions in 2002 surpassed the number of credit card transactions for the first time. Indeed, debit use is growing so fast at Visa that it no longer calls itself a credit-card company. Instead it calls itself a "payment company" (Hovanesian, 2003).

Bankers plan to expand debit card product lines and invest in technology to increase their card operations (Anonymous, 2003). According to a survey conducted in 2002 among 164 members of the Association of Commercial Banks, the bankers ranked debit cards at the top of the list to develop a marketing strategy. Among the bankers, 62% rated debit cards "high" on a priority list, compared with 56% for online banking, 43% for bill paying, 25% for ATMs, and 14% for credit cards (Keenan, 2004). Members of the American Bankers Association ranked "replacing checks with debit cards" as the top growth opportunity in the next five years (Anonymous, 2003).

Although there has been a steady decline in check volume in recent years, not all market segments have enthusiastically abandoned paper-based instruments (Chakravorli, Ciesielski, Clark & Davis, 2003). A few years ago experts predicted the arrival of a paperless payment system (Caskey & Sellon, 1994), but cash and checks are still a dominant form of payment in the United States (Mantel & McHugh, 2001). Therefore, there is a need to understand the factors which affect the use of electronic payments, such as debit cards, instead of traditional paper-based payments. Currently most research on debit cards has focused on the supply-side factors (financial institutions, payment network providers, and payment associations), and there is insufficient research that analyzes the demand side, i.e. consumers (Stavins, 2001).

Moreover, the research on debit card use by consumers needs to be updated because debit card use in the US has changed enormously since the 1990s when most of the existing research was conducted. Profiles of current debit card users are likely to be different from those of just a few years ago. To expand the knowledge of debit card usage, this study will use the 2001 Survey of Consumer Finances (SCF) to examine the impacts of demographic, socio-economic, and credit-related characteristics on the use of debit cards. A better understanding of who is using debit cards will be beneficial to consumer educators, researchers, and financial institutions.

Literature Review

There are two types of debit cards, on-line and off-line. In an on-line debit card transaction, the cardholder authorizes the transaction by entering a personal identification number (PIN) at the point of sale. In an offline debit card transaction, the cardholder authorizes the transaction by signature, similar to a credit card transaction. Although debit cards are similar to credit cards in appearance, their functions are different. Debit card transactions draw on funds that are deposited in the cardholder's bank account beforehand rather than a pre-established line of credit as is done in credit card transactions (Kahn & Roberds, 2002).

Debit cards represent one of the innovations in electronic banking technology. Based on the belief that people in a social system differ in their readiness to adopt an innovation, Rogers (1995) developed the Diffusion of Innovations model to describe different adopter categories. The model divided individuals into 5 groups in terms of their time of adopting an innovation: innovators, early adopters, early majority, late majority and laggards. Furthermore Rogers (1995) presented the idea that social-economic characteristics helped to separate early adopter from later adopters. Early adopters generally tend to have more years of formal education, be more literate, have higher social status, and a greater degree of upward social mobility.

There are some empirical studies which investigated the socio-demographic characteristics of innovation adopters. Dabholkar and Bagozzi (2002) found that early adopters tended to be younger, better educated and have higher income level. In a study of payment instruments, Stavins (2001) found that younger consumers had a significantly higher probability of using debit cards. The study showed that income, education, homeownership, being married, and being white-collar workers were all significantly and positively related to the use of electronic payments. Family size was negatively related to the use of electronic payments.

A study by the Federal Reserve System to estimate the volume and value of retail payments showed that life cycle stage had significant effects on the use of debit cards. Compared to those who were young and single, middle aged singles and retired couples were more likely to have debit cards (Bourgaux, et al., 2002). Mantel and McHugh (2001), in their empirical study of consumer decision making, concluded that age and life cycle stage were associated with debit card usage. In summary, previous studies have shown somewhat conflicting results for age, which implies the need to examine the relationship between age and debit card use.

Based on the Diffusion of Innovations model and the results of some empirical research, the following relationships are hypothesized.

H1: Age is negatively related to the likelihood of using debit cards.

H2: Years of education are positively related to the likelihood of using debit cards.

H3: Compared to those who are not married, married respondents are more likely to use debit cards.

H4: Family size is negatively related to the likelihood of using debit cards.

H5: Income is positively related to the likelihood of using debit cards.

H6: Compared with renters, home owners are more likely to use debit cards.

H7: Compared with white-collar workers, blue-collar workers and those who are not employed are less likely to use debit cards.

Swann (2003) suggested that part of the reason for the increase in debit card usage was the growing popularity of this payment method among Hispanic Americans. Over the past two years, debit card usage has increased by 41 percent among Hispanic-Americans, who are the fastest-growing segment of the population. Therefore, race should be taken into consideration in predicting debit card usage. Information on the adoption of debit cards by other racial or ethnic groups was not located although it may be available. The following hypothesis is offered.

H8: Compared with households headed by whites, households headed by Hispanics are more likely to use debit cards.

Caskey and Sellon (1994), in a study analyzing factors that influenced debit card success, suggested that debit cards could be especially useful for those who did not have access to the complete range of existing payment services. For example, for those who did not have credit cards, they might find that a debit card could meet their desire to carry less cash or to make payments where checks were not acceptable. It might be easier to get a debit card than a credit card because there was no extension of credit and it could be obtained by anyone who had a transaction account

In addition, Caskey and Sellon (1994) proposed that consumers who used credit cards for the benefit of having credit available were unlikely to be interested in debit cards. Most consumers based their decision of using debit cards on non-price factors such as convenience and availability. Caskey and Sellon (1994) suggested that convenience users of credit cards might find debit cards desirable because they did not need to write checks at the end of each month to pay off debit card debits, and convenience users might find debit cards were helpful in

controlling their spending since they could spend only what they had in their account. Therefore, the following hypothesis is developed.

H9: Compared to credit card revolvers, credit card convenience users and those who do not use credit cards are more likely to use debit cards.

The hypotheses will be tested using data drawn from the 2001 Survey of Consumer Finances (SCF).

Methodology

Data and Sample

The Survey of Consumer Finances is a triennial survey of the balance sheet, pension, income, and other demographic characteristics of U.S. families (Kennickell, 2003). The survey also gathers information on the use of financial institutions. Data for the 2001 SCF were collected by the National Organization for Research at the University of Chicago (NORC). The SCF is based on a dual-frame sample design. One set of the survey cases was selected from a standard multi-stage area-probability design. The other set of the survey cases was selected as a list sample from statistical records (the Individual Tax File) derived from tax data by the Statistics of Income Division of the Internal Revenue Service. The second part of the sample was designed to disproportionately select families that were likely to be relatively wealthy.

The sample for this study will be all of the 4,442 households in the 2001 SCF. A weight variable will be used to present the descriptive statistics.

Dependent Variable

The dependent variable was based on this question, "A debit card is a card that you can present when you buy things that automatically deducts the amount of the purchase from the money in an account that you have. Do you (your family) use any debit cards?" Answers were either "Yes" or "No". Respondents were reminded that the focus is on using a debit card rather than having a debit card. It was coded as 1 if the response was "Yes" and 0 if the response was "No." Table 1 shows the coding of variables.

Independent Variables

Independent variables were categorized into three sets of factors: demographic, socio-economic, and credit-related factors. The demographic factors included household head's age, years of education, marital status, race, and household size. The socio-economic factors were represented by household income in 2000, home ownership, and occupation of the household head. The credit-related factors were being a credit card revolver, convenience user of credit cards, and a credit card "nonuser" which was defined as not having a credit card.

Age was coded as a categorical variable with four groups to reflect the life cycle stages: younger than 35, 35 to 49, 50 to 64, and equal to or older than 65. The education of household heads was a continuous variable reflecting their years of education. Marital status was coded as a dichotomous variable: 1 if the household head was married; 0 otherwise. Race of the household head was categorized into three groups: White, Hispanic, and other races. Household size was measured as a continuous variable to reflect the number of persons living in a household. For chi-square analysis, it was coded as a categorical variable.

Income was categorized as: less than $25,000, $25,000 to $49,999, $50,000 to $74,999, and equal to or above $75,000. Homeownership was coded as 1 for homeowners and 0 for renters. The occupational status of household heads was categorized as: white-collar workers, blue-collar workers, and not currently employed. White-collar workers were those working in managerial, professional, technical and administrative occupations; blue-collar workers were people working in services, farming, and production; and not employed included those who were not doing any work for pay at the time of the survey such as those who were retired.

The credit-related variables included three types of credit card usage: credit card revolvers, convenience users, and non-users. Each type of usage was coded as a dichotomous variable. Convenience users were those who always or almost always paid off credit card balances each month, whereas revolvers were those who sometimes or hardly ever paid off balances every month. See Table 1 for the coding of independent variables.

Data Analysis

To help understand the distributions of the demographic, socio-economic, and credit related variables for debit card use, chi-square tests were used as a preliminary analysis. For the chi-square tests, years of education was coded in four categories: less than 13 years, 13 to 15 years, 16 years, and more than 16 years. Household size was categorized into 1 person, 2 persons, 3 persons, equal to or more than 4 persons in a household.

Due to the binary characteristic of the dependent variable, logistic regression analysis was employed to analyze the direction and strength of the impact of independent variables on debit card use. The method of logistic regression is appropriate when there is a single, binary dependent variable and multiple independent variables (Hatcher & Stepanski, 1994).

Results

Sample Description

About 47% of the households used debit cards. On average, household heads were 49 years old. There were 23% of the household heads who were younger than 35, 34% between 35 and 49, 22% between 50 and 64, and 21% aged 65 or over. The average years of education attained by the household head was 13 years. Fifty-three percent of the households had a married head of household. The average family size was between 2 and 3 persons. Among all household heads, 76% were white, 8% were Hispanic, and 16% belonged to other races.

The average household income was $67,407. Thirty one percent of households earned less than $25,000, 28% of households earned between $25,000 and $49,999, 17% of households earned between $50,000 and $74,999, and 24% of households earned $75,000 and more. Approximately 59% of households were home owners. White-collar household heads accounted for 42% of the sample, blue-collar household heads accounted for 30%, and the percentage of those who were not currently employed was 27%. Forty-two percent always paid off their credit card balance every month, 34% did not pay off their credit card balances every month, and 24% did not have a credit card. The results of the descriptive statistics are shown in Table 2.

Chi-square Test Results

All of the Chi-square tests were statistically significant except for the tests of marital status and debit card use. The following relationships were observed. Most of the debit card users were younger than 49 years old. Among the two youngest age groups, there were more debit card users than nonusers in each group. In contrast, in the age groups of 50 to 65 and over 65, there were fewer debit card users than nonusers.

Regarding the effect of education, household heads with a high school education or less were less likely to be debit card users than those with more education. Most of the households who did not use debit cards were in households with only 1 or 2 persons, while among debit card users, the distribution was more even. Among households headed by Hispanics, there were slightly more debit card users than nonusers. For households headed by whites and other races, there were slightly fewer debit card users than nonusers.

When household income was considered, those with low and high income were less likely to use debit cards, while households with middle incomes were more likely to use debit cards. Home owners tended to be less likely to use debit cards than renters. Those who were not employed or retired were less likely to use debit cards. Credit card revolvers were more likely to use debit cards while credit card convenience users and nonusers were less likely to use debit cards. See Table 3 for results of Chi-square tests.

Logistic Regression Results

Age, education, race, income, home ownership, and credit card use were significantly related to the use of debit cards. As hypothesized, age was negatively related to the likelihood of using debit cards. Compared to households with a head younger than 35 years old, households with heads aged 35 to 49 were 39% less likely to use debit cards while households with older heads were even less likely to use debit cards. Household heads aged 50 to 64, and 65 and over were 65% and 83%, respectively, less likely to use debit cards than those younger than 35.

As predicted, education was positively related to the likelihood of using debit cards. Each additional year of education would increase the probability of using debit cards by 7%. Marital status and family size were not significant in predicting debit card use. Thus hypotheses 3 and 4 were not supported.

Income was positively related to the likelihood of using debit cards. Compared with households whose income was below $25,000, households with an income between $25,000 and $49,999, between $50,000 and $74,999, and more than $75,000 were 75%, 117%, and 71%, respectively, more likely to use debit cards. Thus, hypothesis 5 was supported. Contrary to hypothesis 6 which predicted that home owners were more likely to use debit cards, the regression results showed that home owners were 21% less likely to use debit cards than renters. The occupation of household heads was not significantly related to debit card use. Thus, hypothesis 7 was not supported.

Households with Hispanic heads were 56% more likely to use debit cards than households headed by whites. Households headed by other races did not differ from those headed by whites in debit card use. Therefore, hypothesis 8 was supported.

Compared with credit card revolvers, credit card convenience users were 48% less likely to use debit cards, and those who did not hold any credit cards were 58% less likely to use debit cards. These results were the opposite of the hypothesized relationship; therefore hypothesis 9 was not supported. In summary, four hypotheses (age, education, race, and income) were supported. There were conflicting results for two hypotheses (home ownership and credit use). There was no significance for the variables relating to marital status, family size, and occupation. See Table 4 for the results of logistic regression.

Conclusions and Implications

This study examined the impact of household characteristics on the use of debit cards. The results of the analyses showed that age was negatively related to the likelihood of using debit cards. Also, homeowners, credit card convenience users, and credit card non-users were less likely to use debit cards. Education and income were positively related to debit card use and Hispanics were more likely to use debit cards than Whites. The results provide implications for educators, researchers, and financial institutions.

Younger consumers are the primary users of debit cards. Older consumers may be reluctant to use debit cards because they are accustomed to using checks, and usually people are unwilling to change their behavior. Therefore, the advantage of debit cards instead of checks should be emphasized to older consumers. Among young consumers who have not yet established a credit history, debit cards are an attractive electronic payment instrument. Financial institutions should be able to attract more customers from this segment by utilizing effective marketing tools.

Education was found to be an important factor in predicting debit card use. Consumers with more education are more likely to use debit cards. Thus, educational programs are likely to help promote the use of debit cards.

Different ethnic groups showed different patterns in debit card use. Hispanics were found to be more likely to use debit cards than Whites, which confirmed Swann's (2003) proposition that debit card usage has grown faster among Hispanic Americans. Ethnicity thus can be used as a segmentation tool in marketing strategies.

Consumers with higher incomes are more likely to use debit cards. This supports the diffusion of innovation theory, which proposes that younger and affluent consumers have an affinity for trying new products.

Contrary to the hypothesis about homeowners, renters were more likely to use debit cards. One possible explanation may be that renters are more sensitive to controlling their spending. Thus, they prefer debit cards since this could help them to keep from overspending.

Contrary to the prediction, credit card convenience users and non-users were less likely to use debit cards than credit revolvers. This may be because for credit card convenience users, the function of a credit card is similar to that of a debit card, e.g. it is a convenient electronic payment method. Therefore, there is no need for them to use a debit card.

For the households that do not use credit cards, learning theory may explain their being less likely to use debit cards. According to learning theory, consumers with a certain product experience are more familiar with other products of the same product category, because less cognitive effort is required to comprehend the particular innovation (Dickerson & Gentry, 1983; Hirschman, 1980). Therefore, consumers who do not use credit cards may be those who are not familiar with electronic payment methods. Hence, they are less likely to use debit cards. For financial institutions, the implications are that the advantages of debit cards over credit cards, and their ease of use should be emphasized in order to gain more debit card customers.

In future research, it would be useful to take into consideration the frequency of debit card use and the number of debit cards held by each consumer, which would provide a better understanding of factors which influence debit card use. Another area to investigate is the reasons to use debit cards. The underlying reasons for consumers to use debit cards will help financial institutions to design and market the most desirable products for their customers.

Table 1
Coding of Variables

Variables	Coding
Dependent variable:	
Debit card users	1 if yes, 0 otherwise
Independent variables	
Demographic Variables	
Age	
<35 years	Reference group
35 – 49 years	1 if yes, 0 otherwise
50 – 64 years	1 if yes, 0 otherwise
>=65 years	1 if yes, 0 otherwise
Education	Continuous
Marital status	1 if married, 0 otherwise
Family size	Continuous
Race	
White	Reference group
Hispanic	1 if yes, 0 otherwise
Other races	1 if yes, 0 otherwise
Economic Variables	
Income	
<$25,000	Reference group
$25,000 - $49,999	1 if yes, 0 otherwise
$50,000 – $74,999	1 if yes, 0 otherwise
>=75,000	1 if yes, 0 otherwise
Home ownership	1 if home owners; 0 otherwise
Occupations	
White-collar	Reference group
Blue-collar	1 if yes, 0 otherwise
Not employed	1 if yes, 0 otherwise
Credit-Related Variables	
Credit card convenience users	1 if yes, 0 otherwise
Credit card nonusers	1 if yes, 0 otherwise
Credit card revolvers	Reference group

Table 2
Descriptive Statistics of Households in the 2001 SCF (N=4442)

Weight Variables	Percentage	Mean (SD)
Dependent variable:		
Debit card users	47.02%	
Independent variables:		
Age		48.96 (17.12)
<35 years	22.74%	
35 – 49 years	33.82%	
50 – 64 years	22.37%	
>=65 years	21.06%	
Education years		13.13 (2.91)
Married	53.34%	
Family size		2.43 (1.40)
Race:		
White	76.30%	
Hispanic	7.91%	

Weight Variables	Percentage	Mean (SD)
Other races	15.78%	
Income		$67,407.00 ($220,384.20)
<$25,000	31.27%	
$25,000 - $49,999	27.76%	
$50,000 – $74,999	17.38%	
>=75,000	23.59%	
Home owners	59.42%	
Occupation		
White-collar workers	42.76%	
Blue-collar workers	29.88%	
Not employed	27.36%	
Credit card usage:		
Credit card convenience users	41.51%	
Credit card nonusers	24.40%	
Credit card revolvers	34.09%	

Table 3
Chi-square Test of Debit Card Use and Selected Household Characteristics in the 2001 SCF (N=4442)

Variables	Debit Card Users	Debit Card Non-Users	P-value
	Percent	*Percent*	
Age:			P<0.0001
<35 years	26.06%	12.02%	
35 – 49 years	40.98%	28.50%	
50 – 64 years	23.89%	30.37%	
>=65 years	9.07%	29.10%	
Education years:			P<0.0001
<13 years	32.07%	41.92%	
13 to 15 years	23.58%	16.44%	
16 years	25.13%	19.63%	
>16 years	19.22%	21.82%	
Marital status:			P=0.5610
Married	60.21%	61.07%	
Not married	39.79%	38.93%	
Family size:			P<0.0001
1 person	21.40%	26.43%	
2 persons	34.51%	40.05%	
3 persons	15.80%	11.94%	
4 persons	28.29%	21.58%	
Race:			P=0.0005
White	78.76%	81.97%	
Hispanic	7.88%	5.06%	
Other races	13.37%	12.98%	
Income			P<0.0001
<$25,000	17.51%	27.91%	
$25,000 - $49,999	25.08%	18.91%	
$50,000 – $74,999	17.41%	11.19%	
>=75,000	40.00%	42.00%	
Home ownership:			P<0.0001
Home owners	59.95%	66.48%	
Renters	40.05%	33.52%	
Occupation			P<0.0001

Variables	Debit Card Users	Debit Card Non-Users	P-value
	Percent	*Percent*	
White-collar workers	58.19%	47.93%	
Blue-collar workers	27.05%	21.18%	
Not employed	14.77%	30.89%	
Credit card usage:			P<0.0001
Convenience users	47.15%	57.96%	
Nonusers	14.97%	22.61%	
Revolvers	37.88%	19.43%	

Table 4
Results of Logistic Regression on Debit Card Usage among Households in the 2001 SCF (N=4442)

Variables	Parameter Estimates	P-value	Odds Ratio
Demographic Variables			
Age			
<35 years (reference group)	-	-	-
35 – 49 years	-0.4859	<0.0001***	0.615
50 – 64 years	-1.0402	<0.0001***	0.353
>=65 years	-1.7686	<0.0001***	0.171
Education	0.0656	<0.0001***	1.068
Married	-0.0142	0.8740	0.986
Family size	-0.0176	0.5502	0.983
Race			
White (reference group)			
Hispanic	0.4507	0.0016**	1.560
Other races	0.00216	0.9835	1.002
Socio-Economic Variables			
Income			
<$25,000 (reference group)	-	-	-
$25,000 - $49,999	0.5611	<0.0001***	1.753
$50,000 – $74,999	0.7737	<0.0001***	2.168
>=75,000	0.5363	<0.0001***	1.710
Home ownership	-0.2411	0.0043**	0.786
Occupation			
White-collar workers (reference group)	-	-	-
Blue-collar workers	-0.0155	0.8640	0.985
Not employed	-0.0116	0.9108	0.988
Credit-Related Variables			
Credit card convenience users	-0.6475	<0.0001***	0.523
Credit card nonusers	-0.8704	<0.0001***	0.419
Credit card revolvers (reference group)	-	-	-

*P<.05; **P<.01; ***P<.001

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