

Consumer Search Behavior in the Changing Credit Card Market

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Abstract

This paper investigates whether search costs inhibit consumer search for lower credit card interest rates. The results provide evidence contrary to the existing hypothesis that a high likelihood of rejection for large-balance consumers adversely impacts their search behavior. Using the *1998 Survey of Consumer Finances*, we model consumers' propensity to search and their probability of being denied credit simultaneously and find that large credit card balances induce cardholders to search more even though they face a higher probability of rejection. This result demonstrates a policy impact of the Truth-in-Lending Act, which, together with a high volume of direct solicitation, has lowered the cost of search to consumers in the 1990s.

Keywords: Revolving Credit; Credit Cards; Search and Switch Costs
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I. Introduction

Credit card balance switching has become an important issue in the banking community as cardholders seek to move their revolving credit to the lowest-cost lenders. This kind of “search and switch” behavior would be expected to put downward pressure on credit card interest rates. Previous research on the credit card market focused on why its interest rates persisted at levels greater than those for other types of consumer loans, and one explanation put forward was the inhibiting nature of high search costs in this market, especially for large-balance cardholders whose probability of credit rejection is high. Recent developments in the credit card industry – in particular the Truth-in-Lending Act of 1988¹ together with a large increase in direct solicitations – have changed the environment of this market substantially. Because of this new environment, as well as improvements in data availability, the issue of credit card search needs to be revisited.

The current paper identifies those consumers whose probability of rejection is high and tests whether this probability has any impact on their search propensities. It does this by analyzing (i) the effect of large balances on the consumer’s probability of credit application rejection and (ii) how these factors – large balances and rejection probability – affect consumers’ search propensities. In testing the search-cost hypothesis, the issue of endogeneity between consumers’ search and the likelihood of rejection is dealt with by estimating a simultaneous equations model.

The results presented here show no evidence that search costs deter consumer interest rate search in the credit card market of the 1990s, either for high-balance

¹ This is officially known as the Fair Credit and Charge Card Disclosure Act of 1988.

cardholders with a greater probability of rejection or for low-balance cardholders. In the next section we review the relevant literature on this market and discuss recent changes in the market environment. Section III discusses our methodology and improvements in the recent data. Section IV presents our results. Finally, Section V concludes by summarizing our findings.

II. Background and Previous Literature on the Credit Card Market

Consumer revolving credit, which includes credit card debt as its principal component, has been the fastest growing segment of the U.S. consumer loan market in recent years, rising from \$2 billion in 1968 to about \$626 billion in 2000². Although the growth began in the 1970s, the major thrust came during the last two decades and coincided with the rise of credit card banks, the first of which were chartered in the early 1980s³. More importantly, within consumer debt holdings, there was a shift towards revolving credit from 1968 to 2000: revolving credit relative to personal disposable income grew from 0.5 percent to 9.0 percent (an increase of 1,700 percent) while the ratio for overall consumer debt grew by only from 17 to 22 percent (an increase of 29 percent).

A puzzling aspect of the credit card market in the 1980s was its comparatively high interest rates in spite of the fact that it was functionally de-regulated by 1982⁴ and saw the entry of nearly 4,000 firms into the market during this decade. The high average

² Thomas A. Durkin, *Credit Cards: Use and Consumer Attitudes, 1970-2000*, Federal Reserve Bulletin, September, 2000.

³ The vast majority of credit card banks began operation only in the mid-1980s. Revolving credit outstanding rose from \$70 billion in 1982 to \$203 billion in 1989 and then doubled between 1991 and 1997 — from \$247 billion to \$514 billion (Yoo, 1998) and Federal Reserve Board's 2002 Annual Report to U.S. Congress in pursuant of the Fair Credit and Charge Card Disclosure Act of 1988.

⁴ As a result of the Supreme Court Case *Marquette National Bank v. First of Omaha Service Corporation*, 439 U.S. 299 (1978), all state regulations on contract terms were gradually lifted.

interest rate (around 18%) remained stable through 1991, showing no downward trend even as other market rates declined.

Ausubel (1991) was the first to examine the phenomenon of high and downwardly sticky interest rates in the credit card industry, and he explained this on the basis consumers underestimating their borrowing potential. He argued that a large portion of consumers in this market are not sensitive to interest rates because *a priori* they underestimate their borrowing potential. On the other hand, those consumers who intend to accumulate more debt (i.e., the high-risk borrowers) are interest-sensitive. Since banks do not want to attract the high-risk borrowers, this fear of adverse selection prevents them from competing on interest rates. Ausubel felt that this behavior was compounded by the presence of high search and switch costs. As a result, rates remained high and stable in this market. Ausubel's work has been critiqued on the grounds that it presents consumers as engaging in a type of irrational behavior.

Subsequent papers have provided different explanations for the observed high levels of interest rates by focusing on various unique features of credit card debt, such as the non-collateralized characteristic (Mester, 1994) and open-ended revolving credit lines (Park, 1997). Brito and Hartley (1995) provided an explanation based on the liquidity services offered by credit cards under consumption uncertainty and the transaction costs of alternative financing, which will make a rational consumer borrow on credit cards in spite of a higher interest rate.

Calem and Mester (1995) empirically tested the search costs hypothesis of Ausubel and concluded that search and switch costs among cardholders can partly explain the high and downwardly sticky rates in the credit card market. In independent

regressions they examine the determinants of consumers' credit card balances and credit rejection. They find that (a) the level of balances is negatively related to search and (b) credit rejection is positively related to the level of balances. Hence they conclude by inference that higher-balance cardholders, facing a greater risk of rejection, will have higher expected search costs and will search less. This earlier work did not model consumer search explicitly but reached this conclusion by examining the determinates of credit card balances (one of which was consumer search).

Since the crucial implication of the search hypothesis is that the higher likelihood of rejection deters the high balance consumers from searching for lower rates, here we directly estimate this hypothesis by fitting search behavior to credit card balances and past rejections. In addition to using this direct specification, we also use a more recent round of the SCF, which contains improved variables for this type of investigation and allows the researcher to focus specifically on the credit card market.

Relevant Changes in the Credit Card Market

Beginning in 1991, credit card interest rates started to decline after remaining stable at around 18 percent for the previous twenty years. They declined gradually until 1994, and thereafter the average rate has fluctuated between roughly 14 and 16 percent⁵. Although the current rates move in accord with the prime rate (reflecting the marginal cost of funds), the decline in the early 1990s cannot be attributed solely to the reduction in the cost of funds. An examination of the prime rate shows that even though it was around 8 percent in both 1991 and 1998, the average credit card interest rate was 2.2 percentage points lower in 1998 than it had been in 1991.

⁵ Federal Reserve Board's 2001 Annual Report.

A part of the fall in interest rates can be attributed to the number of competitors in this market, which had risen to around 6800 independently-issuing financial institutions by 2000. Moreover, these banks have pursued a vigorous marketing strategy to attract customers. This has led to an explosion in direct solicitations via mail, telemarketing, and the internet. The number of direct solicitations reached 5 billion annually by the year 2001, almost 4 solicitations per month per American household⁶. A further dimension of these solicitations has been the offer of low temporary rates on easily implemented balance transfers, encouraging customers to roll over balances from competing firms. This reduces switch costs substantially and makes balance switching a routine matter. In addition, the Truth-in-Lending Act of 1988 required all issuers to disclose in their solicitations key offer information on interest rates, annual fees, grace periods, etc., thereby forcing them to report up-front their most important contract terms. This also worked to make comparison shopping for credit card terms in the 1990s market easy and relatively costless.

Finally, from a theoretical standpoint we should note that a contradiction arises in applying search cost theory to the 1990s credit card market, since cross-sectional interest rates have been widely dispersed during this period⁷. A dynamic sequential search model suggests that consumers' intensity of search will be directly proportional to the dispersion in prices. Consumers, aware of the distribution of interest rates in the market from direct solicitations, are therefore more likely to shop around for the best terms. All these factors suggest that previous arguments regarding search need to be revisited in the context of the 1990s credit card market.

⁶ Federal Reserve Board's 2001 Annual Report.

⁷ In 1998-99, not including the balance transfer rates which started as low as 1.9%, post-introductory interest rates have varied from approximately 9 % to as high as 25%.

III. The Empirical Investigation

Data

The *1998 SCF* contains important information about consumers' propensity to "comparison shop before making their credit decisions". Prior rounds of the SCF lumped search for credit together with search for savings/investments. Thus the inability to distinguish the two types of search created unavoidable measurement error in earlier research on credit card search behavior. In the *1998 SCF*, search behavior for credit is separately identified from search behavior for savings/investments, and the responses do show significant differences in the numbers of consumers searching for credit as opposed to savings/investments. Roughly half of those who do not comparison shop for credit registered a positive response to shopping for savings/investments (see Table 2, Appendix II). The proxy for consumer search used in this paper, *Shop*, is constructed from the question that collects information on consumers' propensity to search before making decisions related to credit and borrowing⁸.

Other important *SCF* information used here refers to credit rejection. We will investigate two separate categories of rejection. One is *Turndown*, which has been used in previous research (Calem and Mester) and encompasses rejection from *all* credit sources. The second is *CCturndown* (available only in later rounds of SCF), which identifies rejection from credit card issuers only. Here we will report results obtained in separate fits of both of these rejection variables.⁹

⁸ The responses to the shopping question range from "almost no shopping" through "moderate level of shopping" to "a great deal of shopping." *Shop* is assigned the value 0 for "almost no shopping" and 1 for all other categories.

⁹ Both equal 1 if a credit application has been rejected and 0 otherwise.

Methodology

The approval of credit depends on lenders' a priori estimate of the default thresholds of consumers based on various signals of credit risks. Therefore a lender's rejection of a credit application is modeled using an index function of creditworthiness for consumer 'i', $C_i(X_{1i})$, that depends on a vector capturing an individual's credit characteristics, X_{1i} . A credit application is rejected when $C_i(X_{1i}) < \bar{C}$, where \bar{C} is the threshold level for granting credit. Writing $C_i(X_{1i})$ as a first order approximation of the variables and normal error, we get the following probit model for *Turndown*

$$T_i^* = \bar{C} - C(X_{1i}) = \delta_1 \cdot X_{1i} + \varepsilon_{1i} \quad (1)$$

where $T_i^* > 0$ results in rejection and $T_i^* \leq 0$ results in credit approval.

On the other hand, a consumer searches for better credit terms if the utility derived from search through lower finance charges (after adjusting for search costs) outweighs his utility from not searching. The search behavior of consumer 'i' is therefore modeled using the latent variable $S_i^* = V_{si}(X_{2i}, \phi_i) - V_{nsi}(X_{2i}, 0)$, where V_{si} and V_{nsi} denote the utility derived from searching and not searching respectively. The utility from search depends on a vector of individual specific characteristics X_{2i} and also on ϕ_i , which represents both pecuniary and non-pecuniary costs of search and in itself depends on X_{2i} . Writing the utilities as a linear approximation of the individual specific characteristics and a normal error, the determinants of consumer search can then be analyzed with the following probit equation

$$S_i^* = V_{si}(X_{2i}, \phi_i) - V_{nsi}(X_{2i}, 0) = \delta_2 \cdot X_{2i} + \varepsilon_{2i} \quad (2)$$

where individual ‘ i ’ engages in search if $S_i^* > 0$ and does not search when $S_i^* \leq 0$.

Since outstanding card balances and a consumer’s past rejections, T_i , are included in X_{2i} , equation (2) provides a direct test for the hypothesis that consumers with large balances, who are more subject to rejection, will be inhibited from shopping around for credit terms due to their higher expected cost of search.

Endogeneity

It can be argued that since the underlying hypothesis is that a higher probability of rejection makes high balance consumers reluctant to comparison shop, then equation (2) should include the latent variable T_i^* rather than the indicator variable for rejection $Turndown_i$. Also it might be argued that consumers with a higher search propensity subject themselves to more rejection. To account for this latter possibility, we explore the endogeneity between $Shop$ and $CCturndown$. Re-writing $X_{1i} = (S_i^*, Z_{1i})$ and $X_{2i} = (T_i^*, Z_{2i})$, the paper estimates the following two probit equations simultaneously using a two step maximum likelihood procedure (Mallar, 1977).

$$\begin{aligned}
 T_i^* &= \alpha_1 \cdot S_i^* + \beta_1 \cdot Z_{1i} + \varepsilon_{1i} \\
 S_i^* &= \alpha_2 \cdot T_i^* + \beta_2 \cdot Z_{2i} + \varepsilon_{2i}
 \end{aligned}
 \tag{3}$$

The two-step procedure gives consistent estimates of the parameters of the model but does not provide the correct estimated second step standard errors. We follow Murphy and Topel (1985) to calculate the asymptotic variance-covariance matrix of the second stage coefficients. This accounts for the interdependence of the error terms and

the fact that the unobservable regressors have been estimated in calculating the second step coefficients (see Appendix I for details). If α_2 turns out to be insignificant, then we can unambiguously conclude that probability of rejection does not enter in consumers decision to search for better credit terms in this market.

IV. Results

Table 1 below presents the results of the independent probits in equation 1 and 3. There are two sets of results. One is the fit of the credit card rejection variable *CCturndown* (column 1) to outstanding balances and the search variable *Shop*. The second set of results presents the fit of *Shop* (column 2) to *CCturndown* and outstanding balances. *CCturndown* and *Shop* are both binary variables taking the value 1 for having incurred credit application rejection and engaging in search behavior respectively. We also include control variables for income, bankruptcy and delinquency histories, average monthly payments on consumer loans and monthly rents, liquid assets, homeownership, and age.¹⁰ As noted earlier, we have included the fits for both turndown variables – *CCturndown* (i.e., specific to credit cards) and *Turndown* (i.e., general credit turndown) – for the sake of comparison with earlier research. We see from the table that for both turndown variables, the level of outstanding balances has a positive and highly significant effect, consistent with earlier research. Note, however, that the variable representing consumer search – *Shop* – is not significant in either of these fits.

Turning to the determinants of consumer search variable *Shop*, we find that (a) outstanding credit card *Balances* have a significant *positive* effect on consumers' search

¹⁰ A detailed description of variables is presented in Appendix II.

behavior; and (b) being rejected for credit does not effect search significantly. These findings contradict the hypothesis that high costs impede consumer search in this market. Thus finance charge considerations appear to offset any search and switch costs that might exist for high balance consumers. Even though high balance consumers are more likely to be denied credit, this does not deter them from searching for lower interest rates. These results also hold when *Shop* is used in an ordered probit model as the 5-category variable from its original *SCF* format (i.e., ranging from 0 (almost no shopping) to 4 (high level of shopping) (see Appendix III for these results). In addition, the results hold when the *SCF* questions referring to *all* credit card balances (store as well as bank) are used instead of balances on bank cards only.

Table 1: Independent Probit Estimates for *CCturndown/Turndown*, and *Shop*

Variable (<i>SE</i>)	Credit Card Turndown Only		All Consumer Loan Turndown	
	CCturndown	Shop	Turndown	Shop
Constant	-0.4219 ** (0.1680)	1.8693 ** (0.1156)	-0.1536 (0.1481)	1.8482 ** (0.1169)
Shop	-0.0143 (0.1052)	-	0.0561 (0.0913)	-
CCturndown	-	-0.0401 (0.1137)	-	-
Turndown	-	-	-	0.0392 (0.0897)
Balance	1.9596 ** (0.4247)	1.3044 ** (0.5939)	2.2294 ** (0.4071)	1.2556 ** (0.5924)
Mn.Payments	-	3.6791 ** (1.4924)	-	3.6678 ** (1.4928)
Bankruptcy	0.4122 ** (0.1228)	-	0.8956 ** (0.1038)	-
Delinquency	0.2360 ** (0.0645)	-0.0075 (0.0681)	0.5198 ** (0.0573)	-0.0161 (0.0693)
Income	-0.0001 (0.0064)	-0.0071 ** (0.0028)	-0.0104 * (0.0061)	-0.0070 ** (0.0028)
Liquid Assets	-0.0174 (0.0115)	-0.0032 ** (0.0011)	-0.0038 (0.0041)	-0.0032 ** (0.0011)
Mn.Payments/Income	0.0747 (0.0577)	-0.0204 (0.0319)	0.2190 ** (0.0777)	-0.0221 (0.0319)
Home Ownership	-0.2605 ** (0.0845)	0.1626 ** (0.0745)	-0.1412 * (0.0745)	0.1671 ** (0.0744)
Age	-0.0205 ** (0.0029)	-0.0201 ** (0.0019)	-0.0238 ** (0.0025)	-0.0199 ** (0.0019)
Chi-Sq	201.51	181.42	488.97	181.49

N=3193.

** Significant at 5% level of confidence

* Significant at 10% level of confidence

Two-Stage Estimates

Though the results from the independent probits suggest that *CCturndown* does not affect *Shop*, we now explore the link further by estimating the equations accounting for endogeneity. For identification purposes, bankruptcy is used as an instrument for *CCturndown*. Clearly consumers with past record of bankruptcies are more likely to get rejected by credit issuers, but there is no theory or solid evidence suggesting that past bankruptcy filings affect shopping behavior of individuals. Likewise, the consumer's average monthly payments (rent, mortgage, auto, lease) is included in the *Shop* equation and not in *CCturndown*. Consumers having to make high average monthly payments will be sensitive to the price portion of any credit contract and will be more likely to search for lower interest rates. Average monthly payments should therefore have a direct impact on the shopping propensity of consumers and is used an instrument for *Shop*. Some researchers might argue that credit issuers may use average monthly payments as an indicator of default probabilities of consumers. However, the average monthly payment in itself does not convey any signal of credit risk, but does so only relative to monthly income. The ratio of average monthly payments to monthly household income is therefore included in both the equations.

The maximum likelihood estimates of the simultaneous two-equation probit model are reported in Table 2. Following the convention used in Table 1, for the sake of comparison we have included the fits for both turndown variables. The first stage reduced-form estimates in Appendix IV give an indication of the strength of the instruments. Previous bankruptcies significantly affect *CCturndown* (column I) at the one percent level but do not significantly affect *Shop*. Conversely higher average monthly

Table 2: Structural ML Estimates of Shop & CCTurndown/Turndown

Variable (<i>SE</i>)	Credit Card Turndown Only		All Consumer Loan Turndown	
	CCTurndown	Shop	Turndown	Shop
Constant	-1.6533 *	1.9815 **	-0.7990	1.8668 **
	(0.8733)	(0.1811)	(0.9724)	(0.1164)
Shop (latent)	0.6493	-	0.3761	-
	(0.4588)		(0.5148)	
Ccturndown (latent)	-	0.2845	-	-
		(0.3189)		
Turndown (latent)	-	-	-	0.1305
				(0.1413)
Balance	1.0956	0.7307	1.7438 **	0.9883
	(0.8065)	(0.8573)	(0.8216)	(0.6678)
Mn.Payments	-	2.9903 *	-	3.4880 **
		(1.5428)		(1.6782)
Bankruptcy	0.3356 **	-	0.8537 **	-
	(0.1580)		(0.1298)	
Delinquency	0.2509 **	-0.0859	0.5280 **	-0.0858
	(0.0826)	(0.1106)	(0.0630)	(0.1059)
Income	0.0026	-0.0065	-0.0089	-0.0055 *
	(0.0072)	(0.0051)	(0.0068)	(0.0036)
Liquid Assets	-0.0156	0.0019	-0.0027	-0.0026 **
	(0.0117)	(0.0107)	(0.0043)	(0.0018)
Mn.Payments/Income	0.0702 *	-0.0372	0.2050 **	-0.0468
	(0.0384)	(0.0334)	(0.0848)	(0.0453)
Home Ownership	-0.3858 **	0.2454 **	-0.2120 **	0.1858 **
	(0.1324)	(0.1198)	(0.1275)	(0.0783)
Age	-0.0073	-0.0143 **	-0.0164	-0.0169 **
	(0.0098)	(0.0068)	(0.0108)	(0.0039)
Chi-Sq	203.09	182.17	489.14	182.17

N=3193.

** Significant at 5% level of confidence

* Significant at 10% level of confidence

payments increase consumer search (column II) but do not significantly affect *CCturndown*. Turning to the second-stage structural estimates in Table 2, we find that these are similar to the earlier independent probit results. Here also *CCturndown* does not have a significant impact on *Shop* and vice-versa. These results demonstrate that past rejections do not enter in consumers' decisions to search for lower rates. The results are similar when *Turndown* is used instead of *CCturndown*.

V. Summary and Conclusions

Credit card debt has been the fastest growing segment of the U.S. consumer loan market in the last two decades. One line of research in this area has focused on cardholder search behavior as a factor behind the phenomenon of high and downwardly sticky credit card interest rates. In recent years, however, the environment in this market has changed significantly, and many aspects of consumer behavior uncovered in earlier research are no longer in evidence. Here we examine the earlier hypothesis that search and switch costs, especially on the part of high-balance cardholders who are more subject to credit rejection, inhibit search in this market. The explosion of direct solicitations featuring full disclosure of rate and other contract terms as required by the Truth-in-Lending Act of 1988, has cast doubt on the salience of these search and switch costs arguments. We have examined the search phenomenon using the more recent *1998 Survey of Consumer Finance* and a direct model specification for consumer search, investigating the possible endogeneity of consumer search and probability of rejection.

Our results show that: (a) high rejection probabilities do not affect search propensities; and (b) high balance consumers search more even though they have a higher

likelihood of rejection. These results imply that search costs are no longer a dominant economic factor in this market. They also imply that the balance-carrying consumers of the 1990s have become more rational and display greater sensitivity to the interest rate terms of a credit card contract. Our findings demonstrate one important policy impact of the Truth-in-Lending Act which has lowered the cost to consumers of gathering information about credit terms. This change in search behavior is an important factor in the observed decline in credit card interest rates in recent years.

Appendix I

Corrected Asymptotic Variance-Covariance Matrix for Two-Step MLE

The reduced form equations of the model in (3) are as follows:

$$T_i^* = \Pi_1 \cdot Z_i + e_{1i} \quad (3a)$$

$$S_i^* = \Pi_2 \cdot Z_i + e_{2i} \quad (3b)$$

where $Z_i = (Z_{1i}, Z_{2i})$. First, consistent estimates of the reduced form parameters are obtained by maximizing the marginal likelihood functions constructed from (3a) and (3b) separately. Let L_1 be the likelihood function for the first stage reduced form equation for *Turndown_i*,

$$L_1 = \sum_{i=1}^n [T_i \cdot \log\{F(\Pi_1 \cdot Z_i)\} + (1 - T_i) \cdot \log\{1 - F(\Pi_1 \cdot Z_i)\}] .$$

Maximizing L_1 gives $\hat{T}_i^*(\hat{\Pi}_1 \cdot Z_i)$. Second, this estimated probability is substituted for its unobserved counterpart in the structural equation, and the likelihood function for the structural equation is then maximized with respect to its parameters. If L_2 is the likelihood function for the second stage structural equation for *Shop*, then substituting $\hat{T}_i^*(\hat{\Pi}_1 \cdot Z_i)$ for *Turndown_i* in L_2 gives

$$L_2 = \sum_{i=1}^n [S_i \cdot \log\{F(\alpha_2 \cdot \hat{T}_i^*(\hat{\Pi}_1 \cdot Z_i) + \beta_2 \cdot Z_{2i})\} + (1 - S_i) \cdot \log\{1 - F(\alpha_2 \cdot \hat{T}_i^*(\hat{\Pi}_1 \cdot Z_i) + \beta_2 \cdot Z_{2i})\}] .$$

Maximizing L_2 gives consistent estimates $(\hat{\alpha}_2, \hat{\beta}_2)$.

Writing $\theta_2 = (\alpha_2, \beta_2)$, the correct asymptotic variance-covariance matrix for the second stage parameters is given as ¹¹:

$$Var(\theta_2) = V_2^{-1} + V_2^{-1} [C V_1^{-1} C' - R V_1^{-1} C' - C V_1^{-1} R] V_2^{-1}$$

¹¹ For a formal derivation see Murphy and Topel, 1985.

where

$$V_1 = -E \frac{\partial L_1}{\partial \Pi_1 \Pi_1'}$$

$$V_2 = E \frac{\partial L_2}{\partial \theta_2} \left(\frac{\partial L_2}{\partial \theta_2} \right)'$$

$$C = E \frac{\partial L_2}{\partial \Pi_1} \left(\frac{\partial L_2}{\partial \theta_2} \right)'$$

$$R = E \frac{\partial L_1}{\partial \Pi_1} \left(\frac{\partial L_2}{\partial \theta_2} \right)'$$

These matrices are replaced by their estimated counterparts in the calculation of the standard errors. The above procedure is followed for the structural equation *Turndown* also.

Appendix II

Definitions of Variables

<i>VARIABLE</i>	<i>DEFINITION</i>
Shop	1 – Consumer shops around before making credit decisions 0 - Otherwise
CCturndown	1 – Turned down specifically for a credit card or denied increase in credit line. 0 – Otherwise
Turndown	1 – Turned down or denied any form of consumer credit; includes credit cards, mortgages, home equity lines, etc. 0 – Otherwise
Balance	Outstanding Balances on Bank Cards (MC, Visa, Discover, AMEX)
Mn.Payments	Average Monthly Payments; includes mortgage payments, rent, auto, lease.
Bankruptcy	1 – Declared bankruptcy in the past 0 – Not declared bankruptcy
Delinquency	0 – No loans or have loans but never missed a payment 1 – Sometimes missed payments but never by more than 2 months 2 – Behind on their payments by 2 months or more
Income	Annual Household Income.
Liquid Assets	Liquid assets held; checking, savings, money market deposit accounts, CDs, mutual funds.
Mn.Payments/Income	Avg. Monthly Payments / Monthly Income;
Home Ownership	1 – Owns home 0 – Rents
Age	Age of Respondent

Cross-Tabulations for *Shop for Credit/Borrowing* and *Shop for Savings/Investments*

<i>Savings/Investments</i> <i>Credit/Borrowing</i>	Do Not Shop for S&I (=0)	Do Shop for S&I (=1)
Do Not Shop for Credit (= 0)	49.64%	50.36%
Do Shop for Credit (= 1)	12.75%	87.25%

The first row reflects the relative frequency of “not shopping” for credit across the same categories for savings and investments. The second row reflects the relative frequency of “shopping” for credit across the same categories.

Appendix III

Independent Probit Estimates for Ccturndown/Turndown and Ordered Probit Estimates for Shop

Variable (SE)	Credit Card Turndown Only		All Consumer Loan Turndown	
	Ccturndown	Shop	Turndown	Shop
Constant	-0.3865** (0.1491)	1.5030** (0.0830)	-0.0647 (0.1328)	1.5015** (0.0842)
Shop	-0.0191 (0.0284)		-0.0121 (0.0243)	
CCturndown		-0.0684 (0.0783)		
Turndown				-0.0379 (0.0623)
Balance	1.9694** (0.4251)	0.6169* (0.3301)	2.2455** (0.4068)	0.6114* (0.3312)
Mn.Payments		0.6394 (1.1202)		0.6417 (1.1241)
Bankruptcy	0.4145** (0.1228)		0.8989** (0.1038)	
Delinquency	0.2343** (0.0645)	-0.0983** (0.0479)	0.5185** (0.0573)	-0.0950** (0.0485)
Income	-0.0002 (0.0064)	-0.0050** (0.0021)	-0.0107* (0.0062)	-0.0050** (0.0021)
Liquid Assets	-0.0174 (0.0115)	-0.0021** (0.0005)	-0.0038 (0.0040)	-0.0021** (0.0005)
Mn.Payments/Income	0.0738 (0.0569)	-0.0153 (0.0401)	0.2177** (0.0784)	-0.0157 (0.0411)
Home Ownership	-0.2583** (0.0844)	0.0900* (0.0520)	-0.1371* (0.0745)	0.0919* (0.0521)
Age	-0.0206** (0.0029)	-0.0115** (0.0014)	-0.0241** (0.0025)	-0.0115** (0.0014)
Threshold parameters				
MU(1)		0.2668**		0.2668**
MU(2)		1.3504**		1.3503**
MU(3)		1.7678**		1.7677**
Chi-Square	201.94	103.23	488.84	102.81

N=3193. Shop ranges from 0 (*Almost no Shopping*) to 4 (*High Level of Shopping*). ** Significant at 5% level of confidence * Significant at 10% level of confidence

Appendix IV

Two-Step ML Estimates of Shop and Ccturndown/Turndown 1st-Step Reduced Form Estimates

Variable (<i>SE</i>)	Credit Card Turndown Only		All Consumer Loan Turndown	
	CCturndown	Shop	Turndown	Shop
Constant	-0.4498 ** (0.1289)	1.8535 ** (0.1134)	-0.1019 (0.1168)	1.8535 ** (0.1134)
Balance	1.9257 ** (0.4251)	1.2786 ** (0.5898)	2.2247 ** (0.4077)	1.2786 ** (0.5898)
Mn.Payments	2.3815 (1.8064)	3.6680 ** (1.4919)	1.3795 (1.8234)	3.6680 * (1.4919)
Bankruptcy	0.4117 ** (0.1229)	0.1171 (0.1269)	0.8978 ** (0.1038)	0.1171 (0.1269)
Delinquency	0.2394 ** (0.0646)	-0.0177 (0.0683)	0.5214 ** (0.0573)	-0.0177 (0.0683)
Income	-0.0020 (0.0069)	-0.0070 ** (0.0028)	-0.0115 * (0.0064)	-0.0070 ** (0.0028)
Liquid Assets	-0.0177 (0.0116)	-0.0032 ** (0.0011)	-0.0039 (0.0041)	-0.0032 ** (0.0011)
Mn.Payments/Income	0.0564 (0.0435)	-0.0211 (0.0318)	0.1971 ** (0.0860)	-0.0211 (0.0318)
Home Ownership	-0.2778 ** (0.0851)	0.1664 ** (0.0743)	-0.1494 ** (0.0758)	0.1664 ** (0.0743)
Age	-0.0203 ** (0.0029)	-0.0200 ** (0.0019)	-0.0239 ** (0.0025)	-0.0200 ** (0.0019)
Chi-Sq	203.09	182.17	489.14	182.17

N=3193.

** Significant at 5% level of confidence

* Significant at 10% level of confidence

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