The Determinants Of Outstanding Balances Among Credit Card Revolvers

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The purpose of the study was to determine factors predicting the amount of outstanding credit card balances among credit card revolvers. Data from the 1998 Survey of Consumer Finances and a Heckman two-stage estimation were used for analysis. Factors related to the likelihood of having an outstanding balance differed from the factors affecting the amount of the outstanding credit card balance. Education, income, real assets, credit card interest rate, number of credit cards, the credit limit, a positive attitude to credit, and behind schedule payments were positively related to the outstanding credit card balance.

Key words: *Credit cards, Heckman model, Revolving credit card user, Survey of Consumer Finances*

Introduction

A credit card is both a payment tool and a convenient source of credit (Garman & Forgue, 1997). When credit card holders have an outstanding credit card balance after the last monthly payment, they are known as revolving credit card users (Bird, Hagstrom & Wild, 1997). Over time, the number of credit card revolvers and the amount of outstanding credit card debt has increased (Bird, et al., 1997; Canner & Cyrnak, 1985; Lindley, Rudolph & Selby, 1989; Yoo, 1998). According to the 1998 Survey of Consumer Finances, about 44% of households had an outstanding credit card balance (Kennickell, Starr-McCluer & Surette, 2000). In 1996, the amount of consumer revolving debt was about $500 billion, up 12.9% from the previous year. In 2001, the amount of consumer revolving debt averaged about $680 billion (Federal Reserve Board, 2001).

The rapid rise of credit card debt has generated much discussion about credit card use. Much of the previous research addressing the determinants of credit card use examines revolving behavior by dividing the sample between those holding a balance and those with no balance on their credit cards (Bei, 1993; Canner, 1988; Steidle, 1994). However, these studies provide a limited amount of information because the balances vary from $1 to more than $100,000. It is more appropriate to estimate the amount of outstanding balances on credit cards. There has been some research on the amount of the outstanding credit card balance. Yoo (1998) reported descriptive statistics and Zhu and Meeks (1994) focused on low-income households. Even those studies, while useful for an overall understanding of credit card use, do not provide enough information about the factors that contribute to the amount of outstanding balances.

The purposes of this study are 1) to examine the patterns of credit card use (convenience user versus revolver), and 2) to identify the factors affecting the amount of the outstanding credit card balance. To provide a theoretical analysis of the behavior of credit card users, Bryant's exposition of consumption and borrowing (1990, pp. 78-114) and the life cycle theory (Ando & Modigliani, 1963) are applied to examine the pattern of credit card use and the amount of the outstanding credit card balances.

Consumers can maximize the utility of their consumption by using their credit cards as sources of credit (Duca & Whitesell, 1995). The pattern of credit card repayment and the amount of the outstanding balances are closely related to the ability and willingness to borrow money. Furthermore, the cost, benefit, and optimal balance of a credit card depend on its interest rate. Thus, the life cycle model and Bryant's exposition can be applied to the pattern of credit card payment and the amount of the outstanding balance on credit cards. The results should contribute to our understanding of credit card use and provide educators with information to assist consumers. Further, policy makers can use the information to evaluate current regulations in the credit card market.

Literature Review

Theoretical Background

The theoretical background of this study is based on the life cycle model and Bryant's exposition of household consumption and saving (1990, pp. 78-114).

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Ando and Modigliani's (1963) life cycle model assumes that consumers try to maximize utility from lifetime consumption. The model implies that rather than having consumption each year be related to that year's income, consumers even out their household income stream over their lifetime through borrowing or saving (Fan, Chang & Hanna, 1993; Hanna, Fan & Chang, 1995). Consumption needs can be changed by household demographic characteristics such as age, household size, and marital status.

Bryant (1990, p. 80) offers a detailed explanation to show that borrowing is the transfer of future resources to the present to increase current consumption. Under a budget constraint, consumers make borrowing decisions to maximize utility. In addition to consumption needs and a budget constraint, the cost of goods and consumers' time preference can also influence the substitution between current and future consumption. Consumers are assumed to weigh the cost of buying goods in the present against the expected future cost of goods and choose the cost minimizing consumption (Bryant, 1990, p. 86). In credit markets, interest rates represent the cost of goods. This cost is likely to motivate consumers to change their equilibrium choices between current and future consumption by borrowing or saving money.

Time preference is the desire by consumers to rearrange consumption over the lifetime (Bryant, 1990, p. 87). A consumer's willingness to borrow is what Bryant calls the pure time preference effect on household debt. This willingness to borrow is reflected by psychological factors related to credit. Adapting the life cycle model and Bryant's exposition to credit card use produces the following proposition. Credit card payment behavior and the outstanding credit card balance are affected by:
1. Consumption needs,
2. Current resources (the budget constraint) and future resources,
3. The interest rate, and
4. The consumer's preferences.

Since little research has been conducted on the outstanding credit card balance, this study reviews previous research to identify the factors that determine the outstanding credit card balances.

Factors Related to Credit Card Use and Outstanding Credit Card Balances
Consumption Needs A consumers' age, marital status, and household size might influence being a credit card

revolver. A consistent finding in previous studies is the negative relationship between age and being a credit card revolver (Bei, 1993; Canner & Cyrnak, 1985; Choi & DeVaney, 1995; Steidle, 1994; Wasberg, Hira & Fanslow, 1992). This finding implies that households headed by a younger individual are more likely to use credit cards as borrowing instruments than households headed by an older individual.

Canner and Cyrnak (1985) showed that marital status is important in explaining who is a revolving credit card user. Kinsey (1981) and Steidle (1994) also found that marital status was related to credit card possession and use. Consumers who are married are likely to have higher expenditures than non-married consumers. Godwin (1998) showed that household size was positively related to the increase in household debt. This finding supports the belief that demand for present consumption is positively associated with household size. Thus, the need to finance a larger amount of living expenses could be reflected in borrowing money from credit cards.

Resources In previous studies, resources have had various definitions. Based on human capital theory (Becker, 1975) and household production theory (Bryant, 1990), this study uses a broad definition of resources that includes human and economic resources. Education is a proxy for human resources. Economic resources include income, liquid assets, investment assets, and real assets. This study includes the total amount of debt because it should be related to consumer decisions on credit card use versus using other types of debt. In addition, the number of credit cards and the amount of the credit limit are included because these two factors will probably increase a consumer's credit use.

The relationship between education and credit card use has not been consistent in previous studies. Bei (1993) and Steidle (1994) showed that education was negatively related to being a credit card revolver. Canner (1988) found that both higher educated and lower educated people were revolvers as opposed to convenience users. The majority of the revolvers (60%) held less than an 8th grade education in his study. However, theoretically, education is considered as one of the human resources. Education can increase the demand of current consumption. According to Becker (1975), education can be a future resource, as well as a current human resource. High future resources suggest that high future income is likely to increase the demand for consumption and for borrowing more money in the

current period. Empirically, Choi and DeVaney (1995) found that education was positively related to credit card use.

Similar to the effect of current income, the amount of net worth can determine a household's level of consumption (Bryant, 1990, p. 80). If net worth is constrained, consumers can borrow money from credit cards to meet their needs and wants. According to Duca and Whitesell (1995), the amount of liquid assets can be an important indicator of consumers' repayment patterns because consumers with substantial balances of liquid assets can decide whether they want to revolve their bill or pay cash. Households with high liquid assets are more likely to pay their debt in full each month (Canner & Cyrnak, 1985; Zhang & DeVaney, 1999).

Credit cards allow the cardholder access to credit. Similarly, a higher credit limit allows the cardholder to borrow more money using credit cards. For revolving credit card users, more credit cards provide access to more credit sources. Obviously, more credit sources can lead consumers to borrow more money (Canner & Cyrnak, 1986; Kinsey, 1981; Lee & Hogarth, 1998).

Hanna, et al. (1995) simulated an optimal life cycle model related to expected real income growth at the household level. They showed that rational consumers are more likely to consume and dissave if they expect positive income growth. Fan, et al. (1993) found that rational consumers who expected high real income growth should consume more than those with the same current income who expected lower income growth, so that future income growth should be related to borrowing. Godwin (1998) concluded from her empirical analysis that expectations for real income were positively related with an increase in consumer debt.

Interest Rate The interest rate and the payment pattern ultimately determine the balance (Duca & Whitesell, 1995). Canner and Luckett (1992) found that credit card revolvers were more likely than convenience users to be sensitive to the level of interest rates. Lee and Hogarth (1998) examined credit card interest rates associated with search for information about interest rates. Although a low interest rate may not be a concern to convenience users of credit, credit cards revolvers are likely to prefer a low interest rate.

Preferences Consumer preferences to use credit show their willingness to borrow, and this is based on

psychological factors (Zhu & Meeks, 1994). According to Godwin (1998), a consumer's preference regarding the use of credit is considered to be the motive for choosing between present and future consumption. Ajzen and Fishbein (1980) showed that attitude could be used to predict behavior. According to the theory of reasoned action, holding a specific attitude is associated with a specific behavioral intention. Although many studies have examined the relationship between attitude toward credit and credit card use, the results have varied. Bei (1993), Canner and Cynark (1986), and Steidle (1994) found a significant relationship between having a positive general attitude toward credit and revolving credit card use. In a study of low-income consumers, Zhu and Meeks (1994) did not find a significant relationship between general attitude and credit behavior. However, Chien and DeVaney (2001) used an index to measure favorable attitudes for specific uses of credit and found a positive relationship between the index and the outstanding credit card balance. Thus, examining both general attitude toward credit and specific attitude toward credit could be a more accurate measurement of attitude toward credit.

Time horizon is related to time preference (Bryant, 1990 p. 87). Godwin (1998) suggested that a household's level of debt is positively associated with a higher rate of time preference. In other words, people who strongly favor the present over the future are more likely to borrow money.

Habit formation affects the utility obtained from current consumption (Warneryd, 1999, pp. 252-296). Habit implies that a consumer will have a tendency toward repetitive and routine behavior. Therefore, having an outstanding credit card balance could be influenced by loan repayment habit. If consumers frequently miss payments or often pay behind schedule, they may be more likely to accumulate a larger outstanding credit card balance.

Hypotheses
Based on the theoretical framework and previous research, several hypotheses are formulated.

Consumption Needs Household heads who are younger and married are hypothesized to be more likely to be revolving credit card users and to have a larger outstanding credit card balance than households headed by those who are older and those who are not married. Household size is expected to have a positive effect on the likelihood of being a revolving credit card user and the amount of the outstanding credit balance.

Resources Education is expected to have a positive effect on the likelihood of being a revolving credit card user and the amount of the outstanding credit card balance based on theoretical framework. Households with less income, fewer liquid assets, fewer investment assets, fewer real assets, and more debt are expected to be more likely to revolve credit cards and to have a larger outstanding credit card balance.

The number of credit cards and the credit limit are hypothesized to have a positive effect on the likelihood of being a revolving credit card user and the amount of the outstanding credit card balance. The expectation of higher income in the future is expected to have a positive effect on the likelihood of being a revolving credit card user and the amount of the outstanding credit card balance.

Interest Rate It is hypothesized that there will be a negative relationship between the credit card interest rate and being a revolving credit card user and the amount of the outstanding credit card balance.

Preferences It is hypothesized that those who have a positive general attitude toward credit and positive specific attitudes toward the use of credit for vacation, living expenses, and luxury goods are more likely to be revolving credit card users and to have a larger outstanding credit card balance. People who have a short planning horizon are expected to be more likely to be revolving credit card users and to have a larger outstanding credit card balance. Making late or behind-schedule loan payments is expected to be positively related to the amount of the outstanding credit card balance.

Methodology
Data and Sample
Data were drawn from the 1998 Survey of Consumer Finances (SCF), which is sponsored by the Federal Reserve Board of Governors and collected by the National Opinion Research Center at the University of Chicago (Kennickell, et al., 2000). The 1998 SCF provides comprehensive and detailed information on the financial characteristics of U.S. households.

The analysis had two stages. The first stage examined the probability of having an outstanding credit card balance. The second stage examined the factors influencing the amount of the outstanding balance. In the first stage, the sample included all of the households who had any type of a credit card and

positive income for 1997. The unweighted sample for the first stage consisted of 3,376 households. In the second stage, only households with an outstanding balance were included. There were 1,500 households with an outstanding credit card balance.

Analysis
Almost half of the sample used credit cards solely as a convenient means of paying for goods and services, and therefore had zero credit card balances carried over. An Ordinary Least Squares (OLS) regression analysis of the amount of outstanding credit card balance that included all of the households with credit cards would be biased because of sample selection bias (Maddala, 1983). If sample selection bias is not considered in the equation for outstanding balance, there will be an omitted variable specification. To correct the sample selection bias of the OLS regression on the outstanding balance on the explanatory variables, the Heckman procedure was employed in this study (Maddala, 1983).

The Heckman selection procedure provides consistent estimates at the OLS equation by adding an estimate of the expected value of the error terms, the inverse Mill's ratio, or lambda (λ) (Long, 1997). A probit analysis model in the first stage is used to provide the expected values of the residuals that are truncated at the second stage (the OLS regression.) Thus, the Heckman procedure is appropriate because it examines the amount of outstanding balance consistently by considering sample selection bias. (If the same factors related to having outstanding credit card balances were related in the same way to the amount of the balances, then the tobit procedure might be important, but using the Heckman procedure allowed for the possibility that the relationships were different.)

Measurement of Variables
Two dependent variables were used for the Heckman procedure. In the first stage, the dependent variable was coded 1 if the respondent had an outstanding credit card balance (a revolving credit card user) and 0 otherwise. In the second stage, the dependent variable was continuous and was measured by the total amount of credit card debt remaining after the last monthly payment was paid.

Based on the life cycle model, Bryant's exposition, and previous studies, four groups of independent variables were identified: consumption needs, resources, interest rate, and preferences. Consumption needs included age, marital status, and household size. Age and age squared were included to measure a possible

curvilinear effect on outstanding credit card balances, reflecting a life-cycle consumption model. Marital status was coded as married and non-married. Household size was a continuous variable.

Resource factors included education, income, liquid assets, investment assets, real assets, household debt (excluding the outstanding credit card balance), the number of credit cards, credit limit, and expectation about future income. Education, income, liquid assets, investment assets, real assets, household debt, and the number of credit cards were continuous variables. Income, liquid assets, investment assets, real assets, and household debt were replaced with their natural logarithms to reduce heteroskedasticity (unequal variance of the residuals). Empirically, the transformation should improve the explanatory power of the linear model, including the statistical significance of the individual variables.

The credit card interest rate was measured by the interest rate of the credit card with the largest balance. The credit limit was measured by the maximum amount that the credit card holder could borrow on all credit card accounts. Future income expectation was categorized into three groups: higher than current income, the same, or lower than current income.

Table 1.
Measurement of Variables

Variable	Measurement
Dependent Variables	
Credit card use	1 if an outstanding credit card balance, 0 otherwise
The amount of outstanding credit card balances	Continuous
Independent variables	
Age	Continuous
Age squared	Continuous
Marital status	1 if married, 0 otherwise
Household size	Continuous
Education	Continuous, the years of education attained by household head
Ln (Income)	Continuous, log (1+ total household income)
Ln (liquid assets)	Continuous, log (1+ total household liquid assets)
Ln (investment assets)	Continuous, log (1+ total household investment assets)
Ln (real assets)	Continuous, log (1+ total household real assets)
Ln (Debt)	Continuous, log (1+ total household debt excluding

Determinants of Outstanding Balances among Credit Card Revolvers

	outstanding credit card balance)
The number of credit cards	Continuous
Credit limit	Continuous
Income expectation	
Higher	1 if future income is expected to be higher than now, 0 otherwise
Same	1 if future income is expected to be same, 0 otherwise
Lower (reference)	1 if future income is expected to be lower than now, 0 otherwise
Credit card interest rate	Continuous, the interest rate of credit card having the largest balance
Attitude toward credit	
Positive	1 if positive attitude toward credit, 0 otherwise
Ambivalent	1 if ambivalent attitude toward credit, 0 otherwise
Negative (reference)	1 if negative attitude toward credit, 0 otherwise
Positive attitude toward the use of credit for vacation	1 if positive attitude toward the use of credit for vacation, 0 otherwise
Positive attitude toward the use of credit for living expenditures	1 if positive attitude toward the use of credit for living expenditures, 0 otherwise
Positive attitude toward the use of credit for luxury goods	1 if positive attitude toward the use of credit for luxury goods, 0 otherwise
Time horizon	
Less than 5 years	1 if below 5-year time planning, 0 otherwise
5-10 years	1 if 5-10 year time planning, 0 otherwise
More than 10 years planning	1 if above 10-year time planning, 0 otherwise
Loan payment habit	1 if behind schedule or missed payment, 0 otherwise

Note: loan payment habit is included in only the second stage model

Preference factors included general attitude toward credit, and specific attitude toward the use of credit for vacations, living expenses, and luxury goods, time horizon, and loan payment habit. Loan payment habit was not included in the first stage model because the convenience users are likely to designated as "inappropriate" for that response or their response is that they "pay as scheduled." The measurement of variables is presented in Table 1.

Results
Sample Characteristics
Sample characteristics are presented in Table 2. A weight variable (X42001) is used so that the descriptive statistics are representative of the U.S. population. Among respondents holding any type of credit card, 57.8% held an outstanding balance after the

last payment was made. The average household income was $64,461. The average number of credit cards per household was 5. Approximately 30% of respondents had a positive attitude toward the use of credit.

Table 2.
Descriptive Statistics for Households with Credit Cards (Weighted Value)

Variables	Mean (SD) or %
Credit card use	
Convenience user	42.2%
Revolving user	57.8%
Amount of outstanding credit card balance	2360.87 (4810.15)
Age	49.05(16.14)
Marital status	
Married	60.0%
Not married	40.0%
Household size	2.62(1.43)
Education	13.74 (2.59)
Income	64,461(138,350)
Liquid assets	19,175(75,675)
Investment assets	152,849 (789,003)
Real assets	246,458(1,137,800)
Debt	58,407(103,827)
The number of credit cards	4.87 (3.75)
Credit limit	15,868.23(24,323.00)
Income expectation	
Higher	23.58%
Same	48.40%
Lower	28.02%
Credit card interest rate	13.48 (5.77)
Attitude toward credit	
Positive	29.7%
Ambivalent	38.5%
Negative	31.8%
Attitude toward the use of credit for vacation	
Positive	18.45%
Negative	81.55%
Attitude toward the use of credit for living expenditure	
Positive	42.12%
Negative	57.88%
Attitude toward the use of credit for luxury goods	
Positive	6.43%
Negative	93.57%
Time horizon	
Less than 5 years	56.9%
5-10 years	25.7%
More than 10 years	17.4%

Note: Loan payment habit is included in only the second stage model Revised Kennickell-Woodburn weight (X42001) is used for these descriptive statistics.

T-tests were conducted for continuous variables and chi-square analyses were conducted for categorical variables to examine the differences between households with and without an outstanding credit card balance (Table 3). There were significant differences between convenience users and revolvers by age, education, household size, income, liquid assets, investment assets, real assets, household debt excluding outstanding credit card balances, credit limit, and credit card interest rate. Chi-square analyses show that the convenience users and revolvers appeared to differ by marital status, general attitude toward credit, and specific attitude toward the use of credit for vacations, living expenses, and luxury goods, and time horizon.

Probit Analysis for Revolving Credit Card Users
The results of the probit analysis were obtained to provide the inverse Mill's ratio (⊘) for the second stage analysis (Table 4). As hypothesized, age was curvilinearly related to the likelihood of being a revolving credit card user. If the other variables are set at their mean values, the probability of being a revolving user increases until age 37, then decreases with age. Education, income, liquid assets, investment assets, and real assets were negatively related to the likelihood of being a revolving credit card user. Household debt excluding outstanding credit card balance was positively associated with being a revolving credit card user. The number of credit cards was positively related to the likelihood of being a revolving credit card user, while credit limit was negatively related to the likelihood of being a revolving credit card user.

General attitude toward credit, specific attitude toward

the use of credit for vacations, and time horizon also have significant effects on the likelihood of being a revolving credit card user. Compared to a negative attitude toward credit, consumers with a positive or ambivalent attitude toward credit were more likely to use credit cards as credit sources. Consumers who have a positive attitude toward the use of credit for vacations are more likely to borrow money using credit cards. During a vacation, a credit card is a convenient means

of paying for airfare, car rental, and hotel and restaurant expenses. Thus, a specific attitude is likely to predict a specific behavior. Compared to a planning horizon of less than 5 years, holding a longer planning horizon is negatively related to the likelihood of being a revolving credit card user.

Table 3.

Characteristics of Convenience Users of Credit Cards Versus Revolving Users of Credit Cards (Weighted Value)

Variables	Convenience Users	Revolving Users	p
	Mean or %	Mean or %	
Age	55.47	44.38	.0001
Marital status			.0001
Married	71.60%	59.56%	
Not married	28.04%	40.44%	
Household size	2.34	2.82	.0001
Education	14.03	13.52	.0001
Income	82,847	51,054	.0001
Liquid assets	34,516	7,989	.0001
Investment assets	269,295	67,940	.0001
Real assets	371,628	155,188	.0001
Debt	57,833	58,826	.0001
# of credit cards	4.60	5.08	.9518
Credit limit	18,351	14,058	.0001
Income expectation			.5260
Higher	30.44%	26.38%	
Same	46.16%	47.89%	
Lower	23.40%	25.73%	
Credit card interest rate	13.51	13.47	.0001
Attitude toward credit			.0001
Positive	26.49%	34.84%	
Ambivalent	34.65%	37.86%	
Negative	38.86%	27.30%	
Attitude toward the use of credit for vacation			.0001
Positive	13.75%	23.93%	
Negative	86.25%	76.07%	
Attitude toward the use of credit for living expenditure			.0001
Positive	37.90%	46.67%	
Negative	62.10%	53.33%	
Attitude toward the use of credit for luxury goods			.0001
Positive	5.33%	8.73%	
Negative	94.67%	91.27%	
Time horizon			.0001
Less than 5 years	42.39%	59.26%	
5-10 years	32.04%	25.27%	
More than 10 years	25.53%	15.47%	
Payment habit			
As scheduled	-	77.05%	
Behind scheduled or missed payment	-	22.95%	

73

Table 4.
The Heckman Selection Model: Probit Analysis for Revolving Credit Card Users (N=3,376)

Variables	Coefficient	p
Age	0.0402	.0005
Age squared	-0.0006	.0001
Marital status (reference group = not married)		
Married	0.0856	.1966
Household size	0.0195	.3681
Education	-0.0464	.0001
Ln (Income)	-0.2390	.0001
Ln (liquid assets)	-0.1201	.0001
Ln(investment assets)	-0.0239	.0033
Ln (real assets)	-0.0527	.0001
Ln (Debt)	0.0519	.0001
The number of credit cards	0.0522	.0001
Credit limit	-3.2652E-6	.0015
Income expectation (reference group=lower)		
Higher	0.0918	0.2088
Same	0.0717	0.2596
Credit card interest rate	-0.0026	0.5832
Attitude toward credit (reference group= Negative)		
Positive	0.2969	<.0001
Ambivalent	0.1824	0.0031
Attitude toward the use of credit for:		
Vacation	0.2267	0.0045
Living expenditure	0.0737	0.0719
Luxury goods	-0.0393	0.7433
Time horizon (reference group = less than 5 years)		
5-10 years	-0.1278	0.0348
Above 10 years	-0.2911	<.0001
Intercept	3.7479	<.0001
-2 Log likelihood = -1636.01		

Selectivity Corrected OLS for the Outstanding Credit Card Balance

The second stage regression is corrected for sample selection bias. The inverse of the Mills ratio, lambda (λ), is estimated and an additional explanatory variable (i.e. payment habit) is used to reduce bias in estimating the amount of outstanding balance. Lambda is the expected value of the residuals that are truncated at the second stage OLS. The second stage results support two conclusions. First, the Heckman selection model used in this study is systematically related to the variables, showing a statistically significant λ coefficient. Also, payment habit has a statistically significant positive effect on the outstanding credit card balance. Second, many of the variables are statistically significant with coefficient signs consistent with expectations. However, the factors that are statistically significant are not the same as those in the first stage

suggesting that there are differences in the determinants of being a credit card revolver and the size of the outstanding balance.

There are no statistically significant explanatory variables related to consumption needs. Among the resource factors, education, income, real assets, and the number of credit cards are statistically significant. A one-year increase in education increases the average amount of an outstanding credit card balance by $227. Education can affect the consumer credit worthiness (i.e. the ability and willingness to repay the debt). Credit worthiness was related to the desired level of debt (c.f., Godwin, 1998). Revolvers with more education are likely to have higher credit worthiness and be confident about their future financial status.

Table 5.
The Heckman Selection Model: Selectivity Corrected OLS for the Outstanding Credit Card Balances (N=1,500)

Variables	Selectivity corrected coefficient	P
Age	-74.94214	0.3363
Age squared	1.52589	0.0910
Marital Status (Reference group= not married)		
Married	-253.5997	0.4951
Household size	123.6198	0.2872
Education	226.5758	0.0024
Ln (Income)	666.1666	0.0348
Ln (liquid assets)	-144.573	0.2446
Ln (investment assets)	59.7053	0.1762
Ln (real assets)	188.8554	0.0134
Ln (Debt)	-28.9640	0.6482
The number of credit cards	264.4096	0.0001
Credit limit	0.0925	0.0001
Income expectation (Reference group= Lower)		
Higher	92.6094	0.8177
Same	166.4165	0.6407
Credit card interest rate	69.1034	0.0063
Attitude toward credit (reference group = Negative)		
Positive	1458.5620	0.0009
Ambivalent	1056.1956	0.0069
Positive attitude toward the use of credit for:		
Vacation	56.5253	0.8974
Living expenditure	33.1038	0.9078
Luxury goods	536.4730	0.3667
Time horizon (reference group= Less than 5 years)		
5-10 years	50.7794	0.8878
Above10 years	335.8028	0.4893
Payment habit (reference group=As scheduled)		
Behind schedule or miss payment	705.4797	0.0443
λ	-5163.0310	0.0017
Intercept	-7571.2730	0.0084
Adjusted R^2	0.3013	.0001

Note: p<.05.   p<.01. p<.001.

the habit of making late payments on their credit cards, they are likely to encounter penalties, higher interest rates, and higher outstanding balances.

Income is positively related to the amount of outstanding credit card balances. Among revolving credit card users, consumers with high income have a high credit limit in their credit cards reflecting buying power. This buying power might lead high-income revolving users to have large outstanding balances. Real assets are positively related to the amount of outstanding credit card balances. These findings indirectly confirm Duca and Whitesell' (1995) view that consumers borrow money through credit cards to solve their liquidity constraint. With the ability to repay their debt in the future, consumers with higher real assets borrow money through credit cards to smooth their consumption.

The number of credit cards has a positive effect on the amount of outstanding credit card balances. One additional credit card increases the average amount of outstanding credit card balance by $264. The number of credit cards reflects accessible credit sources. Having many credit sources can influence consumers to borrow more money. One additional dollar in the credit limit increases the average amount of outstanding credit card balance by $.09.

The credit card interest rate is positively related to the outstanding credit card balance, contrary to our hypothesis. This might be caused by the fact that cards with a higher interest rate have higher credit limits and this might induce revolving credit card users to borrow more money through credit cards. Another possibility is that lenders increase the interest rates for consumers with high outstanding credit card balances.

The average amount of the outstanding credit card balance for revolving users with a positive attitude toward credit is $1,459 more than revolving users with a negative attitude toward credit. The average amount of the outstanding credit card balance for revolving users with an ambivalent attitude toward credit is about $1,056 more than revolving users with a negative attitude toward credit. This result shows that credit card borrowing behavior is related to general attitude toward credit. Revolvers who pay their loan behind schedule or miss payments have a larger outstanding credit card balance than revolvers who pay their loan as scheduled. This means that loan payment habit is an important influence on the accumulation of outstanding credit card balances among revolvers. If consumers develop

75

Summary and Conclusions

Using the 1998 Survey of Consumer Finances, this study examines the factors affecting outstanding credit card balance among revolving users of credit cards. Four sets of factors based on the life cycle model, Bryant's exposition of household consumption and saving behavior (1990 pp. 78-114), and previous studies are applied to the outstanding credit card balance: consumption needs, resources, interest rate, and preference factors. The Heckman procedure is employed to demonstrate the relationship between the explanatory variables and the amount of the outstanding balance to avoid sample selection bias.

The first-stage probit analysis is conducted to provide inverse Mill's ratios ($\hat{\lambda}$) for the second stage analysis. Except for marital status, household size, income expectation, credit card interest rate, and specific attitudes toward the use of credit for living expenses and luxury goods, all factors are significantly related to the likelihood of having an outstanding balance. However, the second-stage selectivity corrected OLS analysis suggests that the factors affecting the amount of outstanding credit card balances are different from the factors related to the likelihood of being a revolving credit card user. Higher education, higher income, higher real assets, more credit cards, higher credit card interest rates, a positive attitude toward credit, and behind-schedule loan payments or missed payments are found to increase the amount of the outstanding credit card balance. Among revolving credit card users, an increase in education increases the amount of outstanding credit card balances. An increase in income and real assets can also increase the amount of the outstanding credit card balance as consumers borrow to smooth consumption needs during their lifetime.

The number of credit cards as a proxy of credit sources also plays an important role in increasing the outstanding credit card balance. Revolvers with more credit cards can borrow more money using their credit cards than revolvers with fewer credit cards. Also, revolvers who want to borrow more money can apply for more credit card accounts.

The credit card interest rate is positively related to the amount of outstanding credit card balance. However, one should be cautious in interpreting the effect of credit card interest rate on the amount of outstanding credit card balances. The positive effect might result from high credit card interest rates or the fact that having a higher outstanding balance increases the interest rate. General attitude toward credit is positively related to the amount of the outstanding credit card balance. Apparently consumers with a positive attitude toward credit are more likely to accumulate outstanding balances.

Implications

Implications for Consumers, Educators, and Advisors

Overall, the hypotheses formulated in this study received support. The most notable exceptions were the findings that showed that age, marital status, household size, and income expectation are not significantly related to the amount of outstanding credit card balances. These findings fail to support the life-cycle model of consumption demand and supply. Perhaps, the lack of support for these variables is related to the characteristics of the credit card itself. Compared to other consumer loans, borrowing money through credit cards is much easier and faster. Thus, borrowing money with a credit card can be an instantaneous decision, rather than a decision that conforms to the life cycle consumption needs.

A combination of factors such as young consumers in the early stages of their work life, unexpected decline in future income, and revolving credit card use might produce a high debt-to-income ratio. The effect of this would be a suppressed level of consumption and saving. Further, higher rates of interest for credit cards can contribute to an increased burden of debt and damage households' well being in the long run. Thus, revolving credit card users with lower assets and income are likely to be the most vulnerable group if they continue to increase their level of debt. There is a need for educators and advisors to assist these vulnerable households to learn to set goals, develop spending plans, and pay down debt.

The results showed that the individual's general attitude toward credit was influential in explaining the amount of credit card balances. Consumers who have a positive attitude toward credit are likely to increase their outstanding credit card balances to even out their consumption flows. Financial educators and advisors need to help consumers understand the role that attitude plays in the use of credit to obtain goods and services. If consumers believe that it is all right to use credit for a specific purpose such as a vacation, they may find it difficult to reduce the amount they spend because they have developed a behavior of "spending first and paying later." Consumers may need to change their attitudes before they are able to reduce their level of debt, if debt is a problem. Many financial counselors

will help consumers to understand why they hold certain attitudes toward spending, and then help consumers adjust their attitudes.

This study indicates that loan payment habit is important in explaining the amount of credit card balances. Consumers who pay their loan behind schedule or miss payments are likely to accumulate their outstanding credit card balances unintentionally and pay unnecessarily high interest rates. Increased awareness of the significance of loan payment habit can help educators and financial counselors to work with consumers to identify any debt management problems. It may be essential to change loan payment behavior when consumers are confronted with how to manage their debt.

The fact that 56% of the 1998 SCF sample did not have an outstanding credit card balance supports the view that many consumers obtain credit cards for convenience, and they might not conduct any search. In contrast, credit card interest rate had a significant and positive effect on the amount of the outstanding credit card balance. Revolving users who need more money may rationally choose a credit card with a higher interest rate because it provides a higher credit limit. However, Ausubel (1991) showed that consumer's indifference to credit card interest rates made revolving users underestimate the probability they would accrue outstanding balances and pay unnecessarily high rates of interest on these unanticipated balances.

Implications for Public Policy and Research
The period of high credit card interest rates in the 1990s   prompted some to call for government intervention. Regulatory efforts to reduce credit card interest rates could help revolving credit card users to decrease their debt repayment burden. However, government intervention could also produce unintended negative consequences for convenience users. Lower interest rates are likely to weaken the profit of credit card companies. Consequently, they might impose other revenue-increasing actions such as shortening the grace period, charging for telephone customer service, and raising annual fees. By doing some or all of these things, they are likely to maintain their profit, but raise the cost for convenience users of credit cards. Thus, any government intervention should be done cautiously and it should be based on more information about credit card interest rates and consumers' rational behavior.

A limitation of the study is the inability to examine

other variables such as cash rebates, annual fees, and grace period. This information is not available in the data. Thus, this study is unable to predict how other costs and the benefits of credit cards affect outstanding credit card balances. Additionally, it is suggested that future studies should examine the effect of large outstanding credit card balances on household consumption and well being with longitudinal data, if it was possible to obtain longitudinal data.

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77

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