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An empirical investigation of credit card users in China

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An empirical investigation of credit card users in China

Abstract

Since the first credit card issued by the Bank of China in 1985, the domestic banks has issued 140 million credit cards in 2008, and by the end of 2011, the total number of credit cards issued reached 285 million, an increase of 24.3% from 2010. Further, 79.41% of the consumers have more than 3 credit cards, 35.12% have only one credit card while 1.35% have more than 10 credit cards. The total transaction reached 756 million RMB, which was 47.95% higher than the transaction volume in 2010. The number of the domestic credit card merchants has increased at the end of 2011 and the number of domestic acceptance merchants reached 3.18 million, a 45.68% increase compared to 2010 (Peng, 2012).

This paper seeks to investigate the factors that influence consumers' decision to use credit cards and level of credit card limit. In particular, this research seeks to determine which consumers' characteristics have the greatest influence on the respondents' decision to have a credit card. For example, as the age increases, does the probability of consumer to holding a credit card decrease?

The results show convenience, interest rate, application process, size of household, reward program, marital status, credit limit and age impact the respondent's likelihood of owning a credit card. Further, the results show the number of credit card, credit card use duration, monthly spending, and bachelor degree are statistically significant and positively related to different levels of credit limit.

JEL Classifications: E0, E4, E5

Keywords: credit card, China, electronic transaction, payment

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1 Introduction

Credit cards have become an extremely popular payment instrument, which improves the efficiency of transaction payment and reduces transaction costs. The popularity of credit cards continues to grow as evidenced by a greater proportion of merchants that accept them and consumers that carry them worldwide (Wenku, 2013; Chakravorti, 2006). For example, in 2012, the estimated number of US credit card holders was 181 million and the estimated number of credit cards issued was 609.8 million. This means many people in the US hold more than one credit card, and the annual purchase volume of credit cards in 2011 was \$2.1 trillion. Similarly, UK, a country of about 60 million people, had about 50 million credit cards in circulation in 2009. In 2007, there were just 12 million credit cards in Russia but by 2009 that figure rose to 24 million and analysts predict there would be more than 35 million credit cards in use by the end of 2011 (Credit Card Bible, 2011).

Similarly, the credit card market in China has been growing at double-digit rates since the early 1990s and boomed since 2003 (Packaged Fact, 2013). In 2003, there were only 3 million credit cards in circulation compared to 160 million in 2008. The credit card transactions totalled 7.56 trillion RMB in 2011, an increase of 47.95% from 2010 (CIW Team Staff, 2012). However, Chinese credit card market is largely directed by political calculation, policy mission and administrative intervention. Even though economic and social factors play a vital role, government regulations and policies control or strongly influence the competitive landscape, the credit card ecosystem and the industry income structure. Even so, the Chinese credit card market will continue to be the most promising market worldwide due to the size of the national economy and population.

The growth of credit card use in China is expected to come from the increasing number of young affluent Chinese. Young people are innovative, creative, willing to take risk and thus are expected to try new things. They are influenced less by the traditional Chinese culture such as save first spend later. Thompson, Worthington and Stewart's (2009) study revealed the holding of credit cards is widespread among the young affluent Chinese, with some students having more than one credit card. Their finding revealed that credit card usage levels are influenced by the ease of use and the credit card acceptance service provided, and the young affluent are more likely to avoid carrying cash. However, many Chinese consumers are still influenced by the traditional concept of spending, especially among the older generation who are more savings oriented and prefer to pay with cash. Another factor that influences Chinese consumer use of credit card is safety. This is especially true for online payment

There are limited empirical research studies on the credit card user behaviour in China. This paper seeks to investigate the factors that influence consumers' decision to use credit cards and level of credit card limit. The study also examines the impact of demographic characteristics of users such as gender, age, marital status, education, economic status and occupation on credit card usage in urban China.

2 Literature

2.1 Consumer characteristics affecting credit card use decisions

The literature reveals that age is an important factor affecting consumers' decision to credit card use, where younger household are more likely to use credit card as a borrowing instrument than older households (Kim & DeVaney, 2001). Awh and Waters (1974) found that

older age reduces the likelihood of an individual being an active credit cardholder. Further the authors argued that older people tend to resist innovations compared to those who have grown up in a computerized society may be less resistant to banking innovation such as credit card. White (1975) showed that older people have less opportunity to use credit card than younger people.

Armstrong and Craven (1993) found that gender is a predictor of how many credit cards consumer hold, and they found that females tend to have a higher average number of credit cards than males. However, Khare et al. (2011) found that males are more likely to own more credit cards and use them as a form of revolving credit than female. Similarly, Hirschman and Goldstucker (1977) found that bank credit card users are more likely to be males. The different result in credit card use in gender can be explained by different shopping behaviour among female and male consumers and they use credit card in different ways. For example, Kaynak and Harcar (2001) found that women tend to use credit cards to purchase household goods, clothing and personal belongings while men use their credit cards to pay for electronics, entertainment, travel and food. White (1975) argued that male probably find credit cards relatively more convenient to use when making purchase than female.

Canner and Cynrak (1985) showed that marital status is important in explaining who is a revolving credit card user. Kinsey (1981) and Steifle (1994) reported that married people are likely to have higher expenditures than non-married people. Thus, it becomes a necessity for the married people to have a credit card to borrow to finance their large living expenses.

Godwin (1998) showed there is a positive relationship between the household size and the increase in the household debt. Kinsey (1981) found that two-people households have more credit cards than a single-person households as two-people households tend to have higher expenditures in their daily life. Chien & Devaney (2001) also found that a larger household size is more likely to have favourable specific attitudes toward using credit card and higher outstanding credit card balances. Similarly, Bertaout & Haliassos (2001) found that households with more children are more likely to revolve credit card debts because more children reflect the households' higher expenditure in their daily life.

The level of education also contributes to the decision on credit card use. According to Becker (1975), education can be a future resource, as well as a current human resource. Kim & DeVaney (2001) argued that higher level of education implies higher potential income which results in higher propensity of being a credit card holder. Educational attainment could be considered a proxy of economic success. A respondent with a relatively high level of education often has a good job with a steady income to afford a credit card. This is consistent with Chien and Devaney's (2001), Choi and DeVaney's (1995) and Barker and Sckerkaya's (1992) studies where they found the education level to be positively related to credit card use and the people with more education were more likely to have favourable attitudes toward credit card use.

Income significantly affects consumers' decision on credit card use. The effect of net worth is similar to the effect of current income, which can determine a household's level of consumption (Bryant, 1990). If net worth is constrained, consumers can borrow money from credit cards to meet their needs (Kim & DeVaney, 2001). Upper-income consumers exhibit more favourable attitudes toward credit cards than lower-income consumers (Mathews and Slocum 1972, Slocum and Mathews 1970). This is because the lower income consumers may not have the ability or money to pay off the bill on credit card when it is due. Steidle (1994)

found that income was negatively related to credit card debt. This means higher income people have lower credit card debt, since higher income people can pay off their credit card debt on time, or they may not use the credit card frequently since they have enough money to spend and do not have to use credit card.

The interest rate and the payment pattern ultimately determine the credit card purchases and balances (Duca & Whitesell, 1995). Canner and Lockett (1992) found that credit card revolvers are more likely to be sensitive to the level of interest rate. This is because when credit card users cannot pay off their credit card bill before due date, they will end up paying higher interest rate to the bank. Higher interest rate also affects low income consumers' decision to use credit cards since low income implies the higher probability of failure to pay off the credit card bill on time.

For people who have higher income, interest rate on credit card is not a big issue since they can pay off the credit card bill on time and have less credit card debt (Steidle, 1994). In China, the credit card usually has a 25 days- grace period (Hexun, 2009). This means even if the consumers pay off their credit card bill after the due date but within the 25 days grace period, they do not need to pay the credit card interest.

Based on the studies of Baek and Hong (2004) and Kinsey (1981), people who are employed in unskilled jobs and those who are generally unemployed are less likely to have credit cards than employed people. People who are in professional careers are more likely than those in blue-collar jobs to have credit card. The authors find that employed people are more likely to have credit card debts than the unemployed or people who are not working. Similarly, Zhu and Meeks (1994) found people who are employed full time have larger amounts of credit card outstanding balances compared to those who were not employed.

Credit card can only be used when there are acceptance points. The credit card acceptance point refers to the merchants and other retailers where credit card payments are accepted (Wong, 2005). Worthington's (2003) study of Chinese payment card market revealed that it is impossible to get a consumer to hold or use credit card if there are not enough acceptance points. The increase in the number of merchants accepting payment by credit card would increase the consumers' usage of credit cards (Worthington, 2003; 1998). Consumers will rely more on credit cards once they see the convenience of using credit cards.

2.2 Features of credit cards

A credit card provides consumers a secure, reliable and convenient means of payment (Chakravorti, 2003). It offers consumers with unprecedented convenience as a currency transaction that is accepted worldwide. Worthington, Thompson and Stewart (2011) found that young affluent Chinese cardholders believed credit card is more convenient than paying with cash, particularly when shopping online and travelling. The use of credit card can avoid currency exchange rate risk when consumers travel overseas. In addition, credit card can be used to book hotel, airline ticket online, and so forth in advance.

Credit cards have different credit limits. Consumers can choose different credit limit card to use. For consumers who are married with large household size and higher income will probably have higher daily expenditures (Steifle, 1994; Chien & Devaney, 2001). They are more likely to request higher credit limit on their credit card, since higher credit limit will enable them to meet their high expenses.

Consumers in China have several ways to avoid annual credit card fee. For example, when the consumers use their credit card at least 3 to 6 times per year, they do not have to pay the annual credit card fee, or when they spend a certain amount on their credit card, they also do not need to pay for the annual credit card fee (Wenku, 2012). The credit cards of many banks have cooperated with retailers with the aim of promotion, for example, discount per credit card transaction. Consumers can earn credit card reward points when they use their credit card and the points can be used to exchange for gifts or be in the draw for prizes (Xici, 2012). Other advantages of credit cards include offer of free accident insurance, medical insurance, access to airport lounges, and so forth (Xici, 2012).

The credit card application process is very important. Domestic banks in China have simplified the credit card application process where consumers no longer need to provide many documents to the bank to apply for a credit card. The consumers can even apply for a credit card online. This encourages many consumers to start to apply for credit cards (Sina, 2011).

3 Research methodology and data

The logit model is applied in this study to determine the factors that affect the consumers' credit card use decision. The consumers are faced with a simple binary choice situation: have or do not have a credit card. The consumer's utility associated with having a credit card is denoted as U_{1n} , and the utility associated with not having a credit card is denoted as U_{0n} , it can be expressed as (Gao, 2011):

$$U_{in} = V_{in} + \varepsilon_{in} \quad \forall i \in J_n \text{ and } J_n = \{0, 1\} \quad (1)$$

The consumer will choose to have a credit card if $U_{1n} > U_{0n}$, the utility of each choice (V_{in}) depends on the vector of observable attributes of the choice and the vector of observable consumer characteristics. The error term (ε_{in}), which includes all unobservable variables and excludes the consumer characteristics, is assumed to be independently distributed. The choice probability of $U_{1n} > U_{0n}$ is given by (Gao, 2011):

$$P_{1n}^* = \Pr_n(U_{1n} > U_{0n}) = 1 / (1 + e^{-\mu(V_{1n} - V_{0n})}), \text{ where } \mu > 0$$

The model is estimated by the maximum likelihood method used in Stata software. The respondent's decision to have or not to have a credit card is hypothesized to be affected by the following factors and can be implicitly written under the parametric functional form:

$$Y_{in}^* = f(\text{convenience, credit limit, interest rate}(1), \text{acceptance point, annual fee}(1), \text{reward program, application process, young age, male, single, bachelor degree, middle professional, work duration, size of household, low income, } \varepsilon) \quad (2)$$

The discrete dependent variable, Y_{in}^* , is based on the question asked in the survey questionnaire: "Do you own a credit card?" The explanatory variables in equation (1) include convenience, credit limit, interest rate, acceptance point, annual fee, reward program, apply process young age, male, single, education attainment, occupation, annual household income, size of household, duration of work. This study seeks to determine which demographic characteristics have the greatest influence on the respondents' decision to have a credit card. For example, as the age increases, does the probability of the consumer to hold a credit card decrease?

In analysing the credit card users' choice of different levels of credit card limit, an ordered logit model is used, as the consumers face different levels of credit card limit in using credit cards. In an ordinal logistic regression, the event of interest is observing a particular score or in an order. For consumers who choose different credit limit level on their credit card, the model has following odds:

$$\theta_1 = \text{prob}(\text{credit limit less 1000}) / \text{prob}(\text{credit limit greater than 1000})$$

$$\theta_2 = \text{prob}(1001 \text{ to } 5000) / \text{prob}(\text{greater than } 5000)$$

$$\theta_3 = \text{prob}(5001 \text{ to } 10000) / \text{prob}(\text{greater than } 10000)$$

$$\theta_4 = \text{prob}(10001 \text{ to } 20000) / \text{prob}(\text{greater than } 20000)$$

$$\theta_5 = \text{prob}(20001 \text{ to } 50000) / \text{prob}(\text{greater than } 50000)$$

$$\theta_6 = \text{prob}(50001 \text{ to } 100000) / \text{prob}(\text{greater than } 100000)$$

The last category does not have an odd associated with it since the probability of the last level is 1 including the last odds (Norusis, 2011).

All of the odds are of the following form:

$$\theta_j = \text{prob}(\text{score} \leq j) / \text{prob}(\text{score} > j) \quad (3)$$

Equation (3) also can be written as:

$$\theta_j = \text{prob}(\text{score} \leq j) / (1 - \text{prob}(\text{score} \leq j)) \quad (4)$$

The probability of a score greater than j is 1-probability of a level less than or equal to j (Norusis, 2011). The parametric functional form of the ordered logit model can be written as follows:

$$\ln(\text{prob}(\text{credit limit}) / (1 - \text{prob}(\text{credit limit}))) = f(\text{number of credit card own, length of credit card own, monthly spending, annual fee(2), interest rate(2), young age, male, single, bachelor degree, middle professional, work duration, size of household, low income, } \epsilon) \quad (5)$$

The discrete dependent variable, credit limit is based on the question asked in the survey questionnaire: "What is the current credit line (limit) on your primary card?" The dependent variable has 7 ordinal levels.

Previous researches showed that monthly spending and the number of credit cards owned are positively related to the credit limit. Abdul-Muhmin and Umar (2007) and Baek and Hong (2004) found consumers who have more than one credit cards tend to have higher debt, where higher debt reflects they have higher credit limit on their credit cards. Further, according to the finding reported by Bertaout and Haliassos (2001), Chien & Devaney (2001) and Kinsey (1981), households who have higher spending are more likely to have a higher credit limit on their credit card. Consumers with higher education level will have higher credit limit on their credit card, since higher education level means higher income in the future, and higher income is likely to increase the demand for consumption and borrowing in the present (Kim & DeVaney, 2001). Higher credit card limit will meet their increasing demand for consumption and borrowings. Definition of variables for the logit and ordered logit models are described in Table 1.

Table 1: Model variable definitions

Variable Name	Description
Y_{in}^*	Dummy variable equal to 1 if consumers have a credit card; 0 otherwise
Convenience	Continuous variable, use rating scale of 1 to 8 from 1 (least important) to 8 (most important)
Credit limit	Continuous variable, use rating scale of 1 to 8 from 1 (least important) to 8 (most important)
Interest rate (1) ¹	Continuous variable, use rating scale of 1 to 8 from 1 (least important) to 8 (most important)
Acceptance point	Continuous variable, use rating scale of 1 to 8 from 1 (least important) to 8 (most important)
Annual fee (1) ¹	Continuous variable, use rating scale of 1 to 8 from 1 (least important) to 8 (most important)
Reward program	Continuous variable, use rating scale of 1 to 8 from 1 (least important) to 8 (most important)
Application process	Continuous variable, from 1 (very easy) to 4 (not easy at all)
Number of credit card own	Number of credit card the respondent owns
Length of credit card own	Discrete variable, use 1 to 4 represents different range of time.
Monthly spending	Continuous variable, use 1 to 5 represents different range of spending.
Annual fee (2) ²	Continuous variable, use 1 to 4 represents different range of annual fee.
Interest rate (2) ²	Continuous variable, use 1 to 4 represents different range of interest rate.
Young age	Dummy variable equal to 1 if the respondent's age is older than 18 and younger than 35 years old; 0 otherwise
Male	Dummy variable equal to 1 if the respondent is male; 0 otherwise
Single	Dummy variable equal to 1 if the respondent is single; 0 otherwise
Bachelor degree	Dummy variable equal to 1 if the respondent's education level is bachelor; 0 otherwise
Middle professional	Dummy variable equal to 1 if the respondent is employed in a middle professional job; 0 otherwise
Work duration	Dummy variable equal to 1 if the respondent's duration of employment is 1 to 5 years; 0 otherwise
Size of household 3 and above	Dummy variable equal to 1 if number of family members in the household is 3 and above; 0 otherwise
Low Income	Dummy variable equal to 1 if monthly income is less than 4000RMB; 0 otherwise
ϵ	Error term

Notes:

1. Equation (2) focuses on both credit card users and non-credit card users. The interest rate and annual fee are used to assess their impact on consumers' credit card decision.
2. Equation (5) focuses on the credit card users only. The interest rate and annual fee are discrete variables are used to assess consumers' decision on choosing different level of credit limit.

A structured questionnaire was used to collect relevant data from household residents (both credit card and non-credit card users) in Shijiazhuang, the capital city of Hebei Province. The questionnaire obtained information on general credit card usage, factors influencing the decision to have a credit card, credit limit and standard demographic characteristics. The questionnaire was pilot tested on a sample of 30 Shijiazhuang residents. The respondents were encouraged to comment on any questions or statements that they thought were ambiguous or unclear. Some minor wording modifications to the questionnaire were made as a result of this process. Convenience sampling was used due to the practical difficulties in obtaining a comprehensive listing of and information about our target population.

During the months of September 2013 to October 2013, 500 households in Shijiazhuang City were approached and asked to complete the questionnaire. The survey questionnaires were distributed in front of four randomly selected residential areas and shopping malls in Shijiazhuang.

A total of 409 respondents completed the questionnaire, giving an overall response rate of 82 percent. The non-respondents comprised of all refusals, unusable and incomplete survey. The survey results show 65% of (267) of the respondents were credit card users while 35% (142) were non-credit card users. The socio-economic characteristics of the respondents shown in Table 2 was established as follows. The sample of respondents comprised of approximately 44.5% (182) males and 55.5% (227) females. The majority of the respondents were in the age group of 26-35 years old (34.5%) and 36-45 years old (24.2%) and most were from the group of working adults in the early years of establishing their careers and possibly married life.

Table 2 shows 70.7% of the respondents was married and 27.9% were single or never married at the time of the survey. The majority of the respondents have either a bachelor degree (36.4%) or a two-year college degree (42.5%). In term of occupation, 42.8% of the respondents worked as normal company staff, 14.7% engaged in professional jobs and 12.5% of the respondents worked as a company manager. The dominant level of monthly household income was between 5001 – 7000RMB (21.8%) and 4001- 5000RMB (16.4%). From the surveyed respondents, 40.1% of the respondents worked more than 10 years, 25.9% worked between 1 to 5 years and 24.4% worked between 5 to 10 years. The sample statistics also reported that 55.3% of the households comprised of a couple with children, the proportion of adult living alone and immediate and extended family members were 20.0% and 15.6%, respectively. Three people living in the household (including the respondent) with no dependents were considered as the most common current family composition in China.

Table 2 also shows the sample's socio-economic characteristics, separated into credit card users and non-credit card users. Majority of the credit card users were female (54.3%) and married (76.8%) at the time of the survey. Similarly, majority of the non-credit card users were also female (57.7%) and married (59.2%) at the time of the survey. In the age category, 40.1% of the credit card users were from the age group of 26-35 years old, 27.3% in the 36-45 years group and 15.4% between 46-55 years old. For the non-credit card users, 28.9% were from the age group of 18-25 years old, 23.9% in 26-35 years old group and 18.3% between 36-45 years old. In terms of education attainment, 33.7% of the credit card users hold a bachelor degree and 8.6% holds a post graduate, master or PhD degrees. With regards to non-credit card users, 3.5% had post graduate, master or PhD degrees, and 41.5% had a bachelor degree. The result shows 24.7% of the credit card users' income was between 5001-7000 RMB, followed by 16.5% with income more than 10,000 RMB, while 17.6% of non-credit card users had a monthly household income ranged between 4001-5000 RMB. With regards to the duration of employment, 41.6% of the credit card users have worked more than 10 years, compared to non-credit card users (37.3%). In terms of household size, most of the credit card users have a three members living in their families, compared to the non-credit card users whose household size are greater than three members.

Table 2: Descriptive statistics (credit card user vs non-credit card user)

Variables		Total number of respondents	(%)	Credit card users (no. of respondents)	(%)	Non-credit card users (no. of respondents)	(%)
Gender	Male	182	44.5	122	45.7	60	42.3
	Female	227	55.5	145	54.3	82	57.7
	Total	409	100.0	267	100.0	142	100.0
Age	18-25	78	19.1	37	13.9	41	28.9
	26-35	141	34.5	107	40.1	34	23.9
	36-45	99	24.2	73	27.3	26	18.3
	46-55	60	14.7	41	39.2	19	13.4
	56-65	24	5.9	9	3.4	15	10.6
	≥ 66	7	1.7	0	0.0	7	4.9
	Total	409	100.0	267	100.0	142	100.0
Marital status	Single/Never married	114	27.9	59	22.1	55	38.7
	Married	289	70.7	205	76.8	84	59.2
	De facto relation	4	1.0	2	0.7	2	1.4
	Divorced/Separated	2	0.5	1	0.4	1	0.7
	Total	409	100.0	267	100.0	142	100.0
Education level	No education	2	0.5	1	1.3	1	0.7
	Primary school	1	0.2	0	0.0	1	0.7
	Middle school	7	1.7	5	1.9	2	1.4
	High school	48	11.7	30	11.2	18	12.7
	Two-years college	174	42.5	118	44.2	56	39.4
	Bachelor degree	149	36.4	90	33.7	59	41.5
	Higher degree	28	6.8	23	8.6	5	3.5
	Others	0	0	0	0.0	0	0.0
Total	409	100.0	267	100.0	142	100.0	
Occupation	Professional	60	14.7	39	14.6	21	14.8
	Self-employer	19	4.6	12	4.5	7	4.9
	Civil Servant	39	9.5	29	10.9	10	7.0
	Company managerial staff	51	12.5	41	15.4	10	7.0
	Own private enterprise	27	6.6	20	7.5	7	4.9
	Normal company staff	175	42.8	116	43.4	59	41.5
	Unemployed	11	2.7	4	1.5	7	4.9
	Retired	21	5.1	3	1.1	18	12.7
	Others	6	1.5	3	1.1	3	2.1
Total	409	100.0	267	100.0	142	100.0	
Duration of employment	< 1 year	39	9.5	12	4.5	27	19.0
	1 to 5 years	106	25.9	66	24.7	40	28.2
	5 to 10 years	100	24.4	78	29.2	22	15.5
	> 10 years	164	40.1	111	41.6	53	37.3
	Total	409	100.0	267	100.0	142	100.0
Composition of household	Adult living alone	82	20.0	47	17.6	35	24.6
	Couple, with child(ren)	226	55.3	166	62.2	60	42.3
	Couple, with no child(ren)	28	6.8	16	6.0	12	8.5
	Single with child(ren)	5	1.2	3	1.1	2	1.4
	Own and extended family	64	15.6	34	12.7	30	21.1
	Others	4	1.0	1	0.4	3	2.1
	Total	409	100.0	267	100.0	142	100.0

Variables		Total number of respondents	(%)	Credit card users (no. of respondents)	(%)	Non-credit card users (no. of respondents)	(%)
Size of household	One person	30	7.3	22	8.2	8	5.6
	Two persons	26	6.4	14	5.2	12	9.0
	Three persons	208	50.9	157	58.8	51	35.9
	Four persons	79	19.3	42	15.7	37	26.1
	Five persons	50	12.2	24	9.0	26	18.3
	≥ Six persons	16	3.9	8	3.0	8	5.6
	Total	409	100.0	267	100.0	142	100.0
Household monthly income	≤1000 RMB	6	1.5	5	1.9	1	2.1
	1001-2000 RMB	38	9.3	17	6.4	21	14.8
	2001-3000 RMB	47	11.5	24	9.0	23	16.2
	3001-4000 RMB	41	10.0	28	10.5	13	9.2
	4001-5000 RMB	67	16.4	42	15.7	25	17.6
	5001-7000 RMB	89	21.8	66	24.7	23	16.2
	7001-10,000 RMB	59	14.4	41	15.4	18	12.7
	≥10,001 RMB	62	15.2	44	16.5	18	12.7
Total	409	100.0	267	100.0	142	100.0	

4 Discussion of results

Empirical estimates of the logit model via maximum likelihood assure large sample properties of consistency, efficiency, normality of the parameter estimates and validity of the t-tests of significance. The results in Table 3 shows the models fit the data quite well. The chi-square test strongly rejected the hypothesis of no explanatory power for both equations.

Table 3 shows the significant effect of convenience, interest rate, application process, size of household, reward program, marital status, credit limit and age on the respondent's likelihood of owning a credit card. These results support the findings of Worthington, Thompson and Stewart (2011), Canner and Lockett (1992), Xici (2012), Eunyoung Beak and Gong-Soog (2004). For example, convenience is statistically significant at 1% level in influencing the consumers' decision to use credit card or not to use credit card. Worthington, Thompson and Stewart (2011) found young affluent Chinese cardholders believed using a credit card is more convenient than paying with cash. The young affluent Chinese cardholders strongly agreed that credit cards are more useful when travelling and shopping, and it is much easier than paying by cash.

Reward program is positive and statistically significant at the 5% level. Consumers can use the credit card points they earned when using credit card to make payment or to exchange for some household goods without spending extra money. Reward program is an important reason that people use credit card. The results show that people who are attracted by the reward program are more likely to use credit card while others do not use credit card because they are not interested in these programs. In addition, most respondents strongly agreed that they can get some extra rewards by using credit card, such as discount on purchase and gasoline reward. There are many other rewards, such as free accident insurance, medical insurance, trailer and car wash, bank or airport VIP lounge service. Eunyoung Beak and Gong-Soog's (2004) and Xici's (2012) studies showed that a good reward program attract more consumers to apply for credit cards.

Table 3: Logit model 1 (credit card users versus non-credit card users)

Number of observation= 409
 Log likelihood= -197.07672
 Wald chi2 (15)= 105.55
 Prob > chi2= 0.0000
 Percentage of Right prediction= 76.5%

Variables	Coefficient	Standard error	T-statistics	P-value	Marginal effects	Ranking
Convenience	0.30927*	0.07071	4.37	0.000	0.06671	4
Interest rate	-0.30077*	0.06994	-4.30	0.000	-0.06488	5
Reward Program	0.12775**	0.06362	2.01	0.045	0.02756	7
Technology (accept point)	0.07283	0.06174	1.18	0.238	0.01571	
Credit limit	0.10981***	0.64915	1.69	0.091	0.02369	8
Annual fee	-0.0275922	0.06157	-0.45	0.654	-0.00595	
Application process	-0.7193091*	0.10331	-6.96	0.000	-0.15517	2
Male	-0.10557	0.25583	-0.41	0.680	-0.02282	
Young age	0.56339***	0.33903	1.66	0.097	0.12194	3
Single	-0.81130**	0.38674	-2.10	0.036	-0.18384	1
Education level: Bachelor	-0.34812	0.08681	-1.34	0.181	-0.07626	
Occupation: middle professional	0.40042	0.14393	1.39	0.164	-0.04319	
Working duration: 1 to 5 years	0.44119	0.16578	1.33	0.183	0.08403	
Size of household: Three	0.24722*	0.08929	2.77	0.006	0.05333	6
Annual household income: Low income	-0.24460	0.29699	-0.82	0.410	-0.05355	

Notes:

*statistically significant at the 0.01 level of significance.

**statistically significant at the 0.05 level of significance.

***statistically significant at the 0.1 level of significance.

Respondents who consider credit limit is important more likely to use credit card. Eunyong Beak and Gong-Soog (2004) showed that the credit limit reflects the ability to borrow, consumers who have higher ability to borrow may prefer a higher credit limit card, as the higher credit limit allows them overdraft more money from the credit card.

People find interest rate unimportant to their decision to use credit card are more likely to use credit card. In other words, the more people are concerned about interest rate, the less likely they use credit card. Therefore interest rate is of a main obstacle to use credit card. The higher the interest rate, the less likely that the consumers will use credit cards. Canner and Luckett (1992) found that the credit card revolvers are more likely to be sensitive to the level of interest rate. This is because when credit card users cannot pay off their credit card bill before due day, they will end up paying higher interest rate to the bank. Further, less people will apply for a credit card if the application process is difficult. The easier the application process the more consumers will apply for the credit card. This is supported Sine's (2006) finding where consumers only need to fill up a form in the bank and almost all consumers can get a credit card with different levels of credit limit, and this has attracted many customers to apply for a credit card.

The effect of age of household head and household with three members were found to be positive and significant, where younger householders are more likely to use credit card than older householders. This is consistent with Awh and Waters's (1974) finding that older age

reduces the likelihood of an individual being an active credit cardholder. Further, Kim & DeVaney (2001) reported that people who are under 37 years old have the highest likelihood of having a revolving credit card. In China, most families have three members in the household, two parents with a child. A household with three members implies the daily spending will be higher than a married couple without children or a single adult living alone. The result is consistent with Chien & Devaney's (2001) study where a large household size is more likely to have specific attitudes toward using credit card and having higher outstanding credit card balances. Bertaout and Haliassos (2001) also found, among the households that have a credit card, the households with more children are more likely to revolve credit card debts because more children result in higher expenditure in their daily life.

The negative effect of marital status suggests that single respondents are less likely to have a credit card. Kinsey (1981) and Steifle (1994) found that consumers who are married have higher expenditures, are likely to spend more in their daily life or even borrowing money, and the credit card is one of the easiest ways to borrow to purchase goods.

Additional information can be obtained through an analysis of the marginal effects calculated as the partial derivatives of the non-linear probability function, evaluated at each variable's sample mean (Greene, 2000). The marginal effects uncover that among factors affecting the respondents' credit card ownership, single has the strongest marginal effect on the probability of credit card ownership followed by application process, young age, convenience, interest rate, size of household, reward program and credit limit. For example, a respondent who is single will result in an 18% decrease in the probability that he or she will use credit card. The difficult process of applying for a credit card will result in a 16% decrease in the probability of consumers to use credit card.

Table 4 shows the significant effect of the number of credit cards, credit card duration and monthly, bachelor, interest rate, and normal staff on the respondent's credit card limit.

Table 4: Ordered logit model (model of credit card users)

Credit limit	Coefficient	Standard error	T-statistics	P-value
Number of credit cards	0.491744*	0.1404191	3.50	0.000
Credit card use duration	0.4053372*	0.1320661	3.07	0.002
Monthly spending	0.7872934*	0.1423028	5.53	0.000
Annual fee	0.0751981	0.063485	1.08	0.236
Interest rate	-0.4432509*	0.142405	-3.11	0.002
Female	0.2531265	0.2310961	1.10	0.273
Young	0.3450977	0.2710085	1.27	0.203
Single	-0.2521366	0.3650115	-0.69	0.490
Bachelor	0.465596***	0.24168	1.93	0.054
Normal staff	-0.473073***	0.251116	-1.88	0.060
One to five working duration	-0.515839	0.31868	-1.62	0.106
Three people household size	-0.0162363	0.0836358	-0.19	0.846
Low income	-0.1721339	0.2870242	-0.60	0.549

Notes:

*statistical significant at the 0.01 level of significance.

**statistically significant at the 0.05 level of significance.

***statistically significant at the 0.1 level of significance.

A unit increase in the number of credit cards, credit card use duration and monthly spending will increase the probability that the respondents will have a higher credit limit card. This means with more credit cards in hands or higher monthly spending and longer credit card use duration, the respondents with higher expenditures can be met by higher credit limits. Abdul-Muhmin and Umar (2007) and Baek and Hong (2004) found consumers who own more than one credit cards tend to have higher debt, where higher debt reflect they have higher credit limit on their credit cards particularly on their primary credit card. Further Bertaout and Haliassos (2001), Chien & Devaney (2001) and Kinsey (1981) reported that households who have higher spending are more likely to have a credit card with higher credit limit to meet their higher spending.

Similarly, a unit increase in the interest rate will result in an increase in the probability that the respondents will hold a lower credit limit card. This is because a higher interest rate implies the credit card user will need to pay more if they cannot pay the credit card bill on time. Further, higher credit limit means consumers can overdraft more money from their credit cards, but will need more money to pay off when the credit card bill is overdue. This is consistent with Canner and Lueckert's (1992) study where credit card revolvers are more likely to be sensitive to the level of interest rate when the credit card users cannot pay off their credit card bills before due day. They end up paying higher interest rate to the bank.

The bachelor coefficient is positive and statistically significant at 10% level. Consumers with higher education imply that they have a good job and higher income in the future, which will likely increase their expenditure. Thus, a higher credit card limit will be needed to meet their increased expenditure and they are more creditworthy, then banks are more likely to accept their credit limit request. This is similar to Delener and Katzenstein's (1994) result, where they found respondents with a high school degree are more likely to hold a higher credit limit card. Since higher education level means higher income in the future, and the higher income is likely to increase expenditure and borrowing in the present (Kim & DeVaney, 2001). In contrast, the normal staff is more likely to hold a lower credit limit card. This is because a normal staff in China does not command high income, which will reduce their ability to qualify for a higher credit limit card.

Table 5 shows the marginal effect variables in the seven outcomes of the credit limit level, from the credit limit with less than 1,000 RMB to above 100,000 RMB. The first three outcomes (where the credit limit is from less than 1,000 RMB to 10,000 RMB) represent lower credit limit level. This implies a unit increase in interest rate increase the probability of choosing low credit limit and reduce the probability of choosing high credit limit.

For outcomes 4 to 7, where the credit limits are from 10,001 RMB to 100,000 RMB and above, monthly spending has the maximum impact on the consumers' decisions in choosing a higher level of credit limit card. Thus our results show that "monthly spending" is most important for both high and low credit limits. However, the impact was different. It reduces the probability of having a credit card in the "low credit limits" group, but increases the probability of having a credit card in the "high credit limits" group.

Table 5: Marginal effects of ordered logit model (credit card limit)

Variables	Marginal effects						
	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5	Outcome6	Outcome7
Number of credit card*	-0.01902	-0.05596	-0.04582	0.04475	0.05209	0.01957	0.00439
Credit card use duration*	-0.01567	-0.04613	-0.03777	0.03688	0.04293	0.01613	0.00361
Monthly spending*	-0.03044	-0.08961	-0.07335	0.07164	0.08339	0.03133	0.00702
Annual fee	-0.00291	-0.00856	-0.00701	0.00684	0.00796	0.00299	0.00067
Interest rate*	0.01714	0.05045	0.04129	-0.04033	-0.04695	-0.01764	-0.00396
Female	-0.00991	-0.02896	-0.02332	0.02329	0.02665	0.00999	0.00224
Young	-0.01356	-0.03953	-0.03163	0.03178	0.03627	0.01361	0.00305
Single	0.01042	0.02973	0.02221	-0.02504	-0.02576	-0.00945	-0.00211
Bachelor degree*	-0.016906	-0.05082	-0.04488	0.03721	0.05098	0.01991	0.00451
Normal staff*	0.01895	0.05462	0.04256	-0.04432	-0.04926	-0.01843	-0.00413
One to five working duration	0.02265	0.06245	0.04257	-0.05414	-0.05101	-0.01843	-0.00409
Three person household	0.00063	0.00185	0.00151	-0.00148	-0.00172	-0.00065	-0.00014
Low income	0.00690	0.01998	0.01558	-0.0165	-0.01789	-0.00663	-0.00148

Table 5 shows for outcomes 1, 2 and 3 representing the credit limit level from less than 1,000RMB to 10,000RMB, number of credit cards, credit card use duration, monthly spending and bachelor degree exhibit negative signs, while interest rate and normal staff coefficients exhibit positive signs. For example in outcome 3, the credit limit is from the 5,001 to 10,000 RMB, a unit increase in the number of credit card, credit use duration, monthly spending and if the respondent holds a bachelor degree will result in a 4.6%, 3.8%, 7.3% and 4.5% decrease in the marginal probability that the credit card users' credit limit will be in the range of 5,000 to 10,000RMB, respectively. In contrast, if the interest rate increase and if the respondent is a normal staff will result in a 4.1% and 4.3% increase in the marginal probability of the credit card user's credit limit will be in the similar credit limit range, respectively.

In outcomes 4 to 7, the credit limit level ranges from 10,001RMB to above 100,000RMB. The number of credit card, credit card use duration, monthly spending, bachelor degree, interest rate and normal staff exhibit the same signs in both Table 3 and 4. For example in outcome 4, the credit limit is from 10,001 to 20,000 RMB, a unit increase in the number of credit card, credit use duration and monthly spending will result in a 4.4%, 3.7%, 7.2% increase in the probability that the credit card users choose the credit limit in the range of 10,001 to 20,000RMB, respectively. The probability that individuals with bachelor degree choose the credit limit between 10,001 to 20,000RMB is 3.7% higher than the individuals without bachelor degree. In contrast, a unit increase in interest rate will result in a 4.0% decrease in the marginal probability of the credit card users request the credit limit in the similar range. The probability that normal staffs choose the credit limit within this range is 4.4% lower.

5 Conclusions and implications

Our research findings show that consumers are concerned about convenience, interest rate, reward program, credit limit and the level of difficulty in applying for credit card in their decision to use credit card. The result supports the findings of Worthington, Thompson and Stewart (2011), where they found young affluent Chinese cardholders believed that credit

card is more convenient and easier than paying with cash, particularly when shopping online and traveling overseas. In addition the young affluent Chinese strongly agree that there are more advantages to pay by credit card than cash, and they can accumulate credit card points to redeem gifts in the future.

In terms of demographic characteristic, the results show there is a negative relationship between the respondents' decisions to use credit card and the single marital status. The results are similar to the findings of Kinsey (1981) and Steifle (1994) who reported that married people are likely to have higher expenditures than non-married people. Thus, there is a higher probability that married people have credit cards to finance their large living expenses.

There is a significant positive relationship between the respondents' decision in using credit card and the demographic factors such as young age and three people household size. The results are similar to the findings of Awh and Waters (1974), White (1975), Choi & DeVaney(1995), Steidle (1994) and Wasberg, Hira & Fanslow(1992), Bei (1993), Canner & Cynak (1985), Kim & DeVaney (2001), Bertaout and Haliassos (2001). For example, Awh and Waters (1974) found that older individuals are less likely to be an active credit cardholder. In China, most families have three members in the household that exhibit have higher expenditures than families with less than three people. This is similar to Bertaout and Haliassos's (2001) finding, where they found that consumers with a larger household size increase their likelihood in using credit card than the consumer living in a smaller household size.

The result also shows that the number of credit card, credit card use duration, monthly spending, and bachelor degree are statistically significant and positively related to different levels of credit limit. Interest rate and normal staff are statistically significant and negatively related to different levels of credit limit. A unit increase in the number of credit card, credit card use duration and monthly spending will increase the probability that the credit card user will hold a higher credit limit card. In contrast, a unit increase in the interest rate will result in a decrease in the probability that the credit card users will hold a higher credit limit card.

In terms of demographic factors, customers with a bachelor degree are more likely to hold a higher credit limit card. In contrast, normal staff are more likely to hold lower credit limit.

The research findings provide banks with a better understanding of the factors that influence a consumer's decision to use credit card. A major factor that impacts consumers' consideration of using credit cards is affordability and thus banks should reconcile affordability to borrowers, especially the young and low income borrowers. The results shows that young consumers are more likely to use credit cards, but they may have shorter working duration and low income and savings. This implies the young consumers have less ability to repay the credit card bill. For this reason, banks should reconsider the repayment grace-period and make the credit card payoff more affordable to the young consumers in order to increase their credit card usage. In addition, Chinese consumers should be encouraged to save since savings serve as a step in building their credit worthiness, where they can easily apply for the credit card.

The research also provides banks with a better understanding of credit card users' characteristics that influence their choice of different level of credit limit, since the credit limit is a significant factor in influencing the consumers' decision to hold a credit card. Banks can

use the background information that consumers provide when applying the credit card to determine the level of credit limit the consumers qualify. For example, a consumer with higher education and higher job level, higher monthly spending and holding more than one credit card is likely to a higher level of credit limit.

Convenience and reward program were found to be significant factors influencing consumers' decision on credit card use. In order to attract more consumers to use credit card, the credit card market and banks should make it easier and more convenient for the consumers to use their credit cards. Therefore, banks should cooperate with more merchants and retailers to increase the acceptance of credit card payment, including in supermarket and vegetable markets where consumers visit frequently. The banks should also improve the credit card reward program system, to make it more rewarding and efficient. This will increase the consumers' likelihood in using credit card.

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