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การวิจัยความเสี่ยงในการผิดนัดชำระหนี้บัตรเครดิตในประเทศไทย

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บทคัดย่อ

ความสัมพันธ์ทางเครดิตเป็นหนึ่งในงานวิจัยที่สำคัญที่สุดในอุตสาหกรรมการเงิน ในหลายปีที่ผ่านมา ความเสี่ยงในการผิดนัดชำระหนี้บัตรเครดิตในประเทศไทยได้เพิ่มมากขึ้นเรื่อย ๆ ความเสียหายในการผิดชำระหนี้เป็นสาเหตุให้เกิดการสูญเสียทรัพยากรทางสังคมและยังเป็นภัยคุกคามต่อความมั่นคงของระบบการเงินบทความนี้จะยึดหลักทฤษฎีสัญญา แม้ว่าการวิเคราะห์ถดถอยพหุคูณโลจิสติกเกี่ยวกับปรากฏการณ์การผิดนัดชำระบัตรเครดิต ผู้เขียนได้ข้อสรุปโดยวิธีการของการวิจัยเชิงประจักษ์ ความสัมพันธ์เครดิตส่วนบุคคลเป็นรูปแบบที่เป็นรูปธรรมที่สำคัญของความสัมพันธ์ตามสัญญาทางสังคมในด้านการเงิน บทความนี้พยายามทำความเข้าใจเกี่ยวกับความสัมพันธ์เครดิตส่วนบุคคลระหว่างลูกหนี้กับเจ้าหนี้จากมุมมองของทฤษฎีสัญญาที่ไม่สมบูรณ์ สร้างจากแบบจำลองความเสี่ยงการผิดนัดชำระบัตรเครดิต จากการวิเคราะห์รูปแบบการผิดนัดชำระหนี้ ผู้เขียนพบว่าการผิดนัดชำระบัตรเครดิตไม่ได้ขึ้นอยู่กับประวัติข้อมูลเครดิตทางสังคม แต่สังคมควรจะสร้างกฎระเบียบแบบไดนามิกและกลไกจูงใจในด้านระบบกฎหมาย วิวัฒนาการของความสัมพันธ์ของสัญญาสินเชื่อและกลไกการโอนข้อมูลเครดิต

นอกจากนี้ผลการวิจัยยังพบว่าความแตกต่างระหว่างเพศมีผลกระทบต่อการผิดนัดชำระ ซึ่งแสดงให้เห็นถึงการดำรงอยู่ของความสมเหตุสมผลแบบมีขอบเขตในพฤติกรรมทางเครดิตจากมุมมองของเพศ และยังยืนยันได้ว่าความถูกต้องของสมมติฐานความสมเหตุสมผลแบบมีขอบเขต อยู่ในทฤษฎีสัญญาที่ไม่สมบูรณ์ ซึ่งเป็นกรณีที่สมจริงสำหรับการวิจัยทฤษฎีสัญญาไม่สมบูรณ์

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A Research on The Default Risk of Credit Card Clients in THAILAND

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Abstract

Credit relationship is one of the most important research objects in the financial industry. In recent years, the default risk of credit card in Thailand is gradually higher, the loss has caused the waste of social resources, and also threatened the security of the financial system. This paper is based on contract theory, though logistic multiple regression analysis on credit card default phenomenon, author gets conclusion by the method of empirical research, the personal credit relationship is essentially a concrete form of social contractual relationship in the financial field. This paper attempts to re-understand the personal credit relationship between debtor and creditor from the perspective of incomplete contract theory, builds a credit card default risk identification model. Based on analysis of Default Risk Identification Model, author finds It is unreliable to rely solely on social credit records, the

society should establish a dynamic regulation and incentive mechanism in the aspects of legal system, the evolution of credit contract relationship and credit information transmission mechanism.

In addition, the research also found that gender differences have an impact on default, this proves the existence of bounded rationality in credit behavior from a gender perspective, this also verifies the validity of the bounded rational hypothesis in the incomplete contract theory, which provides a realistic case for the research of incomplete contract theory.

Introduction

From 1997 to 2016, within only 20 years' time, the world has already gone through two major global economic crises. The idea to boost national economy by enhancing the public consumption is generally valued by the research field of stimulating economic growth. Personal credit, among other measures, is widely used to satisfy the public advance consumption demands. Personal credit products, with the merits of high returns, small single loans, independent debtors and low credit crisis infection, are also seen as the blue ocean of credit business by banks and other financial institutions. At the same time, the social credit system has been gradually completed, which has set strict entrance requirements in regulating policies for financial institutions and applicants. These all provide favorable conditions for the development of the personal credit business.

However, in recent years, the world has seen an accelerating growth of the personal credit default rate, which has drawn the vigilance of regulatory authorities in different countries. Same situation happens in Thailand, the credit card non-performing rate of entire banking industry continued to increase from 2013 and reached 5.1% in the third quarter of 2016, caused BOT to pay close attention and convened CEOs from all credit card issuing banks, required strict control of credit card NPL. Not only that, BOT has revised the regulations, for new low-income applicants, the possible credit limit is lower than before.

How to control the credit risk at a reasonable level while rationally releasing and satisfying personal credit demands? Besides the major risk of "trading objects losing fulfilling capability", there is an increasing amount of adverse selection and moral hazard among other personal credit default risks. What are the links and neglected factors behind these phenomena? This series of questions poses challenges to the personal credit business' development.

Literature Review

The Oxford Dictionary, the Cambridge Dictionary and the Webster's Dictionary have in their definitions describe the characteristic of credit cards as the credit-based and delayed reimbursement. Master Card sees the application of a credit card as the application of a loan. From the above listed definitions, regardless of their differences, all these definitions have described that the credit card has the unsecured nature of personal credit products. The application and issue of a credit card is the process of completing a personal credit contract. Contract Theory offers prominent theoretical guidance on understanding the default occurrence in credit card contracts.

Contract is generally believed to be produced with the development of human society. Its researches have experienced three phases of development, the classical theory of contract, the new classical theory of contract, and the modern theory of contract. The classical theory of contract is originated in ancient Greek and its major features are: contract is the result of independent choices from

self-conscious trading objects; contract is individual, not consecutive; contract is immediate. Entering the 1870s, Francis Ysidro Edgeworth put forward the idea of contract uncertainty. Kenneth Arrow and Gerard Debreu, based on the general equilibrium theory adapted by John Richard Hicks and Paul A.Samuelson, further developed the   general equilibrium theory by researching the information asymmetry and incompleteness. These have formed the core of the new classical theory of contract.

The modern theory of contract, based on the conditions presumed by the complete contract concept, analyzes the differences between the concept and the real situations, leading to important breakthroughs in economics. The key of modern theory of contract is, first, bounded rationality and then the existence of transaction costs.

Since the 1980s, experts applied the research results of human behaviors in cognitive psychology to analyze the investors' trading in the stock market and got many valuable fruits leading to the systematic research of the behavioral finance. Except the studies based on statistics in the stock investment sector, scholars also start to apply the behavioral finance in studying the default in consumer financial activities. For example, Ping Xinqiao (2009) believes that the moral hazard model is more in accordance with the default facts of the consumer credit market and is better in explaining default behaviors.Huang Chunchun (2014), taking the perspective of the behavioral finance, analyzes the causes behind the increasing rate of credit default in China and finds that the bounded rational behaviors of cardholders in their judgement and decision making is the root cause of the ascending default rate. Chen Tingqiang, He Jianmin (2014) studies the impact and contagious effect of the debtors' default intensity and the loss given default to banks from three aspects: the psychology and behaviors of default risk holders, the network of default risk holders and market regulators behaviors.

In terms of researches on clients using credit cards for consumption, cardholders' income, age and education background are regarded as important influencing factors. Similar conclusions have been made on studies of the influence of income on credit cards' application, holding and debts, that is, income has positive effects on credit cards' application, holding and usage and is negative to credit cards' debts and default. For instance, Crook (1992), Chi Guotai (2006), Huanghui (2010), Fang Kuangnan (2010) all believe that income is the key factor in affecting clients' using credit cards; Median (1994) indicates that low-income cardholders are more prone to consumption impulse; Steidle (1994) suggests a negative correlation between income and credit card debts; Ricky (1997), Jiang Minghua (2003) and Li Yongqiang (2008) hold a positive correlation between income and the credit usage; the above results are all supported by many researches from scholars such as Han Dechang (2007), Ge Jun (2010), Fang Kuangnan (2014), etc..

There are many experts studying from the perspective of age, among which researches of Canner and Cyrnak (1985), Choi and DeVaney (1995), Min an Kim (2003), Andrew (2011), He Changzheng (2014), Shen Hongbo (2013), Fang Kuangnan (2014) all show that young people, compared with older people, have higher inclination and frequency in using credit cards. They would like to or in reality hold credit debts and have overdraft behaviors. These researches all reflect an obvious life cycle characteristic of credit card holders. But, some scholars had results that are different from the conclusion stated above as a whole or in details, for example, Hunag Hui (2010) finds that there is no notable influence of age on the credit card usage; Ge Jun (2010) reaches a result that there is a lower risk of default for the age group 26-35 than other age groups, which is on the contrary to the research conclusion that the group under age 35 has higher default risks from Fang Kuangnan (2014).

There are different results in the study of education background. Chi Guotai (2006) and Han Dechang (2007) find that there is no significant effect of education background on the usage and default rate of

credit card; however studies from Carrow (1999), Chen (2009) and Fang Kuangnan (2010) show that education background has notable impact on the usage and default rate of credit card, and Fang Kuangnan also suggests that "cardholders with a junior college degree have higher default risks".

In terms of gender researches, Xiao Manjun, Ou Yuanyuan, Li Ying (2105) in a research on influencing factors of credit default risks in Chinese P2P internet borrowings (which belongs to QREE as credit cards), find a significant influence of gender on the credit risk of internet borrowings,which means the male debtors are fairly higher in credit risks than their female counterparts and they also find that young debtors are higher in risks than the older ones. Researches from Adrian, furnham (1984), Schreiner (2004), Han Dechang (2007), Ge Jun (2010), Pulina (2011), He Changzheng (2014), Shen Hongbo (2013) suggest that gender has a notable impact on the application, usage, holding, revolving credit, default and default risks. But some experts, such as Jiang Minghua (2004) and Fang Kuangnan(2010) believe that there is no obvious influence of gender on the credit card usage.

There are another 15 research branches, such as, ethnic customs, religion, account opening time, card holding time, credit card quota, majors in campus, the nature of business, swipe amount, withdrawing, personal insurance holding records, the number of credit cards being held, liabilities, judicial records, family assets and health status. Each of these branches has it s own features from the perspective of literature researches. However, due to some objective causes such as the unavailability of data or the difficulties in quantifying, there are small amount of researches in these branches.

Research Purposes

In traditional studies on personal credit risks, many scholars propose the establishment of a complete personal credit recording system and believe that default and the risk of loss are largely results from lacking a national credit investigation database, which is seen as an effective way to control personal credit risks. With this idea, many countries take efforts to perfect their credit databases. Except the developed countries, the developing countries also have established national credit recording databases. The establishment and application of national credit investigation systems all indicate that credit investigation has been widely used in society.

However, the author notices that many default clients around the world do not have previous default records. This phenomenon raises a question and poses challenge to an idea proposed by the scholars that a complete personal credit recording system can be used to prevent default risks. Why those clients who had no default or bad debt records have default behaviors and what are the loss risks of these behaviors to credit institutions? Traditionally, scholars believed that income is the key factor in default. But what is the real situation in researches? This paper is planned to analyze the influencing factors of credit card default to find the key elements so as to provide reference for the unsecured personal credit risk management .

Research Methods

This paper takes credit card default risks as the research object to explore the effectiveness of the current credit card default system. According to the applicants information collected by the card issuers, this paper analyzes credit card default risks and distinguishes the key information of the applicants' first submitted documents from the less correlated information and the invalid information that can be deleted to save invalid input and costs. This paper also analyzes the rationality of the current information collecting system; whether the credit card business providers get enough effective

information in their existing business models; the paper tries to apply forefront theories such as the behavioral finance, the contract economics and the management theory to conduct in-depth discussions on credit card default risks and to find the underlying factors behind phenomena that influence credit card default risks, so as to offer evidence for establishing a more effective management system of credit card default risks.

The paper combines qualitative research methods with quantitative research methods to firstly discuss and explain the causing factors of personal default risks in the credit card business from the perspective of the contract economics and its related theories. Secondly, through quantitative research, it tries to find the key factors influencing credit card default risks in the information submitted when establishing the credit card contract so as to find ways of altering default risks and to validate and discuss theories of contract economics and the behavioral finance.

There is evidence of using the time length of default occurrence to define the default types. According to "BOT Notification No 184-2549" issued by Bank of Thailand, cardholders must repay their credit card debts within 3 months, otherwise their credit cards will be canceled. The research in this paper takes the default time as the standard for measure and defines the dependent variables as those default behaviors that lasts more than 90 days of the debt default period.

In order to find the necessary and key information for contracting credit cards for the current credit card business, the paper adopts on-site and off-site surveys of Thailand major card issuers such as BBL, Kbank, FB, PB on application information of credit cards, which have yielded fairly representative and valuable results. Then, the paper conducts an empirical research on the data of credit cards in Thailand banks.

Research Results

According to the analysis of the application requirements of major card issuers, Thailand banks require 23.8 kinds of information on average from applicants. The information needed are highly similar in different issuers which reflects the same general idea on the credit card contracting in the credit card business. However, there are also differences, which shows that different issuers have different preferences in collecting contract information. According to statistics, around 26 kinds of information are needed in the application by card issuers, which can be divided by logical judgement into four groups:"identity", "communications", "economic capability" and "others". From the previous information stated, this paper takes 7 kinds of information about "economic capability" whose adoption rate beyond 60% of the banks and 5 kinds of information about "others" as the independent variables, and makes 12 divisions of them, "position", "gender", "housing property ", "monthly income", "education background", "profession", "marital status", "time of working for the current job ", "job types", "time of living in the current residence", "age" and "Number of children" etc..

Since previous studies have mainly focused on the income's influence on the credit card default, this paper designs two models, model 1 focuses on the income variable's influence on the credit card default, while model 2 introduced other variables of life cycle and living conditions. Model 1 has 7 variables. On top of that, model 2 adds another 5, making it having 12 variables in total.

In the credit card business, one applicant can apply for several credit cards at the same time. For this situation, this research only studies the credit card accounts that are in usage, those not in usage are deleted from the sample pool. For applicants with several products, this research merges the no-default products in one record. If one product is default, the record is merged as default. For applicants with

supplementary cards, the supplementary card is merged with the master card as one record, if the supplementary is default then the recorded client is default. This research excludes data of non-Thai clients. On the basis of the above models, the paper describes the variable of the data of one certain Thai credit card company in the period of 2012-2016. Seen in the table below:

Table 1• Variable Description

Variable Types	Variables	Description
Economic Status	Position	Employee； Line manager/Director/Senior exective；General manager/CEO
	Housing property	Permanent residence;Renting;Living with families; No mortgage; Others
	Monthly income	Those above 100,000 baht are in one group； those below is divided into 9 groups for every 10,000 baht;
	Profession	There are 21 categories based on the industry divisions from Thai government, which is in accordance with the 21 groups in this research.
	Time of working for	Those above 10years are in one group; those below are separated into 9 groups according to the number
	Job types	Company employee; Civil servant; Business owner; Others
	Number of dependents	0;1;2 and above
Life cycle and other variables	Gender	Female;Male
	Education background	High school; Bachelor; Master; Above master
	marital	Single; Married; Divorced; Others
	Time of living in the	Those above 10years are in one group; those below are separated into 9 groups according to the number
	Age	Age 22-25 are in one group; age 61years above are in another group;those between are assigned to groups for every 5 years

By clearing the 4 years' client information from 2012 to 2016 based on the procedures above, the paper takes the information of 31,693 clients who get their cards between 2012 to 2016 as the sample data. After determining the data in the above models, the paper has done Logistic multiple regression analyses on the two models respectively. The major results are as follows:

Table 2 Multiple Regressio	Variables	Model No. 1		Model No. 2	
Variable	Variables	B	Significanc	B	Significanc
Economic Status	Position	1.006	0.000	1.080	0.000
	Housing property	0.043	0.220	0.060	0.091
	Monthly income	-0.318	0.000	-0.212	0.000
	Profession	-0. 007	0.327	-0.011	0.109
	Time of working for the current job	-0. 044	0.050	-0. 053	0.024
	Job types	0.035	0.068	0.028	0.145
	Number of dependents	-0. 298	0.000	-0. 206	0.066
Life cycle and other variables	Gender			-0. 276	0.000
	Education background			-0. 469	0.000
	marital status			0.148	0.088
	Time of living in the current			-0. 122	0.000
	Age			-0. 023	0.000

The Chi-square tests of model 1 and model 2 show that model 2 has better interpreting ability on the credit card default than model 1. Test results are as follows:

Table 3. The Chi-square Test of Default Models

Model	Chi-square	Degree of Freedom	Significance
Model 1	453.307	7	0.000
Model 2	701. 332	12	0.000

Model 2 shows that the income variables in studying the default risk is not the only influencing factor (among the 6 interpreting variables,2 are income variables), but they are key factors; at the same time, variables of life cycle and living conditions description also affect the default risk.

In light with the above study, the key factors influencing default model of the Thai credit card business are "position", "monthly income", "gender", "education background", "time of living in the current residence" and "age". Income variables have played major roles in interpretation. Among these factors, "position" is in significant positive correlation with the default risk in the default models and has

wide synergistic effect to other variables, while other factors are all in negative correlation with the default risk of credit cards. Conclusions are reached with further discussions:

2."Position" has the positive correlation with and synergistic effect on default risks. This conclusion is related to the negative effect of "monthly income", which is not in line with the deduction in previous researches that the higher position leads to higher income which leads to lower default risks. This phenomenon may indicate that the influence of position in Thailand is different from that of other situations. It may also suggest that the division of position in this research is not detailed enough, which means a possible further study on which types of high position rankings are outstanding in the default risks. But the result effectively proves that "position" is more complicate in influencing the default risks than that of other factors, which means that it has the value for further researches.

3.That "monthly income" is an important factor in affecting the credit card default is in accordance with the long upheld research results from other scholars. This means that the economic factor in Thailand is the most important in influencing default.

4.The result of "gender" influence on the default risks does not just accord with previous researches but clearly indicates that in current situations, the male has higher default risks than the female,which is the same with the research result of Xiao Manjun (2015). The unique point is that "gender" is highly independent as a factor and has no significant correlation with any other factors. Based on the "mental accounts" theory in finance, the male has a higher mental capital account than the female. Individuals with higher mental capital accounts are more reluctant to accept the loss of their own assets and would rather choose to default so as to keep the intact of "mental capitals". In the debt relation of credit cards, they are less internally motivated by repaying debts than the female who have smaller "capital accounts" but larger "dividend accounts".

5. "Education background" is negatively correlated with the default risks. This conclusion diverges from previous researches, but the study in Thailand is in line with the results from scholars such as Fang Kuangnan (2014) and Chen (2009). This phenomenon shows that education can affect people's risk biases and credit attitudes. The higher education one received, the higher recognition of contracts and the better execution of contracts one will have. From the perspective of behavioral finance, people's behaviors are not fundamentally completely rational, but the education received can enhance one's rational judgement so as to avoid irrational behaviors.

6."Time of living in the current residence" is introduced into the default models, that is the longer one lives in the current residence, the lower risk of refusing repayment, and it shows a significant correlation with other variables, except "gender". The author believes that changing residence is high in its cost, which is considered as a part of the default cost making the increasing of the potential default cost as a whole. When the default cost is higher than the credit card debts, default will not occur. So the longer the same residence, the lower the default rate. Since there are not many researches on this factor, this variable may be an important one that has long being neglected.

7.The result that the "age" variable is negatively correlated with the default risk is similar with most of other scholars' researches. It shows that life cycle also plays an important role in affecting default behaviors.

Conclusions and Discussions

According to the above analyses of the default risks, the author thinks that the causes of a higher default risk of unsecured credit products, represented by credit card, is rather complicated. To avoid the occurrence of default and to reduce banks' costs in correcting default, it is necessary to improve the existing business models and management mechanisms. The major aspects are as follows:

1. It is necessary to expand the range and depth of information collection.

From this research, it is clear that income variable is important but varied at the same time. It covers a broad range from the flow of cash, fixed assets, other forms of property to liabilities, thus the description and evidence of applicants' paying ability should be added in the information required, such as materials of non-mortgage house property. Since most applicants are employees, business owners as applicants may have different information requirements with normal employees. Key influencing factors have dynamic variations and needed the dynamic monitoring.

Factors like gender, age and education background once fixed will not change or will change in a predictable way. But factors such as position rankings, monthly income, current residence will have unpredictable changes and will always stay in a dynamic variation, which leads to more requirements and greater challenges in preventing the default risks. Financial institutions should add ways of collecting applicants' information and try to have the lasting acquisition of information to help banks to always maintain advantages in information collection in order to grasp the key factors that are prone to change and have a significant impact on default so as to have individual pricing for different clients, thus increase the default cost of high risk clients.

It should be noted that, except for the default caused by the changes of income statuses and life cycle conditions resulting in the invalidation of credit card, the unsecured nature of credit card, which is the research object in this paper and other unsecured personal credit products determine an extremely low default cost for credit holders. Individual pricing of clients and of risks should become an important part of unsecured credit contracts, and raising the education level of society will help reducing the default rate.

This research demonstrates that individuals with higher education backgrounds are less likely to default, which means the cost payed by the society as a whole on credit card default has been reduced, so raising the education level of the whole society has obvious economic significance. Can raising education level curb other types of default? Can it help to lower the social cost in other economic activities? These are valuable questions for future researches. The behavioral finance offers guidance for studying the default risk.

The different results of "position" research and the influence of "gender" on the default risks in this paper can be explained in economics. Besides, based on the bounded rationality of the behavioral finance, the researches on objects in different gender and on different position rankings having differences in "capital accounts" and "dividend accounts" of the mental account theory give a good explanation on default. The research result of this paper is a good empirical study on the function of the mental account theory.

This paper, with an empirical research on the credit card data in Thailand, has found out the key information for the credit card business. On the basis of the credit card data in Thailand, this paper researches on the relationship between the default risks and the key information firstly collected by banks to try to validate the basics of the modern theory of contract so as to provide suggestions for improving the default risk control.

During the studying process, the author separates traditional research variables that influence default into "income variables " group and "life cycle and other variables" group for researching and reaches the conclusion that both "income variables " group and "life cycle and other variables" group have the major variables of   the default risk interpretation. This paper gives more details to the previous researches in its methods and conclusions, and is a meaningful attempt.

However, due to limits in the data accumulation and research means, this paper is comparatively weak in its theoretical basis and does not conduct in-depth researches on some detailed problems found in the models, such as the researches on the "position rankings" variable, and the influence of the "gender" variable on people's default behaviors. These are needed to be further explored and corrected in future researches.

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