Short communication

How the small and medium-sized enterprises' owners' credit features affect the enterprises'credit default behavior?

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Identifying and measuring credit risk of small and medium-sized enterprises should be different from that of large firms, for SMEs appear to be influenced by their owners more directly and significantly. This paper attempts to testify the relationship between default behaviors of SMEs and the credit features of their owners, so that a more appropriate and effective way of credit management of SMEs could be applied in practice. After segregating the owners' characteristics data into variables of basic features, credit capacity features and credit will features, this paper implemented an empirical study of logistic regression analysis with repeat sampling data. The result demonstrates that, compared with the owners' credit will variables, credit capacity features share more significant relationship with the SMEs' credit default behavior. Specifically, the age of owner, the inquiry frequency of owners' credit information for post-loan risk management and pro-loan approval purpose, and the proportion of overdue loans are the extreme significant variables which are valuable indicators in default risk estimate model.

Keywords: Small and medium-sized enterprise; Owners' credit features; Credit risk

INTRODUCTION

Different from larger companies, identification and measurement of SMEs credit risk not only depend on financial information, which is owing to financial information's incredibility and SMEs' special risk characteristics. Compared with larger firms, SMEs show personification obviously, and it means their development progress largely depends on the enterpriser, because, generally speaking, the owner of the enterprise is its founder as well. It is widely believed that the founder's education level, experience, sprit, ability of management, personal quality, and social network are significant and important factors for enterprise's long term-development. As a result, unlike larger ones, the owners' credit features may be beneficial supplement for identifying and measuring SMEs credit risk. In order to certify owners' influence on SMEs' credit risk and supply a new perspective for indentifying SMEs' credit risk, this paper

resorted to data from Chinese SMEs, and studied on the relativity between owners' basic information and credit features with firms' default behaviors.

LITERATURE REVIEW

In the research field on SMEs Credit Risk, besides the SMEs' own financial information and non-financial information, their owner's personal information attracts scholars' and practitioners' close attention. For the ability of settling debts largely depends on the cash flow of borrower, some scholars began with the study on the relationship between enterprises' performance and their owners' features. Haliassos and Bertaut (1995) showed that the people with higher education degree increasingly enlarge the proportion of risky investment, such as stock

and bond, to the personal fortune. It means that better educated people are also better at finding opportunity of business and analyzing the market. The competence is just the indispensible quality as an entrepreneur, so the owners' education level exerts a significant influence on their enterprises' performance. Avery et al., (1998) provided new empirical evidence on the relationship between personal commitments and the allocation of small business credit, and suggested that personal commitments are important for seeking certain types of loans. Personal commitments appear to be substitutes for business collateral, at least for lines of credit. Moreover, for most SMEs are at the start-up stage, the research on relativity of entrepreneur's feature and enterprise's performance in embarking may offer a useful reference. Lussier (2001) confirmed the factors of management skill and the owner's age should be taken into consideration in the predicting models for enterprise's success. The result shows SMEs' innovation ability is the key factor for SME's growing, and the SME's innovation rest with their owner's creation (Alberto et al., 2008). However, some scholars found there was no relationship between entrepreneur's characteristics and enterprise's performance (Liu Zhenhua, 2007). Meanwhile, some scholars made study on how owners' personal information influences firms' financing behavior and ability. Yan (2008) asserted that the personal and family management affected the will of external equity financing, and make most private SMEs mainly rely on internal financing. The network and diversity-orderly structure and trust of business owners are key factors which affect the availably of financing.

As a result, some enterprisers' features considered as important impact on firms' credit risk also emerged in the theory and practice of identification and measurement for SMEs' credit risk. In terms of the theory, Grunet et al., (2004) emphasizes the effect of the owners' age and characteristics in evaluation on SMEs' credit risk. Ma et al., (2004) conducted spot investigation and made empirical analysis on variables leading to default loans of SMEs, which located at county wide, with Logit model. The results showed that, owners' features, especially their age, education degree and the percentage of stocks held by the owners, could influence firms' credit risk considerably. Zhou (2004) chose the enterprises' quality and value as indicators to evaluate SMEs credit risk. Furthermore, Zhao (2006) put forward that the variables for credit scoring model should include firms and their owners' feature, and latter may contain whether the owners were investors and had extensive social relationship(but it not been proved). As to practice, American Robert Morris Association (ARMA) and Fair Isaac & Company cooperate to develop SMEs credit risk scoring product and absorb owners' personal qualities into the business' credit assessment, and testified that

the owners' personal indicators did have closer relationship with the firms' credit level than its operational variables.

Accompanying the research on owners' special features, parts of scholars sensed owners' credit features made effect on firms' credit risk, but it had less study on this aspects. Wang (2004) thought that SMEs rating should not only concern enterprises, but also take the enterpriser into account as well. Their personal track record of tax duty, laws, social, commercial insurance, personal deposit and debt, and so on, may contribute to predict the SMEs credit risk. Zhang (2005) took advantage of the organizational develop theory and behavior decision theory 's frame to analyze the characters of SMEs' organization and behavior, proving that the enterprisers significantly impacted on the business, and SMEs' credit risk were influenced by both personal aspiration and firms operation. It also puts forward hypothesis of relativity for owners' credit feature, enterprises' operation and their state of default. Yang Huakun and Sun (2006) thought the small companies' loans were similar to their owners' personal loan, and the aspiration to repay depended on its credit level. Based on introducing reasonably owners' credit estimation, they set up bi-variate credit risk model combining enterprisers' credit and financial indictor for small enterprises with less than 2 million loan facility. Edward et al., (2008) used available non-financial and "event" data to supplement the limited accounting data, and found that qualitative data relating to such variables as legal action by creditors to recover unpaid debts, company filing histories, and firm specific characteristics made a significant contribution to increasing the default prediction power of risk models built specifically for SMEs.

However, Limited by the Chinese less developed personal credit system, plenty of researches focused on SMEs enterprisers' specific personal information. However, there is seldom study on owners' credit features. In order to deeply find out SMEs credit risk's regular pattern, we paid more attention to the mechanism that how the SMEs credit risk are influenced by their owners' credit characteristics, and conducted quantitative analysis on the relativity of small and medium enterprisers' personal credit features and controlled enterprise s' credit risk.

RESEARCH MECHANISM, VARIABLE AND DATA

Framework of Mechanism and Theory

This paper absorbed useful conclusion of former researches' achievement, and constructed a mechanism model describing and generalizing the owners' influence on their enterprises' credit risk in theory (See Figure 1).
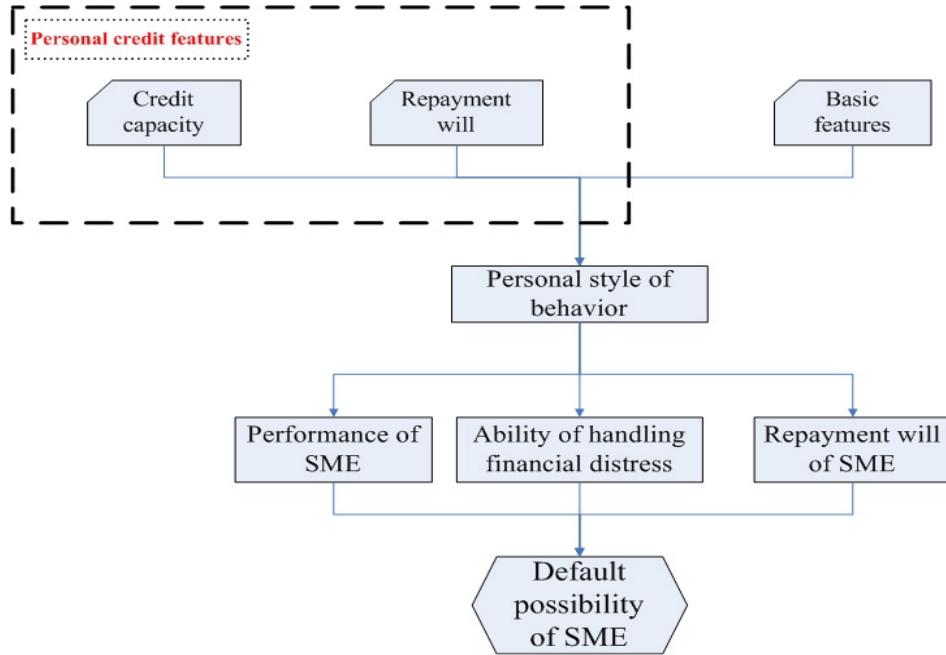
Figure 1. The mechanism of owner informaiton's influence on SME

As showed in the mechanism model, enterpriser's credit features are treated as two aspects, which are credit capacity and credit will. Credit capacity, credit will features and basic characters together represent owners' behavior, and further make impact on firms' credit risk through the personal management. The owner's personal style of behavior would affect his or her enterprise in three aspects, the performance of SME, the ability of handling financial distress and the repayment well of SME, and then these three factors would largely determine the possibility of credit default.

Hypotheses and Variables

According to the framework of mechanism mentioned above, we segregate the owners' characteristics data into variables of basic features, credit capacity features and credit will features, and we draw out the hypotheses that these four aspects of the owner's characteristics would play significant role in SMEs' daily management respectively. Meanwhile, in order to find out the closest personal information with firms' credit risk, this paper separate Credit will into four parts, credit history, overdue degree, recent credit performance (Last 24 months) and self-inquiry frequency (Last 12 months).Credit capacity is also divided into four aspects, ability of acquiring credit, structure of personal credit, tension of liability and inquiry frequency from others (See Table 1).

Data

The data analyzed in this paper was derived from the credit database of SMEs offered by Mintai Institute of Finance and Banking, Central University of Finance and Economics. We chos 204 SMEs' default statuses and their owners' credit information, 38 of which are default firms and the other 166 are non-default firms. When constructing models below, we sampled elaborately according to the ratio of default observations to good ones hitting on 1:2.

EMPERICAL RESULT

In order to certify the relativity of personal credit information and firms' default probability, the paper implied binary logistic regression with forward stepwise method and likelihood ratio standard. For the credibility of empirical results, we have constructed randomly-sampling models for twenty times, according to the ratio of 1:2 for default and non-default enterprises. Out of the twenty models' results, we chosen the result whose entering variable and variable's coefficient were stable as the final empirical result (see Table 2).

   As the empirical results showed, the correlation between owners' age and enterprises' default probability is negative, and inquiry frequency for post-loan risk management and credit loan approval are positive to

Table1. Variables of owners' credit features

Category	Subcategory	Variable
Basic features	-	Age/Marriage/Gender/Habitation/Income/Job title/Education
Credit will	Credit history	Amount/proportion of normal loans
		Amount/proportion of overdue loans
		Amount/proportion of settled loans
		Number/proportion of normal credit cards
		Number/proportion of bad credit cards
		Number/proportion of terminated credit cards
	Overdue degree	Average overdue duration of credit cards
		Maximum overdue duration of credit cards
		Average overdue duration of loans
		Maximum overdue duration of loans
	Recent credit performance (Last 24 months)	Normal repayment frequency of loans
		Settlement frequency of loans
		Normal repayment frequency of credit cards
		Settlement frequency of credit cards
		Maximum number of repayments without reaching requirement
	Self-inquiry frequency (Last 12 months)	Self-inquiry frequency
		Proportion of self-inquiry
Credit capacity	Ability of acquiring credit	Number of loan accounts/Number of credit institution/Credit line of loans/Credit balance/Guarantee for others/Number of loans/Amount of loans/ Number of credit card accounts/Number of credit card issuers/Credit line of credit cards/Number of credit cards
	Structure of personal credit	Number/proportion of housing loans
		Number/proportion of automobile loans
		Number/proportion of business loans
		Amount/proportion of housing loans
		Amount/proportion of automobile loans
		Amount/proportion of business loans
	Tension of liability	Loan balance/Amount of overdraft/Credit balance to credit line ratio/Overdraft amount to credit line ratio/ Guarantee for others to credit line ratio/Number of loans settled in same year/Credit balance to income ratio/ Personal liability to income ratio/ Overdraft amount to income ratio

Table 1. Cont.

	Inquiry frequency from others	Inquiry frequency/Inquiry frequency for dissension/ Inquiry frequency for credit card approval/ Inquiry frequency for credit loan approval/ Inquiry frequency for guarantee qualification/ Inquiry frequency for post-loan risk management

Table 2. Empirical results of owners' credit features

Samples	All samples and variables			
		B	SE	Wald	Sig.
Variables entering the model	Age	-0.086	0.035	6.064	0.014
	Inquiry frequency for post-loan risk management	0.332	0.118	7.889	0.005
	Inquiry frequency for credit loan approval	0.061	0.03	4.075	0.044
Accuracy/True positive rate	75.44%/47.37%				
ROC					
Samples	All samples (only basic and credit capacity variables)				
		B	SE	Wald	Sig.
Variables entering the model	Age	-0.065	0.03	4.821	0.028
	Inquiry frequency for post-loan risk management	0.316	0.107	8.749	0.003
Accuracy/True positive rate	73.81%/35.71%				
Samples	All samples (only basic and credit will variables)				
		B	SE	Wald	Sig.
Variables entering the model	Age	-0.082	0.029	7.706	0.006
	Proportion of overdue loans	3.523	1.931	3.328	0.068
Accuracy/True positive rate	70.75%/20.41%				
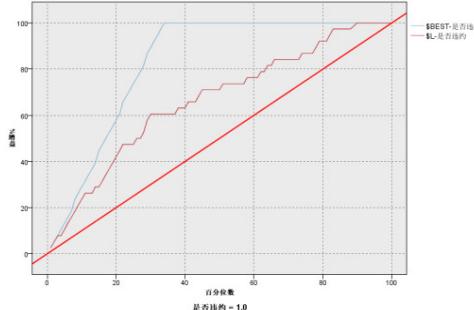
firms' default probability. It means that the higher owners' age is, the lower their enterprises' default probability will be, and it is also greater when the inquiry frequency for post-loan risk management and credit loan approval are

larger. Accordingly, as to the enterprises' credit information, there is some difference between credit capacity and credit will in the correlation degree with SMEs' default behavior. For instance, compared with credit will features, the credit capacity indicators have closer relationship with SMEs' credit risk.

Additionally, despite in the same category, different variables have some difference in the significance of relativity with SMEs' credit risk. In terms of owners' credit will variables, personal credit history and overdue degree are more important, while self-inquiry frequency (last 12 months) is not significant to firms' default behavior. As to owners' credit capability variables, the indicators of inquiry frequency from others are more significant than the variables of structure of personal credit, ability of acquiring credit and tension of liability. It means that appraisement from other intermediaries is important reference for SMEs' credit risk prediction. Moreover, although less than the variables of inquiry frequency from others in relativity, the variables of structure of personal credit, ability of acquiring credit and tension of liability are also related to firm credit risk, such as number of credit institution, number of loan accounts and number of housing loans. The above findings supply suggestions for taking advantage of personal credit information in modeling SMEs' credit risk.

Furthermore, the meaning of this paper perhaps is that, despite the SMEs' financial information usually is not available, small and medium enterpriser's basic information and personal credit data could also be regarded as the useful predictors for the default probability. Specifically, the age of owner, the inquiry frequency of owners' credit information for post-loan risk management and pro-loan approval purpose, and the proportion of overdue loans are the extreme significant variables which are valuable indicators in default risk estimate model. Thus, this finding may offer a new reliable perspective and valuable references for financial intermediaries' credit risk management for loans of SMEs.

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