Does Informal Finance Help Formal Finance?

Evidence from Third Party Loan Guarantees in China[*]

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ABSTRACT

Building on the important studies on corporate financing in China by Allen, Qian and Qian (2005) and Ayyagari, Demirgüc-Kunt and Maksimovic (2010), we examine the role of third-party loan guarantees in facilitating bank lending to SMEs. Using a proprietary database of loan guarantees, we find strong evidence that guarantors and banks disagree on loan credit risk. Loan rates are informative about default but guarantee fee has no predictive power. Given that the guarantor collects soft information in addition to the hard information used by banks, the lack of performance by the guarantor appears puzzling. This result is consistent with the "lazy lender" model as the guarantor takes collateral and overestimates borrower credit quality. Guarantor's main role is to facilitate regulatory arbitrage to circumvent the loan rate cap imposed by the regulators.

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I. Introduction

Over the past thirty years (1980-2010) China experienced extraordinary economic growth. However, the financing source of such growth is unclear. On one hand, Allen, Qian, and Qian (2005) and Allen, Qian, and Zhang (2011) argue that China relied mostly on informal finance given its under-developed formal legal and financial system. Therefore, China presents a counterexample to the law and finance literature. On the other hand, Ayyagari, Demirguc-Kunt, and Maksimovic (2010) argue that the majority and especially most efficient part of China growth is financed by bank loans. Is there any synergy between formal finance and informal finance? In this paper, we use a unique data to examine the interactions between bank loan ("formal finance") and credit guarantee ("informal finance") in China.

The credit guarantee market is growing rapidly in China. By the end of 2010, there are 15,000 firms with "guaranty" in their names. Unlike the banking industry, the credit guarantee firms are mostly private entities. There was little regulatory supervision prior to the establishment of the Division of Financial Guaranty under China Banking Regulatory Commission (CBRC) in early 2010. However, the credit guarantee industry is a national initiative to enhance the financing for small and medium enterprises (SMEs). They play a nontrivial role in the credit market. In 2009, 7.5% SME loans are guaranteed by third-party guarantee firms. By the end of 2010, outstanding guarantee is RMB893 billion (US$137 billion) to 166,000 firms. In May 2011, the regulators announced new rules and distributed permits to qualified credit guarantee firms. The unregulated booming credit guarantee industry provides a good setting to study a specific type of informal finance in China.

We examine the role of credit guarantee using data from a top three credit guarantee firm in China over the period of 2006-2009. Our first important finding is that the credit guarantee officer's

borrower credit quality is negatively related to bank loan rate. When the guarantee officer says the borrower is safe, bank charges a high rate to the loan. This result remains significant if we use credit spread instead of loan rate. Moreover, the loan rate has predictive power for default. Therefore, the loan guarantee does not seem helpful from a credit risk assessment perspective. What is the value-added from the guarantee? To understand this puzzle, we need to explore how the guarantee is processed.

In practice, after a borrower submits its loan application, the bank first does a preliminary examination on the borrower's credit quality, collateral, etc. For those who satisfied the credit requirement but with insufficient collateral value, the bank would require it to find a delegated guarantee firm to get its loan guaranteed. After the loan guarantee application is submitted to a guarantor, the guarantor starts to investigate the borrower and assess its credit quality. Guarantee officers usually visit the borrower's workplace to examine its operation and talk with managers when necessary. They also examine the borrower's accounting report. Combining all relevant information, the guarantee officer starts scoring and finally gives a comprehensive risk measure. The guarantor decides upon whether to guarantee the loan and the rate of guarantee fee to charge according to the risk measure. After a loan guarantee application is approved by a delegated guarantor, the bank would decide whether to initiate a loan and set a loan rate. Usually, the borrower is required to pay back loan principal and interest by month immediately or in a certain period after the loan is initiated[1]. If the borrower fails to make payment in any month[2], that is, when the borrower defaults on its loan, the bank and the guarantor will share the loss according to

[1] Way of payment is negotiated by the borrower and the bank, and therefore varies across different cases. In our sample, all borrowers are required of monthly payment.

[2] The condition under which a guarantor is responsible to cover the loss is predetermined by the contract between the guarantor and the bank. In our sample, failure to make payment in any month would be regarded as "default" by the lending bank.

the predetermined portion[3]. Also, the guarantor has right to take over and liquidate the collateral. If liquidation of collateral can not fully cover the loss, the guarantor is obliged use its own funds to fill the gap[4].

As suggested by Honohan (2008) and Beck, Klapper and Mendoza (2010), credit guarantee schemes emerge typically for three reasons: because of differential information, as a means of spreading and diversifying risk, or as a regulatory arbitrage. They argue that the third reason, as a regulatory arbitrage, has underpinned the rapid growth in guarantee schemes in China. In this case, the guarantee premium is used to bring the total servicing charge for the loan above a regulated ceiling on lending interest rates and thus closer to a market-determined interest rate. Regulatory arbitrage may have potential to explain the prosperity of credit guarantee, however, there has never been a single study providing direct evidence for this argument.

With a ceiling on interest rate, banks can not charge unlimited high lending rate from small, high risky borrowers. Under this regulatory restriction, loan guarantors can make profits by providing guarantees and charging extra guarantee fee. However, this does not necessarily mean that loan guarantee schemes are economically efficient. Specifically, guarantors have the right to take over and liquidate collateral, which may lead to a "lazy lender" problem[5] for guarantors. Without the protection from collateral, guarantors would take the first loss at loan default and act as a "junior bondholder". But they become senior when they obtain the right to take over collateral. Guarantors become more sensitive to the liquidation risk borne in volatile collateral value than borrowers' real business risk. Over reliance on collateral may lead to deviations in loan pricing by

[3] Usually, the portion of loss covered by guarantors varies between 60% and 90%, according to the contract signed by banks and their delegated guarantors. In our sample, the guarantor covers 90% of the loss from loan default and the bank covers the rest 10%.
[4] In our case, the guarantor takes the residual and makes profits if value from liquidation of collateral exceeds loss from loan default to be covered by the guarantor.
[5] See, for example, Manove, Padilla and Pagano (2001) for the theoretical work.

guarantors from that by banks. In contrast, banks have to use its own funds to cover the remaining part of loss because they lose control of posted collateral. In this scenario, banks become the "junior bondholder" and are more likely to be concerned with project quality. To test this hypothesis, we examine the relations between collateralization rate, guarantor's risk measure and loan rate in our major analysis. Our empirical results show that loan rate has predictive power for loan default, while guarantor's risk measure does not. Furthermore, we find that loan rate is positively related to collateralization, while guarantor's risk measure is negatively related to collateralization, even though we control for borrower characteristics, loan characteristics, credit history, guarantee officers' characteristics and fixed time and industry effects. Our results are interpreted as follows: the observed collateralization is a net of borrower's constraints and bank's requirement. For riskier borrowers, banks require them to pledge higher collateral value and charge higher loan rate, while guarantors give lower risk measure when they see more collateral posted. These results confirm our conjecture that banks tend to take real business risk into consideration when pricing loans, while guarantor's risk measure is more reflective of collateral related risk.

This article is related to several strands of literature. It enriches the literature on the ex-ante commitment role of collateral (see Liberti (2010), etc) and that on the ex-post hedging view (see Berger, Frame and Ioannidou (2011), etc). The first group of articles argues that the major role of collateral is to mitigate information asymmetry in bank lending. Therefore, high quality borrowers are more likely to pledge collateral of high value. In the second stream of articles, the argument is that observable riskier borrowers are more likely to be required to pledge collateral. Therefore, higher collateralization is associated with higher ex-post default probability. Our study on the interaction between banks and guarantors provides an ideal setting for separating and testing the two competing views.

This article is also related to literature discussing the use of soft versus hard information in bank lending. Petersen (2004) and Petersen and Rajan (2002) confirm the role of hard information used by commercial banks, while another stream of studies, such as Degryse, Liberti, Ongena and Mosk (2010), Chang, Liao, Yu and Ni (2010), etc, put increasing emphasis on the value of soft information collected by loan officers. They find that it is the soft information component that contributes to the predictive power of credit rating. In our study, we notice that guarantee officers collect more soft information and use more discretion in assessing loan risk than loan officers. If soft information plays a better role in reflecting loan risk than hard information, we should expect that soft information proxy has larger predictive power for default. However, we did not observe this in our data. This finding suggests that differential information alone is not enough to explain the disagreement between banks and guarantors. Alternative explanations are more relevant and need to be explored.

Our results also suggest that banks and guarantors have different objective functions, since they are faced with different types of risk and cash flow distributions, although they deal with the same borrower. These implications potentially shed light on the different roles played by banks and guarantors. As additional tests, we analyze other determinants of loan default. Borrower age, abnormal book value of shareholder equity, loan history and guarantee officers' capacity are found to have predictive power for loan default.

Overall, these findings point out that loan guarantees help loosen credit constraints in bank lending to SMEs, but guarantor's main role is to facilitate regulatory arbitrage to circumvent the loan rate cap imposed by the regulators. Our findings demonstrate that guarantors are economically inefficient from risk assessment perspective. Subject to the "lazy lender" problem, guarantors rely on collateral too heavily and lack of incentives to screen and monitor loans they have guaranteed.

We may contribute to literature in the following senses: first, to our knowledge, this article is the first empirical study of third party guaranteed loans, using first hand loan-level data. Second, we provide direct evidence for regulatory arbitrage, a potential reason for the rapid growth of credit guarantee schemes, and for the "lazy lender" problem faced by guarantors. Third, we comprehensively study the interactions between borrowers, banks and guarantors. We link guaranteed loan pricing to both collateralization rate and default probability, which uncovers the underlying mechanism of loan guarantees. Finally, our results have rich implications on, for instance, possible reversion of seniority of banks and guarantors, importance of human capital in bank lending, etc.

The rest of paper is organized as follows. In Section II, we describe the financing patterns for Chinese small and medium enterprises, and the development of credit guarantee in China. We also review the recent regulation which largely motivated this study from practical perspective. In Section III, we describe our data source and sample characteristics. In Section IV we present the empirical evidence of disagreement between guarantor and bank. We analyze the underlying mechanism through collateral channel in Section V. Section VI concludes.

II. Institutional Background and Hypothesis Development

A. Third Party Loan Guarantee in China

A.1. Small and Medium Enterprises (SMEs) Financing

China's banking sector has been the primary source of financing for China's growing economy, with the banking and credit industry accounting for over 80 percent of China's financial assets (Bailey, Huang and Yang, 2010). According to the website of the China Banking Regulatory

Commission, in 2009 the GDP grew by 8.7 percent and reached RMB 33.5 trillion, while the outstanding balance of loans made by banking institutions increased by RMB 10.5 trillion or 33.0 percent year-on-year to RMB 42.6 trillion. Total bank loans comprised 127.16% of GDP. Bank loans and private lending are the two major financing channels for enterprises in China. Figure I shows the major sources of funding for Chinese firms from 2006 to 20096. 73.5% of the 4256 firms which responded effectively chose long-term bank loan as the major funding source. 55.3% chose private lending, 14.9% syndicated loans and 10.5% private equity or venture capital. Compared with big firms, small firms rely more on informal finance such as private lending.

Small firms find it more difficult to get access to direct bank loans than large firms. According to the recent survey by China Enterprises Survey System (CESS) in 2010, compared with the percentage of 56% of big firms which find it easy to get bank loans, only 26.8% of small firms find "not difficult" to get bank loans. 42.5% of small firms find it very difficult to get bank loans. Besides, small firms are faced with higher financing cost. The survey results show that around 60% of big firms obtain bank loans with loan rate around base rate, only 27.2% of big firms are charged a loan rate higher than base rate. However, 62.5% of small firms are charged a loan rate higher than the base rate. To alleviate the difficulty faced by small enterprises in getting external finance, China government passed "Promotion of Small and Medium Enterprises (SMEs) Development Law" in 2003. However, financing difficulties faced by small businesses persist (Chong, Lu and Ongena (2010)).

The major obstacle in bank lending to SMEs is insufficient collateral (Li (1998), Shim (2006)). Banks are reluctant to lend to small enterprises pledging collateral whose value is less than the loan amount. The economic role of collateral has been discussed by a strand of literature. Collateral can be used as an attempt to compensate for ex-ante asymmetric information or as a method of reducing

[6] The data is from a survey conducted by China Enterprises Survey System (CESS) in 2010.

ex-post incentive problems such as moral hazard (Berger, Frame and Ioannidou (2011), Liberti (2010), Rajan and Winton (1995), etc). Under these circumstances, small firms have to rely on more informal finance. Beck, Demirgüc-Kunt and Maksimovic (2008) find that small firms and firms in countries with poor institutions use less external finance, especially bank finance. Small firms substitute bank finance with other sources of finance.

One form of the informal finance is credit guarantee program. Credit guarantee program can be classified into two groups: government-operated and non-government-operated7.In countries like U.S., Canada, U.K. and Hong Kong, it is the government sectors that carry out credit guarantee schemes. For instance, in the U.S., the Small Business Administration (SBA) provides supports to entrepreneurs and small businesses. The 7(a) Loan Guarantee Program is designed to help small entrepreneurs to start their businesses[8]. In U.K., The Small Firms Loan Guarantee Program (SFKG) seeks to address the market failure by providing a government guarantee in cases where a business is unable to secure a loan solely because of lack of collateral. SFLG is unique in tackling with the specific problem of lack of collateral. SFLG is therefore additional to, rather than in competition with, commercial lending. The Trade and Industry Department of HKSAR initiated SME Loan Guarantee Program along with other credit enhancement measures in 2008 to help enterprises secure loans from participating lending institutions for meeting general business needs to tide over the liquidity problem during the global financial crisis with the government acting as the guarantor[9]. In other countries such as Japan, Germany, France and Mainland China, however, it is the private sectors that provide credit guarantee services. In these countries, a large number of credit guarantee

[7] Source: www.heronco.ca, prepared by Heron & Company in 2007;
http://www.chinaguaranty.net/aspx/news.aspx?info=info&recordid=138739;
Graham Review of the Small Firms Loan Guarantee, 2004;
http://www.eif.org/what_we_do/guarantees/credit_enhancement/index.htm
[8] Source: http://en.wikipedia.org/wiki/Small_Business_Administration#Loan_Guarantee_Program.
[9] Source: http://www.smefund.tid.gov.hk/eng_text/spgs.htm

firms, insurance companies and other financial institutions act as the guarantor under government regulations.

The guarantor plays a key role in bank lending to SMEs. Banks would initiate a loan as long as the guarantee application is approved by its delegated guarantor. In a case of loan default, the guarantor takes over the collateral pledged by the borrower to compensate the loss. Supposedly, guarantors have incentives to investigate the borrower and collect information about its operation and creditworthiness. Although we use a propriety database owned by one Chinese guarantee company, the basic line of business and practice applies to its industry peers, since they are operating under uniform laws and regulations, and similar capital requirements. When assessing a guarantee application, a guarantee officer would give two scores: the qualitative score, based on the officer's subjective judgment of the borrower's market power, competitiveness, credit worthiness, etc; and the quantitative score, calculated by a formula with accounting data as major inputs. Then, combined with loan information, including amount of loan applied for, maturity and collateral value, the officer would then compute an overall risk measure. The risk measure is mapped into certain level of rate of guarantee fee. Normally, higher risk measure corresponds to a higher rate of guarantee fee. After a guarantee application is approved by the guarantor, the lending bank would decide a loan rate based on its own risk measure. While the lending bank may or may not take the rate of guarantee fee into consideration when setting the loan rate, the guarantor would not adjust its pricing of the loan guarantee after the loan rate is set[10].

A.2. Credit Guarantee Market in China

[10] We thank Maggie Chen for useful illustration. In practice, there are few cases where borrowers reject bank loans because of high loan rates. This rules out the possibilities that any disagreement in the pricing by guarantors and banks are due to borrowers with high loan rates dropping out of the sample.

The first set of mutual guarantee fund in China was established in 1992 in the city of Chongqing and Shanghai. One example is the loan guarantee fund established by the Yangpu Branch of the Bank of Communications and the local government in Shanghai. Independent guarantee agencies have been founded in Beijing, Shanghai and some other big cities in South China, since 1998. These agencies are named as loan guarantee fund or loan guarantee center, aimed to alleviate the financing difficulties faced by SMEs in China. The issuance of "Guide to Improve Finance Service for SMEs" marked a brand new period of development for credit guarantee. Government sectors and the People Bank of China started to participate in and provide supports to the SMEs' guarantee market. Formal guarantee firms specialized in high-tech industry were established in Beijing, Shanghai and Shenzhen. The issuance of "Policy Recommendations for Helping SMEs' Development" by the General Office of State Council in 2000 has further promoted the development of loan guarantee market. In 2003, the Ministry of Finance made an announcement that in the case of loss, state-owned guarantee firms can be compensated by the finance sector of loan government, while non state-owned guarantee firms may also apply to local government for partial compensation.

As shown in Figure 2, the number of guarantors in China has grown dramatically over the past few years. By the end of 2008, there are 4247 guarantee firms in China, providing 1.75 trillion funds to 907 thousand SMEs. 1245 of the guarantee firms are state-owned, representing a percentage of 29.3%. The guarantee provided for policy-related purposes amounted to 61.54 trillion, representing 26.3% of the total amount. In 2009, the General Office of State Council made recommendations that local government is supposed to improve the financial condition of guarantee firms by means of injecting capitals, sharing risks and compensating for losses.

A.3. Recent Regulation

Credit Guarantors have not been formally regulated until the China Banking Regulatory Commission (CBRC) established the Department of Credit Guarantee in September of 2009. The department set a clear-cut threshold for setting up guarantee firms at the central level[11]. At the provincial level, guarantee firms are regulated by different government sectors: within the 31 provinces which have guarantee firms operating, guarantors are regulated by the Office of Finance in 19 of them, by the Bureau of SMEs in 10 provinces and by the Department of Finance in the rest 2 provinces[12].

Since late 2009, CBRC initiated a nation-wide regulation on guarantee business with other 6 government sectors[13]. Some cities, such as Shanghai even started to restrict the registration of guarantee firms. This regulation was motivated by the existence of the large number of small informal or illegal guarantee firms. By the end of 2009, there are more than 14000 firms using the term "guarantee" in their names, but only 5547 of them are doing legal credit guarantee business. The rest more than 8000 so called guarantors are out of the reach of current laws and regulations. Moreover, some of these unregulated firms are involved in speculation, lending money at high interest rate or illegal fund raising. These illegal actions have endangered the reputation of the guarantee business in China.

There is large heterogeneity and imbalance in the development of guarantee firms across regions. According to laws and regulations, guarantors' book value of shareholder equity should exceed 50 million RMB. In developed area such as cities in the Pearl River Delta, the required book value of shareholder equity is 100 million RMB, while in other cities in Guangdong Province, the

[11] Source: website of China Banking Regulatory Commission: www.cbrc.org.cn.
[12] Information was extracted from the conversation by the Head of Guarantee Business Department of CBRC at the Lujiazui Forum in Shanghai, 19-21st May, 2011.（http://news.cnfol.com/110520/101,1281,9908764,00.shtml）
[13] Other 6 sectors are: People's Bank of China, the Ministry of Finance, Development and Reform Commission, Ministry of Industry and Informationization, Ministry of Commerce, State Administration of Industry and Commerce.

requirement is 50 million. In less developed areas, such as Chongqing, the requirement is 30-50 million. This nation-wide regulation aims to clarify the threshold of entry to guarantee market, eliminate illegal guarantors and alleviate the imbalance in the development of guarantee firms. To achieve these goals, from early 2010, the Department of Credit Guarantee of CBRC started to issue permits for guarantee firms. Those which are unable to be licensed are forced to close[14]. By May of 2011, 6030 guarantee firms have obtained permits.

Regulators are also concerned about the asset quality and risk management of guarantee firms. In 2009, the overall claim payment by guarantors is 2.98 billion, representing a percentage of 0.27% of the total guaranteed amount. Compared with 2008, the amount of payment decreased by 21%. Guarantors' capability of detecting and measuring risk needs to be improved.

Overall, guarantee firms are playing an important role in facilitating SMEs in China to raise funds. According to statistics by the Department of Credit Guarantee, by the end of 2010, there are 1892 out of 6030 guarantee firms with book value of shareholder equity exceeding 100 million RMB. The amount of total outstanding guaranteed loans is 893 billion RMB. 689.4 billion, or a percentage of 77% go to SMEs. In 2010, the number of SMEs obtaining loans through guarantee firms is 142 thousand, increased by 58.6% compared with the year 2009.

B. Theoretical Framework

Previous studies attempt to uncover the rationale for credit guarantee program. They mainly focus on the role of credit guarantee as a supplement of insufficient direct loan or as a means of spreading and diversifying risk.[15] Only a few studies mention credit guarantee as a regulatory

[14] For example, 69 unlicensed guarantee firms in Yangzhou are closed. But we do not have exact number of all closed guarantors.

[15] For arguments explaining the rationale of credit guarantee, see Li (1998), Shim (2006), Honohan (2008), Beck (2010), etc.

arbitrage. Honohan (2008) and Beck (2010) argue that guarantee premium can be used to bring the total servicing charge for the loan above a regulated ceiling on lending interest rates and thus closer to a market-determined interest rate. They suggest that this mechanism underpins the rapid growth in credit guarantee schemes in China in the past decade. The argument regarding regulatory arbitrage can potentially serve as a major rationale for the prosperity of credit guarantee market, but neither theoretical framework nor empirical evidence has ever been provided.

We try to model the scenarios under which a direct bank loan or a guaranteed loan is applicable, combining the interest cap condition. Firstly, we specified the borrower's maximization problem and objective functions for the bank and the guarantor. Next, we added zero-profit condition[16] and analyzed the effect of interest rate cap. Finally, we discussed under which of the combinations of collateralization rate and default probability a guaranteed loan may apply. We also analyzed the determinants of loan rate and guarantee fee.

B.1. Benchmark Case: Direct Bank Loan

As a benchmark, we first consider the case where direct bank loan is possible. Suppose there is a continuum of risk-neutral borrowers. Each borrower wants to borrower I to make an investment. Denote default probability rate by π. Default probability is an abstract of project quality and real business risk, therefore, π is observable to the borrower but unobservable to banks and guarantors. The outcome of each project is a stochastic variable $\tilde{X}$, which takes two possible values: $\overline{X}$ and zero, depending whether the good or the bad outcome occurs. The good project pays $\overline{X}$ and the bad project pays zero. In addition, the good outcome occurs with the probability of $1-\pi$ and the bad

[16] It is appropriate to impose the zero-profit condition for both banks and guarantors. With the openness of the financial system after China's entry into WTO, the banking sector has become much more competitive, especially in SME lending. As for credit guarantee, 6030 guarantee firms represent a highly competitive market structure.

with π. Denote collateralization rate by c. Then the value of collateral pledged by the borrower is cI. Presumably, π and c are exogenous and uncorrelated. Assume the bank can make a loan with lending rate r, subject to an interest rate cap condition $r \le \bar{r}$, where $\bar{r}$ is fixed by the central bank[17]. Denote the bank's financing cost by r_0. To simplify our analysis, we assume the banking system and the guarantee market are completely competitive.

The borrower's firm value can be expressed as $V = \max(cI + \tilde{X} - rI, 0)$. The bank's objective function is $V_B = \min(rI, CI + \tilde{X}) - r_0 I$. To make sure that the borrower is able to pay back bank loan when the project quality turns out to be good, we assume $cI + \overline{X} > rI$. Combining the maeket clearing condition[18] we derive $r = \frac{r_0 - \pi c}{1-\pi}$. If $r > \bar{r}$, the bank would lose money for all feasible r. Therefore, we have $r = \frac{r_0 - \pi c}{1-\pi} \le \bar{r}$, from which we can derive $c \ge \frac{r_0 - \bar{r}}{\pi} + \bar{r}$, indicating that c increases in π. For borrowers which have higher propensity to default, the bank is more likely to require a higher collateralization rate. Moreover, the interest rate cap and zero-profit condition determine that a direct bank loan is possible only if collateralization rate is above certain level. Finally, positive net present value (NPV) of the project requires $E(\tilde{X}) = (1-\pi)\overline{X} \ge r_0 I$, from which we obtain $\pi < 1 - \frac{r_0 I}{\overline{X}}$.

[17] Interest rate in China is partially regulated by the government. Lending rate is adjusted around the base rate set by the Peoples Bank of China, see, Qian, Strahan and Yang (2010).

[18] The borrower's firm value is expressed as $V = \begin{cases} cI + \overline{X} - rI, 1-\pi \\ 0, \pi \end{cases}$. The bank's profit is expressed as $P_B = \begin{cases} rI - r_0 I, 1-\pi \\ cI - r_0 I, \pi \end{cases}$. The zero-profit condition for the bank is written down as:

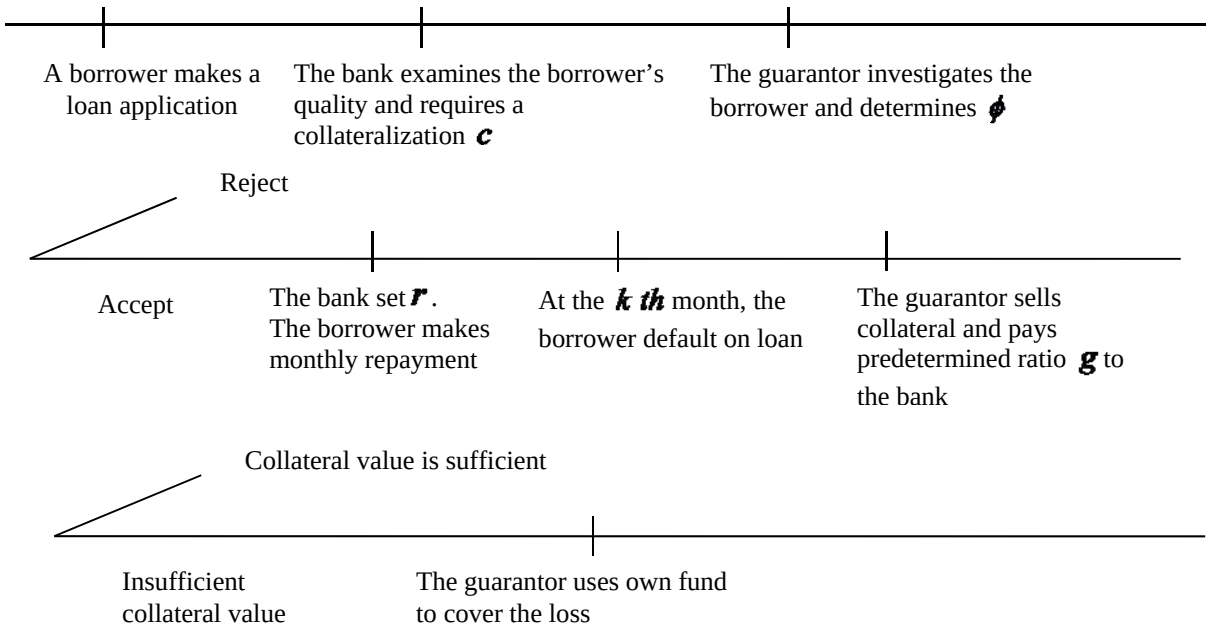
$(1-\pi)(rI - r_0 I) + \pi(cI - r_0 I) + \pi(cI - r_0 I) = 0$,

To summarize, the borrower can get direct bank loan when the following two conditions are satisfied: (1) sufficient collateral ($c \geq \bar{r} - \frac{\bar{r} - r_0}{\pi}$); (2) low default probability ($\pi < 1 - \frac{r_0 I}{\bar{X}}$). Figure V shows combination of collateralization rate and default probability in which a direct bank loan is possible.

B.2. Guaranteed Loan

As we mentioned before, a guaranteed loan is needed because small borrowers usually pledge insufficient collateral and a risk-sharing mechanism is required by lending banks. Moreover, direct bank lending is subject to an interest cap. Banks can not charge unlimited high interest rate from high-risk borrowers. With the guarantor sharing risk with the bank, bank loans to risky borrowers with low collateralization rate become available. The Timing of the model can be illustrated as follows:

Timing of the Model



Usually, guarantee firms cover the major part of the loss according to a predetermined portion, which is clarified in the contract between the guarantee firm and the participating commercial bank. Therefore we regard the predetermined portion, or guarantee rate as exogenous. Denote guarantee rate by g. We also implicitly assume $gI > cI$. Otherwise, collateral is sufficient to cover the loss from loan default, and the guarantor would play no role. Let ϕ denote the rate of guarantee fee charged by the guarantor. Let kI denote the operating cost for the guarantor. Borrower's firm value can be expressed as $V = \max(cI + \tilde{X} - rI - \phi I, 0)$. When $X = \overline{X}$, the bank gets $rI - r_0 I$, the guarantor gets $\phi I - kI$, and the borrower gets $cI + X - rI - \phi I$, with a probability of $1-\pi$, respectively. When $X = 0$, the bank gets $gI - r_0 I$, the guarantor gets $-kI - gI + cI$, and the borrower gets 0, with a probability of π. With interest rate cap condition $r = g + \frac{r_0 - g}{1-\pi} \le \bar{r}$, from which we can derive $\pi \le 1 - \frac{r_0 - g}{\bar{r} - g}$.

Combining zero-profit condition[19] for the bank, we can derive $r = g + \frac{r_0 - g}{1-\pi}$, which indicates that interest rate increases with default probability. This prediction is later confirmed by our empirical results. Different from the direct bank loan case, with existence of guarantor, loan rate is no longer associated with collateralization rate, since collateral would be taken over by the guarantor and guarantor would always have to pay a portion of g of the total lending to the bank when loan defaults. We have also assumed complete competitive market for the guarantor[20], from which we derive $\phi = \frac{(g-c)\pi}{1-\pi} + \frac{k}{1-\pi}$. The first order condition of π shows that ϕ decreases with

[19] Similarly with the benchmark scenario, the zero-profit condition for bank is $(1-\pi)(rI - r_0 I) + \pi(gI - r_0 I) = 0$.

[20] The zero-profit condition for guarantor is $(1-\pi)(-kI + \phi I) + \pi(-kI - gI + cI) = 0$.

c and increases with π. In ideal cases, the guarantor charges higher rate of guarantee fee for borrowers with lower collateralization rate or with higher default probability. Moreover, positive NPV of the project requires that $E(\tilde{X}) = (1-\pi)\overline{X} \geq (r_0 + k)I$.

As figure VI shows, when $c < \bar{r} - \frac{\bar{r} - r_0}{\pi}$ and $\pi < 1 - \frac{(r_0 + k)I}{\overline{X}}$, a guaranteed loan would take over direct bank loan and become applicable. The use of loan guarantee makes bank loans to borrowers with insufficient collateral become available. To make the use of guarantee necessary, an additional condition $c < g$ is also needed[21]. Figure VI shows the combination of collateralization rate and default probability in which a loan guarantee may occur. The model makes two main predictions: guarantor charge higher fee from borrowers with (1) lower collateralization; (2) higher default probability.

C. Hypothesis Development

The model developed above suggests that the guarantor and the bank can form different risk measure for borrowers, because collateralization rate affects their pricing in different ways. As one way to cover the ex-post loss from loan default, pledge of collateral is likely to be perceived as a signal indicating low risk by the guarantor. Relying on collateral too heavily leads to the "lazy lender" problem for guarantors, which may cause guarantors' risk measure biased because they are likely to ignore real business risk of the financed project. However, from the bank's view, collateral

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[21] Combined with the interest rate cap condition, if $g \geq \frac{r_0\overline{X} - \bar{r}(r_0 + k)I}{\overline{X} - (r_0 + k)I}$, zero-NPV line would lie at $\pi = 1 - \frac{(r_0 + k)I}{\overline{X}}$; if $g < \frac{r_0\overline{X} - \bar{r}(r_0 + k)I}{\overline{X} - (r_0 + k)I}$, zero-NPV line would shift to left, and the zero-NPV line would lie at $\pi = 1 - \frac{r_0 - g}{\bar{r} - g}$.

mainly works as an attempt to reduce contracting frictions in the presence of asymmetric information (Liberti (2010)). We do not expect the same negative relation between collateralization rate and loan rate to hold. Furthermore, as the seniority of banks is reversed, banks are likely to become "junior" bondholder and therefore are more concerned with project quality than guarantors.

Moreover, apart from the collateral channel discussed above, the guarantor and the bank collect information about borrowers and decide upon guarantee fee and loan rate independently, which can potentially lead to disagreement between the guarantor and the bank on risk assessment. Guarantor officers do substantial investigation into borrowers and collect information from both public sources and private channels. They make guarantee decision and decide upon guarantee fee based on objective scoring and subjective judgment. Both hard and soft information is involved in the risk assessment process. In contrast, loan officers assess loan risk with less discretion. Initiated by the Peoples' Bank of China and the four state-owned commercial banks, China's banking system has been constructing a comprehensive internal information system. It contains credit history information of all Chinese enterprises which have set up a bank account[22]. Mester, Nakamura and Renault (2006) also provide evidence that transaction accounts help financial intermediaries monitor borrowers, by providing ongoing data on borrowers' activities. When setting the loan rate, loan officers feed financial data and other relevant information into computer system, and then a recommended loan rate is out put[23]. Compared with guarantee pricing, loan pricing is based on more objective assessment. Based on the above analysis, we developed the following hypothesis:

Hypothesis 1. The guarantor and the bank disagree on loan pricing. Higher default probability measure given by the guarantor is associated with a lower loan rate.

[22] We thank Frank Song and Chen Lin for providing the information.
[23] We thank Yi Wu for the description and illustration.

Hypothesis 2. Higher collateralization rate is associated with lower default probability measure by the guarantor.

Hypothesis 3. Higher collateralization rate is associated with higher loan rate charged by the bank.

Hypothesis 4.a. Loan rate can predict loan default.

Hypothesis 4.b. Rate of Guarantee Fee can predict loan default.

III. Data and Sample Description

The dataset used in this study is compiled from two main sources: (1) a SME loan guarantee database provided by one major guarantee firm in China; (2) the base rate data from the website of the Peoples' Bank of China. The loan guarantee dataset contains all loan guarantee issued by the guarantor from 2006 to the first half of 2009. There are 1076 loan guarantees in total. Excluding observations with loan rate data unavailable, we end up with 1052 observations for analysis. It covers various industries such as manufacturing, service, wholesale, construction, etc. The majority of borrowers are privately owned. Except for only a few cases where the loan maturity is two years, most loans in our dataset have maturity of one year.

For each loan guarantee application, the dataset contains information on its applied amount, approved amount, value of collateral, and whether the borrower defaults on its loan. The dataset is suited for our purposes for several reasons. First, it provides credit scores and risk measure given by the guarantor. The information helps us understand borrowers' credit quality from the guarantor's view. Second, it provides private information about the borrowers, which can not be easily obtained

by other institutions. For example, it reports information such as whether the managers' relatives work for the firm, whether these shareholders have a political background (ever been elected as a representative of People's Congress of China), the number of shareholders, loan history, guarantee history, etc. Studies about soft information usually use estimates from regression or other indirect proxies to measure soft information, while this dataset gives direct, easy-to-use measures. Finally, it has comprehensive accounting data of borrowers. For most borrowing firms, it provides only two consecutive years' accounting data. The available accounting period might not overlap with the guarantee application year, so our final sample reduced to 616 after including accounting data.

Figure 3 plots the composition of the sample guaranteed loans from 2006 to the first half of 2009. Panel A of Table I describes the distribution of loan guarantees by year. According to the nature of loan, our sample can be grouped into three categories: bank loans, which represents 73.38% of the whole sample, government loans, which aim to support hi-tech firms' start-up and special projects, and entrusted loans, with the guarantor acting as the lender. For the purpose to make consistent analysis, we mainly focus on bank loans in our subsequent discussion. The guarantor issued largest number of guarantees in 2007, with the highest default rate of 3.33%. We define a default if the borrower fails to pay in any month during the repayment period. In our sample, 15 out of 1052 loans are defined as default. The average default rate throughout 2006 to 2009 is 1.43%. According to our general knowledge of the guarantee business, the default rate is below the industry average. Collateralization rate is dispersed between 75% and 85%, along with the evidence from previous literature that lack of collateral is a prominent feature in bank lending to SMEs (Shim (2006), Li (1998), etc). As to industry distribution of borrowers, Figure IV demonstrates that the sample borrowers cover various industries such as manufacturing, wholesale,

IT, Service, etc. Manufacturing firms represents the majority of the sample, accounting for a percentage of 66.5%.

Panel B reports the distribution of guaranteed loans by lending banks. There are 860, or 79.93% loans issued by non-state-owned banks. Shenzhen Ping'an Bank, China Construction Bank and Huaxia Bank are the top three issuers, covering 75.85% of the sample. The largest issuer, Shenzhen Ping An Bank, issued 451 loans, representing 42.87% of all sample loans. Loans by China Construction Bank have highest default rate of 3.28%.

Panel C summarizes guaranteed loans by collateral type. We classify collateral broadly into borrower non-specific assets and borrower-specific assets. Borrower-specific assets refer to inventory and machine. We observe higher collateralization rate for the group of borrowers pledging specific assets as collateral by simple visual inspection.

Panel A of Table II reports borrower characteristics for all sample, default group and non-default group. Default borrowers are charged higher loan rate. The difference is around 2 percent and significant at 5% level. The average total asset of borrowers is RMB 70 million, and the average annual revenue is RMB 98.55 million. The guarantor's risk measure ranges from 0 to 1. The guarantor perceives a measure below 0.4 as low risky, 0.4 to 0.6 as medium, and above 0.6 as high risky[24]. The mean of the guarantor's risk measure is 0.494. Difference in guarantor's risk measure between default and non-default borrowers is negligible. We also examine the correlation between guarantor's risk measure, collateralization and borrowers' accounting variables. Panel B of Table II reports the Pearson Correlation coefficients. Consistent with our expectation, higher guarantor's risk measure leads to higher rate of guarantee fee. Higher collateralization rate is perceived as lower risk by the guarantor. We learnt from the correlation table that guarantor officer

[24] We thank Maggie Chen for providing the Handbook of Credit Guarantee Industry Norms in China.

give a higher credit score to borrowers with larger size, higher profitability measured by ROA, and higher asset turnover ratio.

IV. Disagreement between Guarantor and Bank

This section analyzes whether guarantors help banks assess loan risk effectively. The difficulty is that we do not exactly know the inputs guarantors or banks use for deciding upon a loan rate, therefore, we add all possible factors affecting guarantee or lending decisions into the specification as controls.

A. Guarantor's Risk Measure Inconsistent with Loan Rate

To test whether the guarantor's risk measure is consistent with loan rate set by banks, we estimate the following specification:

$$LoanRate_i = \alpha_i + \beta_{1i} Guarantor's\,Risk\,Measure + \beta_{2i} X_i + \varepsilon_i$$

X_i refers to a set of control variables: Borrower Characteristics, Loan Characteristics, Credit History, and fixed time and industry dummy. Borrower Characteristics contain major financial data: firm size, measured by the logarithm of Total Asset, ROA, Leverage ratio, Cash to Total Asset ratio, Sales Growth rate and Firm Age. We select these accounting variables following Chang, Liao, Yu and Ni (2010). They use the above variables as the proxy of hard information used by lending banks. Since the majority of sample guaranteed loans have maturity of one year, Loan Characteristics refer to loan amount only. Credit History contains a vector of variables which can be observed by banks. This category incorporates Loan History, Current Loan and Rating. Loan History is a dummy variable indicating whether a borrower has financed by bank loans before. Current Loan indicates

the amount of current loans that a borrower has. Rating is a dummy variable indicating whether a borrower is rated by an independent rating agency.

Table III shows the results of estimating the above specification. We are primarily interested in the coefficient of β_{1i}, which shows whether guarantor's risk measure is consistent with loan rate. Surprisingly, the coefficients across all specifications are significantly negative, suggesting that loan risk perceived by banks and guarantors are contradicting. To correct for the possible heterogeneity in loan rate suggested by Cerqueiro, Degryse, and Ongena (2011), we use GMM estimation in some of the regressions. Column 2 and 6 reports the corresponding results.

Since we aim to investigate whether guarantors and banks share the same view on loan risk, a potential concern is that loan rates are regulated by government and are not effectively linked to borrower creditworthiness. To address this issue, we construct Credit Spread by subtracting base rate from loan rate, and examine the relations between credit spread and guarantor's risk measure. The results are presented in Table IV. Significance of the coefficients of guarantor's risk measure in the baseline regression reduces slightly, but is still significantly negative at the 5% level. Credit spread excludes the macro-control components, and therefore can better measure banks' view on loan risk.

Our findings reveal that guarantors and banks disagree on loan risk assessment. The sources of information they rely on are fundamentally different. Black (1975) and Fama (1985) suggest that banks are "special" monitors of their borrowers because their role in the payment system gains them privileged information. Mester, Nakamura and Renault (2006) find that cash flows into and out of a borrower's transaction account can help an intermediary monitor its borrower. Transactions are inherently informative. Besides, Jiménez, Salas and Saurina (2006) mention the possibility that banks sort borrowers not only under observed risk, but also under private information. All above

evidence indicates that banks have information advantage generated from lower cost of information collection and its ability of tracking borrowers' transaction accounts. Furthermore, loan officers feed borrowers' information into systems and a loan rate is calculated automatically. In contrast, guarantee officers collect information in a more personal way. They mainly collect information by visiting borrowers' workplace, inspecting its operation and talking to the managers. Both information collection and scoring process involve more subjective views and discretion. These discrepancies can potentially lead to deviations in risk assessment. However, a drawback of this explanation lies in that different information channel may leads to uncorrelated risk measure by banks and guarantors, but not necessarily contradicting results.

Another possible explanation is through the collateral channel. There are two competing views on the use of collateral: the ex-ante commitment view and ex-post hedging view. Jiménez, Salas and Saurina (2006) provide comprehensive analysis of these theories and concluded that among borrowers with observable credit quality, high-risk borrowers are associated with higher likelihood of using collateral, while among borrowers with unobservable credit quality, the use of collateral is a signal of high credit quality. Along with their analysis, if borrowers' credit quality is more observable to banks than guarantors, we should expect that positive relationship between borrower risk and use of collateral applies to banks, while the latter theory of the signaling role of collateral is better curtailed for guarantors. Since the two theories predict relations between collateral and borrower risk in opposite direction, it may work as a potential explanation for the disagreement between the bank and the guarantor.

The disagreement result is suggestive of "lazy lender" story, elaborated in the theoretical model by Manove, Padilla and Pagano (2001). Supposedly, banks and other financial institutions that fund numbers of investment projects are likely to be more knowledgeable about project quality

than are many of the entrepreneurs they lend to, because banks may have considerable experience in appraising similar projects and may be more familiar with general economic trends. However, if the screening services of banks can not be enforced by contract, banks that are highly protected by collateral may perform too little screening of the projects that they finance, which leads to a “lazy bank” problem. In bank lending with loan guarantee, with the right to take over and liquidate collateral, guarantors take over banks and become highly protected by collateral. Similar with the arguments provided in Manove, Padilla and Pagano (2001), it is very likely that protection from posted collateral would reduce guarantor’s incentive to screen and monitor, leading to the arising of inefficiency. Positive relation between guarantor’s risk measure and collateralization rate serves as strong evidence showing that guarantors are subject to the “lazy lender” problem. In contrast, banks are derived of the right to claim on posted collateral because of the use of guarantee. Without the protection from collateral, banks tend to resume its project-evaluation business and focus more on ex-ante commitment role of collateral. That is, banks use collateral only to correct moral hazard problems. Banks are not expected to rely heavily on collateral as guarantors do.

Moreover, the risk sharing mechanism in guaranteed loan may lead to reversion of seniority of banks and guarantors, which can also potentially lead to deviation between banks and guarantors in measuring borrower risk. Without protection from collateral, guarantors take the first and major loss at loan default and act as junior bondholder, while banks cover the minority of loss and act as senior bondholder. However, with protection from collateral, in the case of default, guarantors can exercise its right to take over and liquid collateral. They make payments to banks using money from collateral liquidation, while banks lose their control over posted collateral and become exposed to the rest part of the loss. In this scenario, guarantors become more senior than banks. Seniority of banks and guarantors is reversed. Banks would more concerned with borrowers’ real business risk

without of protection from collateral. Therefore, banks and guarantors may be faced with different part of the distribution and different types of risk although they are lending to the same borrower.

B. Who is Correct?

We have seen that guarantor's risk measure is inconsistent with loan rate. The next question is which of the two ex-ante risk assessment can better predict loan default. To accommodate the fact that the guarantee is triggered as long as a borrower fails to repay any amount of the loan, we consider a loan in default if the borrower stopped paying at any point within one year from the loan is initiated. Table V reports the estimation of the following probit model:

$$Loan Default_i = \alpha_i + \beta_{1i} Loan Rate_i / Guarantor's Risk Measure + \beta_{2i} X_i + \varepsilon_i$$

Loan Default is a dummy variable indicating whether the borrower ever failed to repay the loan. Following Berger, Frame and Ioannidou (2011) and Chang, Liao, Yu and Ni (2010), we allow Borrower Characteristics, Loan Characteristics and Credit History to enter the regression as controls. Loan Rate is positively associated with ex-post default across all specifications, suggesting that higher loan rate is associated with higher default probability, *ceteris paribus*. This predictive power is statistically significant at the 5% level.

We run similar regression with Guarantor's Risk Measure as the independent variable. The results are insignificant. To save space we do not report the estimation results. This suggests that, guarantor's risk measure has no predictive power on loan default.

This result is unsurprising if we note that banks have substantial advantage in information collection and risk assessment. A strand of literature has demonstrated that commercial banks have incentive to investigate and monitor borrower in order to resolve incentive problems between borrowers and lenders (i.e., Diamond (1984)). A more powerful explanation is from the incentive

perspective mentioned in Section A. With the existence of loan guarantee, banks lose their control over collateral in a loan default case, which motivates them to resume their project-evaluation business. Banks have to be concerned with real business risk and project quality because they can no longer rely on collateral to cover the portion of loss they assumed. Therefore, loan rate is expected to be more suggestive of project quality, which can be measured by ex-post default, than guarantor's risk measure is.

However, the results of guarantor's risk measure somewhat challenge the view that soft information contributes to default prediction. Without a reliable record of borrowers' creditworthiness, guarantors largely rely on information collected by individual guarantee officers by visiting borrowers' factory and talking with borrowing firms' managers. A large amount of soft information and subjective discretion is considerably involved in the process. Guarantors' informal information channel and their limited technology in risk assessment may lead to biased default prediction. To further study the effects of hard and soft information collected by guarantors, we apply the above probit model to the quantitative score and qualitative score calculated by the guarantor. Supposedly, the quantitative score is based on public accounting data. The qualitative score is based on guarantee officer's subjective judgment on borrower's creditworthiness. We confirm the components of each score with additional test. We also apply the above probit model to the credit scores. Our findings suggest that neither of these scores can predict loan default.

V. Loan Rate, Guarantor's Risk Measure and Collateralization

A. Loan Rate and Collateralization

So far we have shown that guarantor's risk measure is inconsistent with loan rate charged by lending banks, and loan rate has predictive power on loan default. Next, we attempt to explain these findings by picturing the underlying economic mechanism.

The most prominent features in bank lending are asymmetric information and moral hazard. A series of studies attempt to investigate these issues by discussing the role of collateral. Explaintions for the use of collateral can be divided into two categories. Liberti (2010) argues that the commitment view alone can explain collateralization. Collateral is used as a commitment to mitigate asymmetric information and incentive problems, and thus is uncorrelated with ex-post realized default. However, another strand of literature, such as Berger, Frame and Ioannidou (2011) support the ex-post theories that observable riskier borrowers are more likely to be required to pledge collateral. Motivated by these studies, we conjecture that the use of collateral is a possible channel to solve the puzzling findings. We estimate the following specification:

$$LoanRate_i = \alpha_i + \beta_{1i} Collateralization_i + \beta_{2i} X_i + \varepsilon_i$$

Collateralization is the ratio of collateral value to amount of loan. Apart from the control variables used in above analysis, we add State-owned Bank dummy and Crisis dummy to account for heterogeneity across banks and time period. Crisis refers to the credit crisis period from 2007 to 2009. Loans initiated during July of 2007 to June of 2009 have Crisis dummy equal to one.

Table VI represents the results on interaction between loan rate and collateralization. Positive coefficients of collateralization across all specifications suggest that borrowers pledging higher ratio of collateral are associated with higher loan rate. Accounting for borrower and loan characteristics, and credit history, one percentage increase in collateralization will result in 9 basis point increase in loan rate.

B. Guarantor's Risk Measure and Collateralization

Similarly, we test the relation between Guarantor's Risk Measure and Collateralization with the following model:

$$Guarantor's\ Risk\ Measure_i = \alpha_i + \beta_{1i} Collateralization_i + \beta_{2i} X_i + \varepsilon_i$$

Accordingly, we change control variables except Borrower Characteristics. To account for discrepancy of the information collected by the guarantor and heterogeneous guarantee officers' capacity, we use Guarantor's Private Information and Guarantor Characteristics as alternative controls.

Guarantor's Private Information includes Guaranty History, Loan History and Political Background. Guaranty History is a dummy variable indicating whether a borrower has be guaranteed by the same guarantor before. Loan History is a dummy variable indicating whether the borrower have obtained bank loan before. Political Background is a dummy variable indicating whether the manager of a borrowing firm has acted as a representative of Peoples' Congress of China. Guarantor Characteristics incorporate dummy variables as Low Capacity, Master Degree and Above, Female and Married. Low Capacity indicates whether the individual guarantee officer has relatively lower capacity, measure by working as a guarantee officer for over 8 years without promotion. Master Degree and Above indicates the education background of guarantee officers. Female indicates the gender of the officer. Married indicates the officer's marital status. Potentially, personal characteristics can affect loan decision as suggested by Andrea, Borisov and Zazzaro (2010).

The regression results are shown in Table VII. Significantly positive coefficients of collateralization provide strong evidence that higher rate of guarantee fee is associated with higher collateralization. This result is reasonable if we note that the guarantor will take over the pledged

collateral in the case of loan default. Liquidation of collateral provides the major source of payment by the guarantor. Therefore, higher collateralization reduces the possibility that guarantors use own funds to cover the loss of default. The guarantor is expected to give higher risk measure to borrowers having lower collateralization rate.

The negative coefficients of ROA and Asset Turnover ratio, and the positive coefficients of Leverage ratio suggests that guarantors take into accounting information into consideration, when deciding upon the guarantee fee.

Interestingly, the coefficients of Political Background dummy are significantly negative across all specifications. Potential explanation is that managers who have been elected as representative of Peoples' Congress of China tend to have more personal connections with the guarantor, and therefore can influence the guarantor's risk measure and other decisions. One can argue that borrowers with a politically influential manager tend to be high-quality and high-creditworthiness ones. However, this conjecture can be ruled out with controls for borrower characteristics. A caveat is that public accounting information is unreliable and thus is not linked to real credit quality. This concern becomes more apparent with the evidence that the quantitative score has no predictive power on loan default. Along with the evidence about managers' political background, we question the use of soft information collected by the guarantor.

C. **Determinants of Collateralization**

In this subsection we examine the relation between collateral type and collateralization. If high ex-ante risky borrowers are required of high collateralization, then borrowers which pledge less redeployable collateral would be required of even higher collateralization, because decreased collateral redeployability can diminish the ability of collateral to hedge loss in the case of default. Therefore, less redeployable collateral will have a positive effect on ex-ante risk measure

(Benmelech and Bergman, 2009). Compared with general assets such as property, borrower-specific assets such as machine and inventory are more difficult to be redeployed. Therefore, we expect borrowers pledging firm-specific assets as collateral are required of higher collateralization.

Table VIII reports the regression results showing the determinants of collateralization. As expected, Borrower-specific Collateral dummy is positively associated with collateralization. The positive relation remains significant after controlling for borrower characteristics, loan characteristics and credit history. The effect is both statistically and economically significant. Borrowers pledging firm-specific assets as collateral are required of a 69.13% increase in collateralization. Further, as can be seen in the table, Loan History dummy has a negative coefficient, indicating that borrowers which have borrowed multiple times from banks are required of lower collateralization. This is consistent with the finding of Berger and Udell (1995) that relationship lending improves the terms of the loan.

D. Prediction of Loan Default

Our previous analysis has shown that higher loan rate is associated with higher collateralization, and that loan rate has predicative power on loan default. This finding is consistent with that of Inderst and Mueller (2007), which provides a model predicting that collateralized loans are more likely to default ex-post. Our empirical evidence echoes the theoretical prediction.

We now turn to examine other determinants of loan default, apart from loan rate. We run the following Probit model:

$$Loan\,Default_i = \alpha_i + \beta_{1i} Laon\,Rate_i + \beta_{2i} Borrower\,Characteristics_i + \beta_{3i} Credit\,History + \beta_{4i} Loan\,Characteristics + \beta_{5i} Guarantor's\,Private\,Information + \beta_{6i} Guarantee\,Officer\,Characteristics + \varepsilon_i$$

Variables in interest in Borrower Characteristics category are Firm Age and Abnormal Book Value of Shareholder Equity. We regress borrowers' book value of shareholder equity on

accounting variables as Size, ROA, Leverage, Asset Turnover ratio and Sales Growth rate and take the residual as the measure of abnormal book value. Other variable definitions follow previous description. We present results in Table XI. Unsurprisingly, older firms, firms with borrowing history and firms with a credit rating have lower propensity of default. It is worth noting that Abnormal Book Value of Shareholder Equity has a positive effect on default probability. Intuition behind is that borrowers with abnormally high book value have higher propensity to default on bank loans. Presumably, book value of shareholder equity should not deviate a lot from the prediction of accounting data. Our results show that borrowers which "exaggerated" book value are more likely to default on loans. This finding reveals the possibility that borrowers may cheat on its reported book value.

Finally, the Low Capability dummy has positive effect on default probability. This finding sheds light on the role of human capital for financial intermediaries. A number of studies provide evidence that financial intermediaries involve processing soft information[25]. Specifically, Qian, Strahan and Yang (2010) provides evidence that decentralization in bank system can provides stronger incentives for individual loan officers to produce soft information. Therefore, the personal characteristics of the loan officer/guarantee officer can affect quality of loans granted. Focarelli and Panetta (2003) pointed out that human capital is especially important for financial services and hi-tech industries. Bellucci, Borisov and Zazzaro (2010) argues that gender of loan officer and borrower can both play a role in bank-firm relationships. Bottazzi, Rin and Hellmann (2008) provides evidence for the importance of human capital for venture capital firms. The most relevant one is Berger and Udell (2004), which finds that an easing of credit standards is resulted from the deterioration in the ability of loan officers. In our study, it is the guarantee officers that produce a large amount of soft information, thus the ability of a guarantee officer can be associated with

[25] See, for example, Diamond (1984), Ramakrishnan and Thyakor (1984), or Allen (1990).

potential loan problems. We therefore expect the loan guarantees granted by a guarantee officer with lower capability are more likely to default. The results strongly support this expectation.

VI. Conclusion

Using a unique proprietary third-party guaranteed loans database in China, we investigate interaction between guarantors and lending banks in issuing guaranteed loans to SMEs. Our main finding is that guarantors and banks disagree on assessment of loan risk. To provide an explanation to this puzzling fact, we link the risk measure given by guarantors and banks to collateralization, because lack of sufficient collateral is regarded as the key rationale for the use of loan guarantees. We find that loan rate charged by banks is positively associated with collateralization and is predictive of loan default. In contrast, guarantor's risk measure is negatively associated with collateralization and has no predictive power on default.

These findings uncover the underlying mechanism in guaranteed loan pricing. The inconsistency between guarantor's risk measure and loan rate is suggestive of information frictions and inefficiency in lending process. Consistent with Ayyagari, Demirgüc-Kunt and Maksimovic (2010), we question the effectiveness of guaranteed loan, as a form of informal finance, in facilitating bank lending to SMEs. The implications of our findings provide support for the recent restriction and regulation of credit guarantee market in China.

This article also potentially contributes in solving the current debate on the role of collateral. The two competing views on collateral in bank lending are ex-ante commitment role in mitigating asymmetric information and ex-post hedge role in covering loss from loan default. The empirical framework of guaranteed loan provides an ideal set for separating and examining the two views. Investigation of the link between risk measure and collateralization helps us understand the role of

guarantors and banks. Furthermore, we identify a set of variables which have predictive power on loan default. Apart from loan rate, abnormal book value of shareholder equity also has positive effect on default probability. These findings provide further evidence that guarantors have limitations in identifying borrower quality and loan risk.

Given that the guarantor collects soft information in addition to the hard information used by banks, the lack of performance by the guarantor appears puzzling. This result is consistent with the "lazy lender" model as the guarantor takes collateral and overestimates borrower credit quality. Guarantor's main role is to facilitate regulatory arbitrage to circumvent the loan rate cap imposed by the regulators. Although guaranteed loans temporarily help SMEs get access to bank loans, our findings have implications for its limited role and question the effectiveness of such informal financing channels in mitigating information asymmetry and other incentive problems.

References

Acharya, Viral V., Philipp Schnabl, and Gustavo Suarez, 2010, Securitization without risk transfer, Working Paper, New York University and Federal Reserve Board.

Allen, Franklin, 1990, The market for information and the origin of financial intermediation, *Journal of Financial Intermediation* 1, 3-30.

Allen, Franklin, Elena Carletti and Robert Marquez, 2009, Credit market competition and capital regulation, *Review of Financial Studies* 24, 983-1018.

Allen, Franklin, Jun Qian and Meijun Qian, 2005, Law, finance, and economic growth in China, *Journal of Financial Economics* 77, 57-116.

Allen, Franklin, Jun Qian and Chenying Zhang, 2011, An alternative view on law, institutions, finance and growth, 2011, Working paper, University of Pennsylvania and Boston College.

Andrew Hertzberg, José M. Liberti, and Daniel Paravisini, 2010, Information and incentives inside the firm: Evidence from loan officer rotation, *Journal of Finance*, 65, 795-828.

Ayyagari, Meghana, Asli Demirguc-Kunt, and Vojislav Maksimovic, 2010, Formal versus informal finance: Evidence from China, *Review of Financial Studies* 23, 3048-3097.

Bailey, Warren, Wei Huang, and Zhishu Yang, 2010, Bank loans with Chinese characteristics: Some evidence on inside debt in a state-controlled banking system, *Journal of Financial and Quantitative Analysis*, Forthcoming.

Barth, James R., Chen Lin, Ping Lin and Frank M. Song, 2009, Corruption in bank lending to firms: Cross-country micro evidence on the beneficial role of competition and information sharing, *Journal of Financial Economics* 91, 361-388.

Beck, Thorsten, Asli Demirguc-Kunt, and Vojislav Maksimovic, 2008, Financing patterns around the world: Are small firms different? *Journal of Financial Economics* 89, 467-487.

Beck, Thorsten, Leora F. Klapper, and Juan Carlos Mendoza, 2010, The typology of partial credit guarantee funds around the world, *Journal of Financial Stabilities* 6, 10-25.

Bellucci, Andrea, Alexander Borisov, and Alberto Zazzaro, 2010, Does gender matter in bank-firm relationship? Evidence from small business lending, *Journal of Banking and Finance* 34, 2968-2984.

Benmelech, Efraim, and Nittai K. Bergman, 2009, Collateral pricing, *Journal of Financial Economics* 91, 339-360.

Berger, Allen N., and Gregory F. Udell, 2004, The institutional memory hypothesis and the procyclicality of bank lending behavior, *Journal of Financial Intermediation* 13, 458-495.

Berger, Allen N., Nathan H. Miller, Mitchell A. Petersen, Raghuram G. Rajan, and Jeremy C. Stein, 2005, Does function follow organizational form? Evidence from the lending practices of large and small banks, *Journal of Financial Economics* 76, 237-269.

Berger, Allen N., W. Scott Frame, and Vasso Ioannidou, 2011, Tests of ex-ante versus ex-post theories of collateral using private and public information, *Journal of Financial Economics 100*, 85-97.

Berger, Allen N., and Gregory F. Udell, 1995, Relationship lending and lines of credit in small firm finance, *Journal of Business* 68, 351-382.

Bester, Helmut, 1985, Screening versus rationing in credit markets with imperfect information, *American Economic Review* 75, 850-855.

Berkman, Henk, Rebel A. Cole, and Lawrence J. Fu, 2009, Expropriation through loan guarantees to related parties: Evidence from China, *Journal of Banking and Finance* 33, 141-156.

Bharath, Sreedhar, Sandeep Dahiya, Anthony Saunders, and Anand Srinivasan, 2007, So what do I get? The bank's view of lending relationships, *Journal of financial Economics* 85, 368-419.

Black, Fischer, 1975, Bank funds management in an efficient market, *Journal of Finance Economics* 2, 323-339.

Black, Sandra E., and Philip E. Strahan, 2002, Entrepreneurship and bank credit availability, *Journal of Finance* 57, 2807-2833.

Bottazzi, Laura, Macro Da Rin and Thomas Hellmann, 2008, Who are the active investors? Evidence from venture capital, *Journal of Financial Economics* 89, 488-512.

Boot, Arnoud W.A., Stuart I. Greenbaum, and Anjan V. Thakor, 1993, Reputation and discretion in financial contracting, *American Economic Review* 83, 1165-1183.

Carey, Mark, Mitch Post and Steven A. Sharpe, 1998, Does corporate lending by banks and finance companies differ? Evidence on specialization in private debt contracting, *Journal of Finance* 53, 845-878.

Cerqueiro, Geraldo, Hans Degryse, and Steven Ongena, 2011, Rules versus discretion in loan rate setting, *Journal of Financial Intermediation*, Forthcoming.

Chang, Chun, Guanmin Liao, Xiaoyun Yu, and Zheng Ni, 2010, Information from relationship lending: Evidence from loan default in China, Working paper, Indiana University.

Chen, Jeff Zeyun, Gerald J. Lobo, Yanyan Wang and Lisheng Yu, 2011, Loan collateral and accounting conservatism, Working Paper, University of Colorado at Boulder, University of Houston and Xiamen University.

Chong, Terrence T., Liping Lu, and Steven Ongena, 2010, Does banking competition alleviate or worsen credit constraints faced by small and medium enterprises? Evidence from China, Working paper, Tilburg University.

Cook, Douglas O., and Lewis J. Spellman, 1996, Firm and guarantor risk, risk contagion, and the interfirm spread among insured deposits, *Journal of financial and quantitative analysis* 31, 265-281.

Coval, Joshua D., and Anjan V. Thakor, 2005, Financial intermediation as a beliefs-bridge between optimists and pessimists, *Journal of Financial Economics* 75, 535-569.

Degryse, Hans, Jose Maria Liberti, Steven Ongena and Thomas Mosk, 2011, The added value of soft information, Working Paper, Tilburg University and DePaul University.

Diamond, Douglas W., 1984, Financial intermediation and delegated monitoring, *Review of Economic Studies* 51, 393-414.

Diamond, Douglas W., 2001, Liquidity risk, Liquidity creation, and financial fragility: A theory and banking, *Journal of Political Economy* 109, 287-327.

Duffie, Darrell, Leandro Saita, and Ke Wang, 2007, Multi-period corporate default prediction with stochastic covariates, *Journal of Financial Economics* 83, 635-665.

Fama, Eugene F., 1985, What's different about banks? *Journal of Monetary Economics* 15, 29-40.

Focarelli, Dario, and Fabio Panetta, 2003, Are mergers beneficial to consumers? Evidence from the market for bank deposits, *American Economic Review* 93, 1152-1172.

Grunert, Jens, and Lars Norden, 2010, Bargaining power and information in SME lending, Working Paper, University of Tuebingen and Erasmus University.

Hale, Galina, and Joao A.C.Santos, 2009, Do banks price their informational monopoly? *Journal of Financial Economics* 93, 185-206.

Hauswald, Robert, and Robert Marquez, 2006, Competition and strategic information acquisition in credit markets, *Review of Financial Studies* 19, 967-1000.

Hertzberg, Andrew, Jose Maria Liberti, and Daniel Paravisini, 2010, Information and incentives inside the firm: Evidence from loan officer rotation, *Journal of Finance* 65, 795-828.

Honohan, Patrick, 2008, Partial credit guarantees: Principles and practice, World Bank mimeo.

Inderst, Roman, and Holger M. Mueller, 2007, A lender-based theory of collateral, *Journal of Financial Economics* 84, 826-859.

Ivashina, Victoria, 2009, Asymmetric information effects on loan spreads, *Journal of Financial Economics* 92, 300-319.

Jimenez, Gabriel, Steven Ongena, Jose-Luis Peydro, and Jesus Saurina, 2010, Credit supply: Identifying balance-sheet channels with loan applications and granted loans, Working Paper.

Kashyap, Anil K., Raghuram Rajan, and Jeremy C. Stein, 2002, Banks' as liquidity providers: An explanation for the coexistence of lending and deposit-taking, *Journal of Finance* 57, 33-73.

Li, Wenli, 1998, Government loan, guarantee, and grant programs: An evaluation, *Federal Reserve Bank of Richmond Economic Quarterly* 84, 25-51.

Li, Zhiru, 2010, Discussions on improving SMEs credit guarantee system, Enterprise Strategy 362, 23-25 (in Chinese).

Liberti, Jose Maria, 2010, Uncovering collateral constraints, Working Paper, DePaul University, Tilburg University and European Banking Center.

Liberti, Jose Maria, and Atif R. Mian, 2009, Estimating the effect of hierarchies on information use, *Review of Financial Studies* 22, 4058-4090.

Mankiw, N. Gregory, 1986, The allocation of credit and financial collapse, *Quarterly Journal of Economics* 101, 455-469.

Manove, Michael, A. Jorge Padilla, and Marco Pagono, 2001, Collateral versus project screening: A model of lazy banks, *RAND Journal of Economics* 32, 726-744.

Mester, Loretta J., Leonard I. Nakamura, and Micheline Renault, 2006, Transactions accounts and loan monitoring, *Review of Financial Studies* 20, 529-556.

Norden, Lars, and Martin Weber, 2010, Credit line usage, checking account activity, and default risk of bank borrowers, *Review of Financial Studies* 23, 3665-3699.

Pagura, Maria, and Marié Kirsten, 2008, Formal-informal financial linkages: Lessons from developing countries, Working Paper, United Nations and Development Bank of Southern Africa.

Peterson, Mitchell A., 2004, Information: Hard and soft, Working Paper, Northwestern University and NBER.

Petersen, Mitchell A., and Raghuram G. Rajan, 2002, Does distance still matter? The information revolution in small business lending, *Journal of Finance* 57, 2533-2570.

Qian, Jun, Philip E. Strahan, and Zhishu Yang, 2010, The impact of organizational and incentive structures on soft information: Evidence from bank lending, Working paper, Boston College.

Rajan, Raghuram, and Andrew Winton, 1995, Covenants and collateral as incentives to monitor, *Journal of Finance* 50, 1113-1146.

Ramakrishnan, Raghu, and Anjan V. Thakor, 1984, Information reliability and a theory of financial intermediation, *Review of Economic Studies* 51, 415-432.

Rayo Luis and Ilya Segal, 2009, Optimal Information Disclosure, *Journal of Political Economy*, Forthcoming.

Santos, Joao A.C., and Andrew Winton, 2008, Bank loans, bonds, and information monopolies across the business cycle, *Journal of Finance* 63, 1315-1359.

Sapienza, Paula, 2002, The effects of government ownership on bank lending, *Journal of Financial Economics* 72, 357-384.

Schenone, Carola, 2009, Lending relationships and information rents: Do banks exploit their information advantages? *Review of Financial Studies* 23, 1149-1199.

Shim, Ilhyock, 2006, Corporate credit guarantees in Asia, *BIS Quarterly Review*, 85-98.

Stein, Jeremy C., 2002, Information production and capital allocation: Decentralized vs. hierarchical firms, *Journal of Finance* 57, 1891-1921.

Williamson, Stephen D., 1994, Do informational frictions justify federal credit programs? *Journal of Money, Credit and Banking* 26, 523-544.

Table I

Summary Statistics of Guaranteed Loans and Loan Defaults

This table reports the summary statistics of sample guaranteed loans by loan type and guarantee approval year, by lending banks and by collateral type. Guarantor's Risk Measure ranges from 0 to 1. Larger values represent higher loan risk perceived by the guarantor. Observations with no loan rate data are excluded from the sample. In Panel C, we define collateral consisting of machine or inventory as borrower-specific assets. See Appendix I for variable definitions.

Panel A. Summary Statistics by Year and Loan Type

All sample

Year	No. of Loans	No. of Loan Defaults	Guarantor's Risk Measure	Rate of Guarantee Fee (%)	Loan Rate (%)	Loan Amount (RMB 10,000)	Collateralization	Default Rate
2006	240	1	59.64%	1.91	1.00	445.38	78.85%	0.42%
2007	343	11	49.34%	1.80	5.88	607.18	69.96%	3.21%
2008	310	3	43.30%	1.66	5.50	528.60	84.99%	0.97%
2009	159	0	45.87%	1.47	3.89	486.23	80.36%	0.00%
Total	1052	15	49.39%	1.73	4.35	528.83	77.97%	1.43%

Loans by Bank

Year	No. of Loans	No. of Loan Defaults	Guarantor's Risk Measure	Rate of Guarantee Fee (%)	Loan Rate (%)	Loan Amount (RMB 10,000)	Collateralization	Default Rate
2006	171	1	57.71%	2.12	1.13	478.01	77.58%	0.58%
2007	258	8	48.33%	2.04	6.89	602.40	66.14%	3.10%
2008	238	3	42.35%	2.00	6.95	567.06	84.81%	1.26%
2009	105	0	44.88%	1.98	5.41	478.19	74.53%	0.00%
Total	772	12	48.09%	2.04	5.43	547.06	75.55%	1.55%

Loans by Government

Year	No. of Loans	No. of Loan Defaults	Guarantor's Risk Measure	Rate of Guarantee Fee (%)	Loan Rate (%)	Loan Amount (RMB 10,000)	Collateralization	Default Rate
2006	39	0	66.59%	1.05	1.19	301.28	79.03%	0.00%
2007	42	1	55.10%	1.13	0.17	286.76	59.73%	2.38%
2008	66	0	46.26%	0.59	0.17	400.08	84.47%	0.00%
2009	45	0	47.40%	0.37	0.12	388.89	90.66%	0.00%
Total	192	1	52.59%	0.75	0.37	352.60	79.38%	0.52%

Entrusted Loans by Guarantor

Year	No. of Loans	No. of Loan Defaults	Guarantor's Risk Measure	Rate of Guarantee Fee (%)	Loan Rate (%)	Loan Amount (RMB 10,000)	Collateralization	Default Rate
2006	30	0	61.60%	1.81	0.00	446.67	85.77%	0.00%
2007	43	2	49.67%	1.01	5.37	948.84	102.91%	4.65%
2008	6	0	49.60%	0.02	6.34	416.67	98.00%	0.00%
2009	9	0	49.78%	1.07	5.01	1066.67	96.92%	0.00%
Total	88	2	53.79%	1.22	3.57	753.41	96.12%	2.27%

Panel B. Summary Statistics by Lending Bank

Lending Bank	No. of Loans	No. of Loan Defaults	Guarantor's Risk Measure	Rate of Guarantee Fee (%)	Loan Rate (%)	Loan Amount (RMB 10,000)	Collateral Ratio	Default Rate
Industrial and Commercial Bank of China	37	0	43.49%	1.93	6.63	457.03	75.50%	0.00%
Bank of China	13	0	50.92%	1.98	2.75	1107.69	58.89%	0.00%
China Construction Bank	122	4	50.04%	2.02	6.14	505.90	59.01%	3.28%
China Development Bank	5	0	81.40%	1.64	1.60	3600.00	22.86%	0.00%
China Bank of Communications	31	1	50.97%	2.05	5.58	491.61	53.78%	3.23%
China Everbright Bank	4	0	73.50%	0.00	5.50	100.00	110.58%	0.00%
China Industrial Bank	63	0	48.10%	1.80	4.58	528.89	84.51%	0.00%
China Merchants Bank	14	0	47.79%	2.06	4.00	667.86	69.70%	0.00%
China Minsheng Bank	8	0	61.13%	0.25	0.00	467.50	59.02%	0.00%
China Pingan Bank	451	6	47.36%	1.80	5.03	517.74	84.59%	1.33%
Huaxia Bank	115	3	56.96%	1.19	0.35	341.17	74.96%	2.61%
Guangdong Development Bank	29	0	42.10%	0.02	0.00	501.72	66.38%	0.00%
Pudong Development Bank	88	1	46.39%	2.06	5.65	623.18	85.39%	1.14%
Shenzhen Development Bank	26	0	48.42%	2.03	6.31	816.15	88.90%	0.00%
Others	46	0	57.35%	1.74	0.64	432.70	81.21%	0.00%
Total	1052	15	49.39%	1.73	4.35	528.83	77.97%	1.43%

Panel C. Summary Statistics by Collateral Type

Collateral Type	No. of Loans	No. of Loan Defaults	Guarantor's Risk Measure	Rate of Guarantee Fee (%)	Loan Rate (%)	Loan Amount (RMB 10,000)	Collateralization	Default Rate
Borrower Non-Specific Assets								
Property	799	11	47.29%	1.75	4.53	541.75	80.53%	0.00%
Car	4	0	56.00%	2.03	6.07	180.00	73.11%	0.00%
Guarantee Deposit	18	0	55.11%	1.12	1.85	416.11	44.81%	0.00%
Cash	2	0	64.50%	1.00	2.66	400.00	56.67%	0.00%
Property, Car	12	0	47.92%	1.93	5.30	321.67	74.32%	1.38%
Property, Guarantee Deposit	11	0	57.30%	1.29	2.65	355.00	62.00%	0.00%
Property, Cash	4	0	51.50%	0.98	4.78	375.00	73.46%	0.00%
Private Equity	3	0	59.00%	1.43	5.01	1033.33	193.46%	0.00%
Borrower-Specific Assets								
Guarantee Deposit, Machine	1	0	50.00%	2.10	5.84	300.00	149.23%	0.00%
Inventory	2	0	67.00%	0.51	0.00	280.00	136.90%	0.00%
Machine	33	0	54.27%	1.84	4.17	263.64	172.82%	0.00%
Machine, Car	1	0	55.00%	3.00	8.22	100.00	120.40%	0.00%
Property, Machine	55	2	52.06%	1.80	4.47	581.73	122.14%	0.00%
Property, Cash, Machine	2	1	54.50%	0.00	4.00	425.00	87.04%	0.00%
n/a	105	1	59.01%	1.78	3.66	530.87	0.00%	0.00%
Total	1052	15	49.39%	1.73	4.35	528.83	77.97%	1.43%

Table II

Borrowing Firms' Characteristics and Correlation Analysis

This table reports borrower characteristics and correlation between variables. Accounting data are extracted for the year prior to the approval of a loan guarantee. Firms without total asset or sales data are excluded from the sample. Variables in Panel B are: (1) Collateralization; (2) Guarantor's Risk Measure; (3) Rate of Guarantee Fee; (4) Credit Score; (5) Size; (6) Leverage; (7) ROA; (8) Asset Turnover; (9) Cash/Total Asset; (10) Sales Growth. Numbers in the second row for each variable are p-values. All Variables are winsorized at 1% level. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Panel A. Borrower Characteristics: Non-default vs. Default

	Mean				Median			
Variable	All	Non-default	Default	Difference	All	Non-default	Default	Difference
Total Asset (RMB 10,000)	7000.45	7014.70	6078.73	935.969	3792.00	3792.00	3241.50	550.500
	(788)	(776)	(12)		(788)	(776)	(12)	
Asset Turnover	1.664	1.657	2.131	-0.474	1.355	1.346	1.917	-0.571
	(782)	(770)	(12)		(782)	(770)	(12)	
Cash/Total Asset	0.087	0.087	0.076	0.011	0.063	0.063	0.043	0.020
	(782)	(770)	(12)		(782)	(770)	(12)	
Collateralization	0.780	0.778	0.875	-0.097	0.627	0.628	0.615	0.013
	(1048)	(1033)	(15)		(1048)	(1033)	(15)	
No. of Employee	329.431	329.532	322.071	7.460	200.000	200.000	275.000	-75.000
	(1041)	(1027)	(14)		(1041)	(1027)	(14)	
Rate of Guarantee Fee (%)	1.733	1.735	1.560	0.175	2.000	2.000	2.000	0.000
	(1052)	(1037)	(15)		(1052)	(1037)	(15)	
Loan Rate (%)	4.350	4.322	6.340	-2.018**	5.841	5.841	7.655	-1.814***
	(1052)	(1037)	(15)		(1052)	(1037)	(15)	
Leverage	0.353	0.353	0.323	0.030	0.345	0.346	0.322	0.024
	(782)	(770)	(12)		(782)	(770)	(12)	
Guarantor's Risk Measure	0.494	0.494	0.504	-0.010	0.480	0.480	0.470	0.010
	(1048)	(1033)	(15)		(1048)	(1033)	(15)	
ROA	0.190	0.189	0.214	-0.025	0.164	0.164	0.171	-0.007
	(786)	(774)	(12)		(786)	(774)	(12)	
Sales (RMB 10,000)	9855.36	9876.06	8517.35	1358.71	5414.50	5444.00	5037.18	406.820
	(788)	(776)	(12)		(788)	(776)	(12)	
Sales Growth	-0.001	-0.005	0.307	-0.312	0.011	0.000	0.451	-0.451
	(774)	(762)	(12)		(774)	(762)	(12)	

Panel B. Correlation Matrix									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Guarantor's Risk Measure	-0.2569								
	<.0001								
Rate of Guarantee Fee	-0.1075	0.0009							
	0.0209	0.9846							
Credit Score	-0.0844	-0.4586	-0.0196						
	0.0708	<.0001	0.6755						
Size	0.0428	0.1188	-0.1585	-0.0972					
	0.3592	0.0108	0.0006	0.0372					
Leverage	-0.0443	0.1412	-0.0417	-0.3171	0.2498				
	0.3427	0.0024	0.3714	<.0001	<.0001				
ROA	-0.0013	-0.2561	-0.0002	0.4608	-0.3678	-0.2318			
	0.9779	<.0001	0.9966	<.0001	<.0001	<.0001			
Asset Turnover	-0.0055	-0.1893	-0.0259	0.0784	-0.2380	0.0551	0.2975		
	0.9064	<.0001	0.5783	0.0933	<.0001	0.2373	<.0001		
Cash/Total Asset	-0.0996	-0.0241	0.0473	0.0556	0.0040	0.1174	0.0970	0.0401	
	0.0326	0.6057	0.3100	0.2343	0.9325	0.0116	0.0374	0.3895	
Sales Growth	-0.0096	0.0512	-0.1243	-0.0145	0.5249	0.1870	-0.0977	0.2307	0.0784
	0.8366	0.2734	0.0075	0.7575	<.0001	<.0001	0.0362	<.0001	0.0925

Table III
Loan Rate Inconsistent with Guarantor's Risk Measure

This table reports the regression results for loan rate. The dependent variable is Loan Rate set by lending banks. The independent variable in interest is Guarantor's Risk Measure, ranging from 0 to 1. Larger value represents higher loan risk perceived by guarantor. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 6 are estimated with fixed year and industry effect controls. Model 2 and 6 are estimated with GMM to correct for heteroskedasticity. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model2	Model3	Model4	Model5	Model6
Guarantor's Risk Measure	-1.6074	-2.0999	-2.5424	-2.5312	-2.4749	-2.4749
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Borrower Characteristics						
Size			-0.0942	-0.1743	-0.2989	-0.2989
			(0.1414)	(0.0254)**	(0.0030)***	(0.0018)***
ROA			-0.1913	-0.2529	-0.7103	-0.7103
			(0.6218)	(0.5149)	(0.1963)	(0.1575)
Leverage			0.0950	0.1627	0.0843	0.0843
			(0.7451)	(0.5799)	(0.8204)	(0.8401)
Cash/Total Asset			0.6463	0.5852	1.5839	1.5839
			(0.2899)	(0.3374)	(0.0350)**	(0.0278)**
Sales Growth			-0.0040	-0.0015	0.0115	0.0115
			(0.9155)	(0.9684)	(0.8075)	(0.8059)
Asset Turnover			0.0433	0.0326	0.0198	0.0198
			(0.2672)	(0.4079)	(0.7274)	(0.7293)
Firm Age			0.0051	0.0046	-0.0014	-0.0014
			(0.6875)	(0.7158)	(0.9293)	(0.9272)
Loan Characteristics						
log (Loan Amount)				0.1307	0.2085	0.2085
				(0.0721)*	(0.0244)**	(0.0124)**
Credit History						
Loan History					0.3394	0.3394
					(0.1058)	(0.0512)*
Log (Current Loan)					0.0033	0.0033
					(0.9115)	(0.8783)
Rating					-0.0988	-0.0988
					(0.4085)	(0.4149)
Intercept	7.8956	1104.08	1005.60	1005.60	851.289	851.289
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0001)***
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Correction for Heteroskedasticity	No	Yes	No	No	No	Yes
Adjusted R-square (%)	14.24	18.06	14.63	15.33	42.21	39.56
No. of Observations	616	616	616	616	616	616

Table IV
Credit Spread Inconsistent with Guarantor's Risk Measure

This table reports the regression results for credit spread. The dependent variable is credit spread, which equals loan rate minus base rate. The independent variable in interest is Guarantor's Risk Measure, ranging from 0 to 1. Larger value represents higher loan risk perceived by guarantor. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 6 are estimated with fixed year and industry effect controls. Model 2 and 6 are estimated with GMM to correct for heteroskedasticity. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model2	Model3	Model4	Model5	Model6
Guarantor's Risk Measure	-0.4888	-0.6597	-0.9162	-0.9069	-1.1535	-1.1535
	(0.0278)**	(0.0008)***	(0.0004)***	(0.0004)***	(0.0005)***	(0.0002)***
Borrower Characteristics						
Size			-0.1499	-0.2164	-0.2255	-0.2255
			(0.0005)***	(0.0000)***	(0.0013)***	(0.0005)***
ROA			-0.3357	-0.3868	-0.5695	-0.5695
			(0.1924)	(0.1329)	(0.1441)	(0.1260)
Leverage			-0.1942	-0.1380	-0.0612	-0.0612
			(0.3166)	(0.4780)	(0.8087)	(0.8131)
Cash/Total Asset			0.1849	0.1341	0.2410	0.2410
			(0.6480)	(0.7397)	(0.6401)	(0.6093)
Sales Growth			0.0212	0.0232	0.0270	0.0270
			(0.3952)	(0.3487)	(0.4131)	(0.4186)
Asset Turnover			0.0124	0.0035	0.0044	0.0044
			(0.6316)	(0.8929)	(0.9123)	(0.8957)
Firm Age			-0.0015	-0.0019	-0.0016	-0.0016
			(0.8600)	(0.8210)	(0.8840)	(0.8723)
Loan Characteristics						
log (Loan Amount)				0.1085	0.1560	0.1560
				(0.0243)**	(0.0114)***	(0.0144)**
Credit History						
Log (Current Loan)					-0.0241	-0.0241
					(0.6432)	(0.6150)
Rating					-0.0852	-0.0852
					(0.2989)	(0.3074)
Intercept	0.7726	393.086	463.144	460.938	426.174	426.174
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Correction for Heteroskedasticity	No	Yes	No	No	No	Yes
Adjusted R-square (%)	0.63	5.34	13.93	14.74	11.69	11.69
No. of Observations	616	616	616	616	616	616

Table V
Loan Rate and Loan Default

This table reports the Probit regression results for loan default. The dependent variable is Loan Default dummy. The independent variable in interest is Loan Rate set by lending banks. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 5 are estimated with fixed year and industry effect controls. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model2	Model3	Model4	Model5
Loan Rate	0.2831	0.3280	0.4882	0.4881	0.6166
	(0.0264)**	(0.0307)**	(0.0258)**	(0.0252)**	(0.0154)**
Borrower Characteristics					
Size			0.0862	0.2166	0.2417
			(0.7163)	(0.4845)	(0.4603)
ROA			-1.2648	-1.3338	-1.6003
			(0.4528)	(0.4344)	(0.3883)
Leverage			0.3149	0.1688	0.9074
			(0.7712)	(0.8813)	(0.4841)
Cash/Total Asset			1.4117	1.3715	2.5131
			(0.4945)	(0.5073)	(0.2750)
Sales Growth			0.0531	0.0397	0.0712
			(0.7122)	(0.7854)	(0.6639)
Asset Turnover			0.1074	0.1263	0.0905
			(0.2963)	(0.2577)	(0.4627)
Firm Age			-0.1255	-0.1240	-0.1286
			(0.0596)*	(0.0590)*	(0.0846)*
Loan Characteristics					
Loan Amount				-0.2003	-0.1660
				(0.5382)	(0.6439)
Credit History					
Loan History					-1.1016
					(0.0169)**
Rating					-0.4974
					(0.2415)
Intercept	-4.2287	574.494	373.645	417.788	228.877
	(0.0000)***	(0.1866)	(0.5452)	(0.4948)	(0.7528)
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes
Wald Chi-square	10.16	13.55	10.00	10.16	13.55
Adjusted R-square (%)	9.94	17.93	35.46	36.24	53.56
No. of Observations	616	616	616	616	616

Table VI
Collateralization and Loan Rate

This table reports the effects of collateralization on Loan Rate. The dependent variable is Loan Rate set by lending banks. The independent variable in interest is collateralization, a ratio of collateral value to loan amount. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 6 are estimated with fixed year and industry effect controls. Model 2 and 6 are estimated with GMM to correct for heteroskedasticity. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model2	Model 3	Model 4	Model 5
Collateralization	0.0854	0.0854	0.0799	0.0972	0.0908
	(0.0399)**	(0.0626)*	(0.0546)*	(0.0286)**	(0.0143)**
Borrower Characteristics					
Size	-0.0883	-0.0883	-0.1685	-0.2652	-0.3111
	(0.1876)	(0.2182)	(0.0389)**	(0.0102)***	(0.0003)***
ROA	0.1799	0.1799	0.1197	-0.1682	-0.5580
	(0.6538)	(0.6669)	(0.7658)	(0.7636)	(0.2324)
Leverage	-0.1773	-0.1773	-0.1106	-0.1243	-0.1047
	(0.5584)	(0.5668)	(0.7165)	(0.7466)	(0.7436)
Cash/Total Asset	0.9138	0.9138	0.8464	1.8408	1.7018
	(0.1520)	(0.1251)	(0.1842)	(0.0179)**	(0.0087)***
Sales Growth	-0.0018	-0.0018	0.0010	0.0074	0.0237
	(0.9631)	(0.9610)	(0.9792)	(0.8801)	(0.5622)
Asset Turnover	0.0742	0.0742	0.0628	0.0803	0.0610
	(0.0674)*	(0.0707)*	(0.1254)	(0.1665)	(0.2081)
Firm Age	0.0024	0.0024	0.0018	-0.0012	-0.0045
	(0.8564)	(0.8567)	(0.8915)	(0.9410)	(0.7482)
Loan Characteristics					
log (Loan Amount)			0.1311	0.1936	0.1711
			(0.0849)*	(0.0429)**	(0.0321)**
Credit History					
Loan History				0.3047	0.1904
				(0.1589)	(0.2909)
Log (Current Loan)				-0.0013	0.0265
				(0.9656)	(0.2982)
Rating				-0.1791	-0.1812
				(0.1453)	(0.0776)*
State-owned Bank					0.3029
					(0.0071)***
Crisis					1.0830
					(0.0000)***
Intercept	903.694	903.694	900.130	760.715	854.937
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Year Fixed Effect Controls	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	Yes	Yes	Yes	Yes	Yes
Correction for Heteroskedasticity	No	Yes	No	No	No
Adjusted R-square (%)	14.24	14.24	14.63	12.84	39.10
No. of Observations	616	616	616	616	616

Table VII
Collateralization and Guarantor's Risk Measure

This table reports the effects of collateralization on Ex-ante loan risk measure perceived by guarantor. The dependent variable is Guarantor's Risk Measure, ranging from 0 to 1. Larger value represents higher loan risk perceived by guarantor. The independent variable in interest is Collateralization, a ratio of collateral value to loan amount. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 6 are estimated with fixed year and industry effect controls. Model 2 and 6 are estimated with GMM to correct for heteroskedasticity. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model2	Model3	Model4	Model5	Model6
Collateralization	-0.0230	-0.0231	-0.0242	-0.0250	-0.0254	-0.0252
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Borrower Characteristics						
Size			-0.0035	-0.0016	-0.0014	-0.0016
			(0.6522)	(0.8354)	(0.8572)	(0.8819)
ROA			-0.1257	-0.1185	-0.1250	-0.1212
			(0.0076)***	(0.0121)**	(0.0076)***	(0.0083)***
Leverage			0.1010	0.0940	0.0877	0.0891
			(0.0044)***	(0.0087)***	(0.0142)**	(0.0114)***
Cash/Total Asset			-0.0755	-0.0640	-0.0552	-0.0557
			(0.3113)	(0.3923)	(0.4608)	(0.4295)
Sales Growth			0.0023	0.0023	0.0018	0.0016
			(0.6137)	(0.6134)	(0.7044)	(0.7566)
Asset Turnover			-0.0119	-0.0113	-0.0111	-0.0110
			(0.0121)**	(0.0186)**	(0.0200)**	(0.1007)*
Firm Age			0.0009	0.0008	0.0007	0.0006
			(0.5533)	(0.5987)	(0.5420)	(0.7110)
Guarantor's Private Information						
Guaranty History				0.0054	0.0043	0.0038
				(0.6731)	(0.7393)	(0.7750)
Loan History				-0.0070	-0.0074	-0.0073
				(0.6026)	(0.5898)	(0.6029)
Political Background				-0.0238	-0.0237	-0.0237
				(0.0424)**	(0.0438)**	(0.0506)**
Guarantor Characteristics						
Low Capability					-0.0099	-0.0101
					(0.6196)	(0.6471)
Master Degree and Above					-0.0259	-0.0259
					(0.1328)	(0.1964)
Female					-0.0122	-0.0116
					(0.3709)	(0.4502)
Married					0.0032	0.0034
					(0.8497)	(0.8158)
Loan Characteristics						
Loan Amount						-0.0005
						(0.9708)
Intercept	0.4721	45.7683	41.0222	39.8911	36.5593	36.6564
	(0.0000)***	(0.0006)***	(0.0034)***	(0.0053)***	(0.0111)***	(0.0211)**
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Correction for Heteroskedasticity	No	Yes	No	No	No	Yes
Adjusted R-square (%)	2.91	5.00	11.59	11.72	11.73	11.34
No. of Observations	616	616	616	616	616	616

Table VIII
Determinants of Collateralization

This table reports the determinants of collateralization. The dependent variable is Collateralization, a ratio of collateral value to loan amount. Firm Specific Collateral is a dummy which takes the value of one if the collateral consists of firm specific assets such as machine and inventory, and zero if the collateral consists of general asset such cash, property and vehicles. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 5 are estimated with fixed year and industry effect controls. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Firm Specific Collateral	0.6913	0.7172	0.7635	0.9401	0.9947
	(0.0000)***	(0.0006)***	(0.0004)***	(0.0013)***	(0.0008)***
Borrower Characteristics					
Size		0.2088	0.1369	0.0782	0.0704
		(0.0136)**	(0.2087)	(0.6285)	(0.6642)
ROA		0.2351	0.1629	0.4145	0.3311
		(0.6336)	(0.7435)	(0.6172)	(0.6913)
Leverage		-0.2881	-0.2363	-0.1751	-0.1331
		(0.4425)	(0.5322)	(0.7532)	(0.8118)
Cash/Total Asset		-0.5349	-0.5666	-0.6890	-0.6593
		(0.5092)	(0.4847)	(0.5411)	(0.5601)
Sales Growth		-0.0152	-0.0120	0.0164	0.0184
		(0.7545)	(0.8041)	(0.8220)	(0.8009)
Asset Turnover		-0.0141	-0.0223	-0.1367	-0.1428
		(0.7721)	(0.6502)	(0.0931)*	(0.0807)*
Firm Age		-0.0262	-0.0269	-0.0205	-0.0229
		(0.1084)	(0.0999)*	(0.4068)	(0.3564)
Loan Characteristics					
log (Loan Amount)			0.1043	0.1308	0.1321
			(0.2963)	(0.3676)	(0.3645)
Credit History					
Loan History				-0.5478	-0.5850
				(0.0866)*	(0.0693)*
Log (Current Loan)				-0.0004	0.0040
				(0.9926)	(0.9270)
Rating				-0.2599	-0.2524
				(0.1454)	(0.1589)
Crisis					0.1617
					(0.3593)
State-owned Bank					-0.1495
					(0.4513)
Intercept	0.7727	-178.89	-180.17	-496.74	-523.92
	(0.0000)***	(0.2262)	(0.2229)	(0.0277)**	(0.0220)**
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes
Adjusted R-square (%)	3.79	5.33	5.35	7.57	7.49
No. of Observations	616	616	616	616	616

Table IX
Predication of Loan Default

This table reports the Probit regression results for determinants of loan default. The dependent variable is the Loan Default dummy. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2 to 7 are estimated with fixed time and industry effects, and borrower characteristics. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Loan Rate	0.2831	0.4807	0.5125	0.7351	0.6690	0.8114	1.6137
	(0.0264)**	(0.0217)**	(0.0231)**	(0.0129)**	(0.0214)**	(0.0341)**	(0.0693)*
Borrower Characteristics							
Firm Age		-0.1400	-0.1979	-0.2320	-0.2252	-0.2408	-0.4178
		(0.0467)**	(0.0189)**	(0.0198)**	(0.0251)**	(0.0288)**	(0.0318)**
Abnormal Book Value of Shareholder Equity			0.0001	0.0001	0.0001	0.0001	0.0002
			(0.0163)**	(0.0040)***	(0.0048)***	(0.0048)***	(0.0477)**
Credit History							
Loan History				-1.2783	-1.2305	-1.5078	-1.7200
				(0.0458)**	(0.0541)*	(0.0422)**	(0.0407)**
Rating				-1.0204	-0.9788	-1.1028	-0.9788
				(0.0762)*	(0.0907)*	(0.1131)	(0.0907)*
Guaranty History					0.1736	0.5742	1.2384
					(0.7881)	(0.4256)	(0.1944)
Guarantor Characteristics							
Low Capability							2.2216
							(0.0496)**
Intercept	-4.2287	-6.0452	-5.7547	-7.9220	-5.8430	-7.3984	-17.903
	(0.0000)***	(0.0336)**	(0.0564)*	(0.0366)**	(0.1557)	(0.1502)	(0.1351)
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Characteristics Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square (%)	9.74	33.20	43.38	62.35	63.84	71.36	81.15
Wald Chi-square	4.94	9.39	13.77	12.93	10.67	10.67	10.67
Accuracy Ratio (%)	20.53	55.21	78.35	80.52	82.01	79.44	82.73
No. of Observations	616	616	616	616	616	616	616

Figure I. Firm Major Financing Channel in China

This figure plots the major financing channels for firms in China. The horizontal axis represents all sources of funds. The vertical axis represents the percentage of firms choosing corresponding source as their major financing channel from 2006 to 2009. The data is extracted from a survey conducted by China Enterprises Survey System (CESS) in 2010.

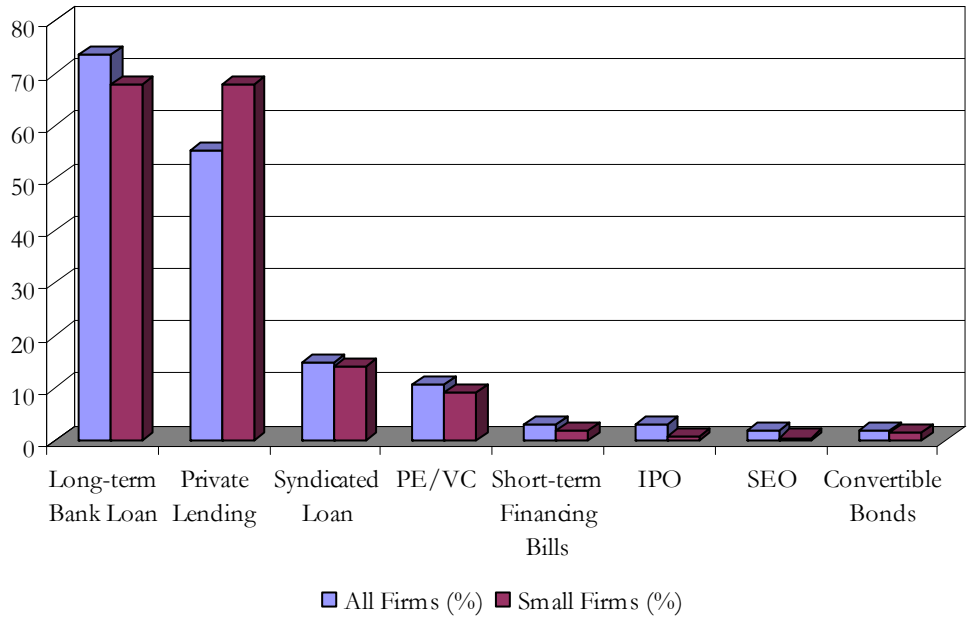


Figure II. Development of China Guarantee Market

This figure plots the number of credit guarantee firms in China from 2005 to 2010. The data is from a speech by the Head of Department of SMEs Credit Guarantee from China Banking Regulatory Commission (CBRC), and a research report prepared by Research In China Corporation.

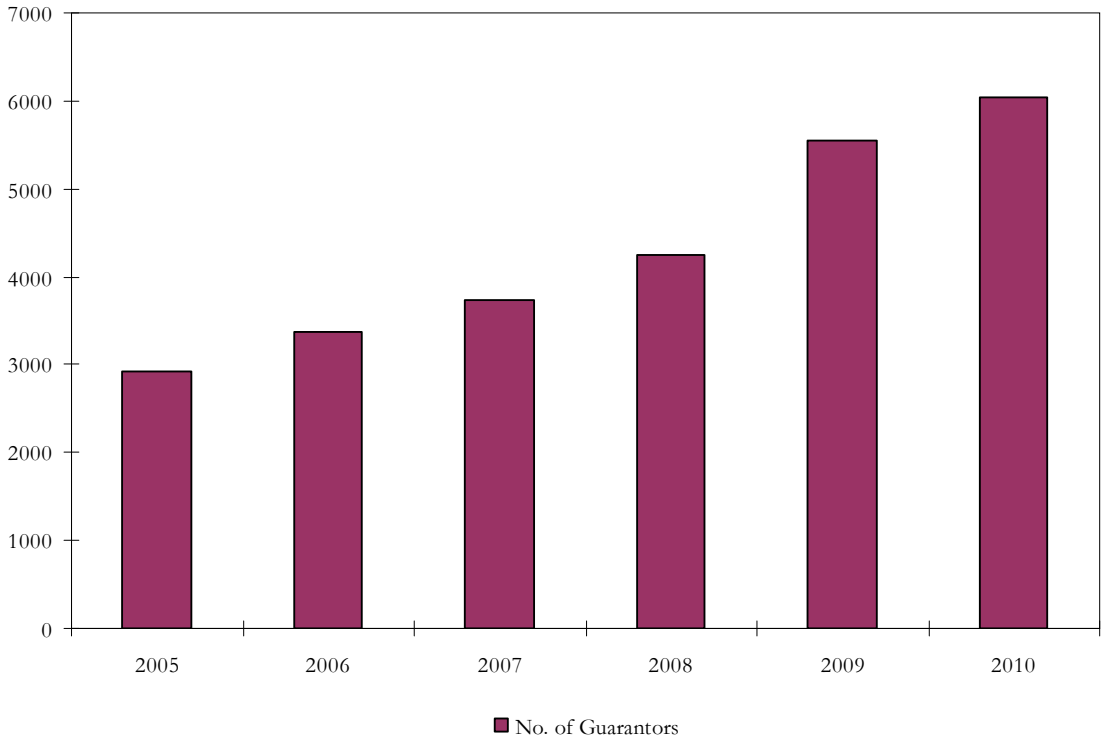


Figure III. Number and Type of Guaranteed Loans by Year

This figure plots the composition of sample guaranteed loans by guarantee approval year. The whole sample is composed of bank loans, government loans and entrusted loans. Observations without loan rate data are excluded from the sample. This figure is plotted with 1052 observations in total.

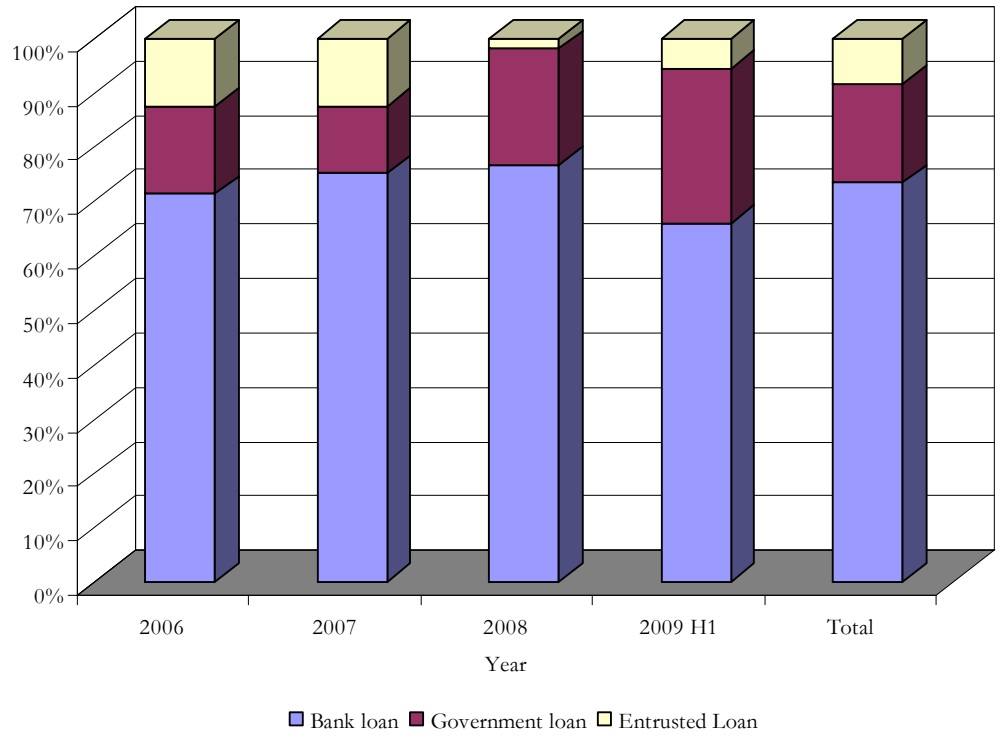


Figure IV. Number of Guaranteed Loans by Industry

This figure plots the sample guaranteed loans by borrower industry. Observations without loan rate data are excluded from the sample. Borrowers belong to following industries: 1. Wholesale; 2. Manufacturing; 3. I.T.; 4. Service; 5. Food; 6. Medicine; 7. Education; 8. Mining; 9. Construction; 10. Agriculture; 11. Transportation; 12. Others. This figure is plotted with 1052 observations in total.

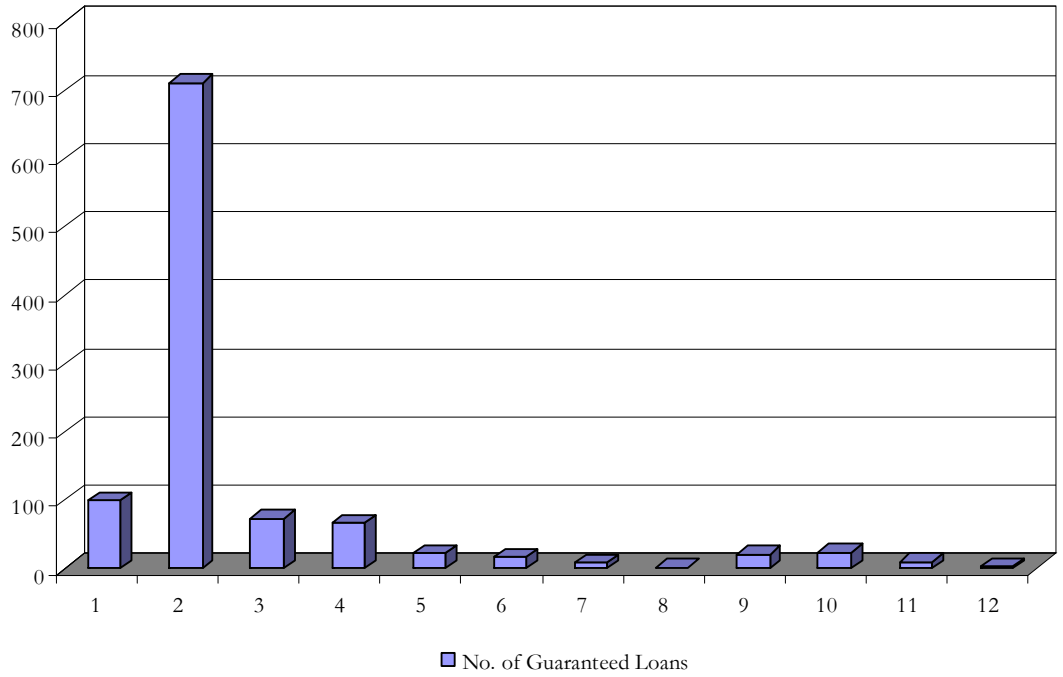


Figure V. Benchmark: Direct Bank Loan

This figure plots the combination of collateralization rate and default probability, in which a direct bank loan is applicable. The horizontal axis represents default probability π, and the vertical axis represents collateralization rate c. A direct bank loan is possible only if $c \geq \bar{r} - \frac{\bar{r} - r_0}{\pi}$ and $\pi < 1 - \frac{r_0 I}{\bar{X}}$. The area to the right of $\pi = 1 - \frac{r_0 I}{\bar{X}}$ represents negative NPV of the project.

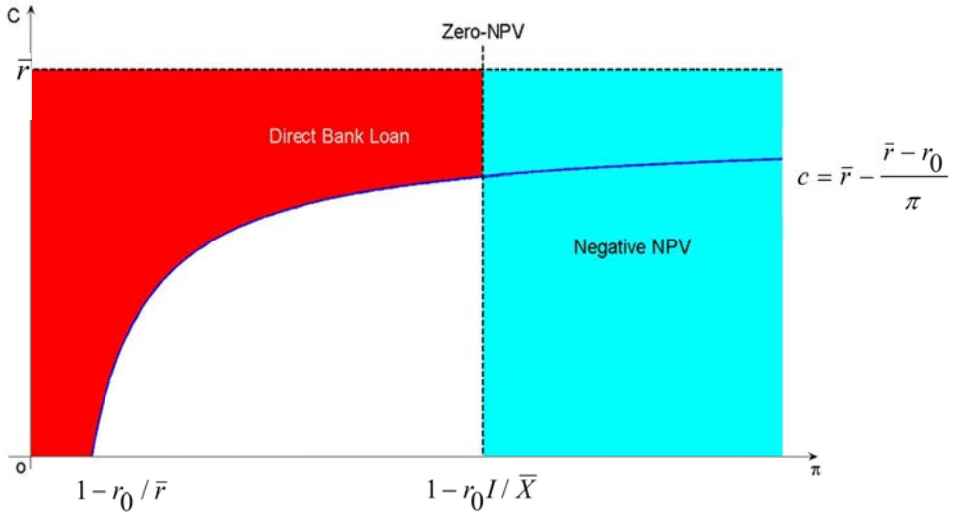
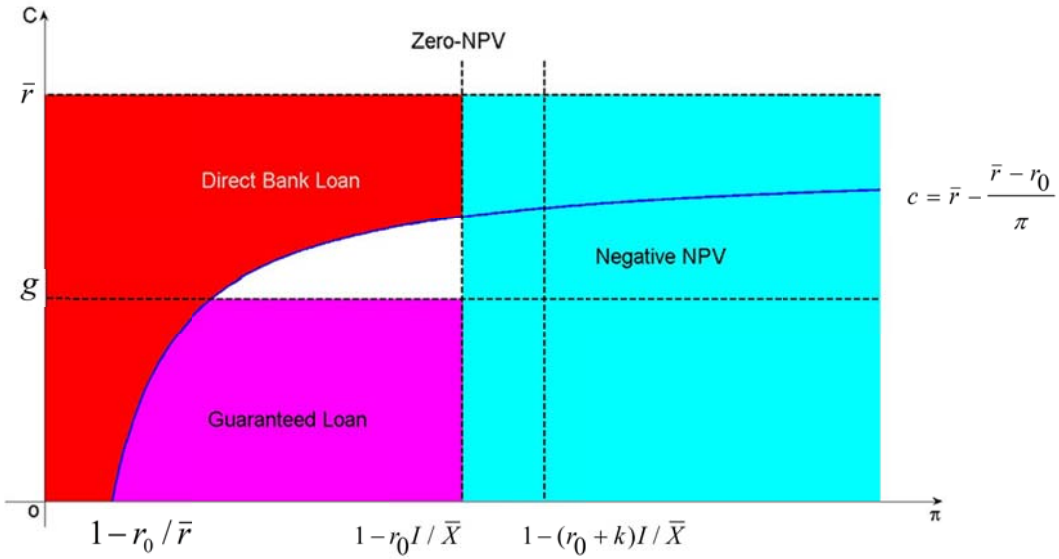


Figure VI. Guaranteed Loan

This figure plots the combination of collateralization rate and default probability, in which a direct bank loan or a guaranteed loan is applicable. The horizontal axis represents default probability π, and the vertical axis represents collateralization rate c. A direct bank loan is possible when $c \geq \bar{r} - \frac{\bar{r} - r_0}{\pi}$ and $\pi < 1 - \frac{r_0 I}{\bar{X}}$. A guaranteed loan is possible when $c < g$ and $c < \bar{r} - \frac{\bar{r} - r_0}{\pi}$. The area to the right of $\pi = 1 - \frac{(r_0 + k)I}{\bar{X}}$ represents negative NPV of the project.



Appendix I
Variable Definitions

Variables	Definition	Measure as of Year
Borrower Characteristics		
Abnormal Book Value of Shareholder Equity	The residual taken from regression of borrower's book value of shareholder equity on borrower characteristics, i.e., Size, Firm Age, ROA, Leverage, Asset Turnover, Sales Growth.	
Guaranty History	A dummy variable which equals one if a firm was guaranteed by the same guarantor before, and equals zero if not.	
Loan History	A dummy variable which equals one if a firm was granted loans before, and equals zero if not.	
No. of Loans	The number of loans a borrower has already had until the application of the guaranteed loan.	
Rating	A dummy variable taking the value of one if a borrower is rated by an independent rating agency, and zero otherwise.	
Firm Age	The number of years from a borrower's foundation date to its loan guarantee application date.	
Size	The natural log of book value of total assets at the end of the year.	
Leverage	Financial leverage, calculated as total liabilities divided by total assets at the end of the year.	These variables are measured at one year before the year when the loan was approved.
ROA	Return on assets, calculated as net income divided by total assets.	
ROA Growth	The incremental in ROA this year compared with the previous year.	
Asset Turnover	Asset turnover ratio, calculated as total sales divided by total assets.	
Sales Growth	The natural log of the division of sales of current year by that of previous year.	
Inventory Turnover	The ratio of Sales Cost to Average Value of Inventory in the same accounting year.	
Inventory Turnover Growth	Annual percentage growth rate of Inventory Turnover.	
Net Profit Growth	Annual percentage growth rate of Net Profit	
Relatives	A dummy variable that equals one if the borrowing firm's manager's relatives are working in the firm, and equals zero if not.	
Political Background	A dummy variable that equals one if the borrowing firm's manager has ever been elected as a representative of People's Congress of China, and equals zero if not.	

Loan Characteristics		
Loan Rate	Interest rate charged by lending banks	
Rate of Guarantee Fee	Percentage rate of credit guarantee fee charged by guarantor.	
Collateralization	The ratio of collateral value to finally approved guaranteed loan amount.	
Loan Amount	Finally approved guaranteed loan amount by guarantor.	
Guarantor Officer Characteristics		
Female	A dummy variable which takes the value of one if the guarantor officer is female, and zero otherwise.	These variables are measured at the year when the loan was approved.
Married	A dummy variable which takes the value of one if a guarantor officer has been married when approving a loan guarantee application, and zero otherwise.	
Low capacity	A dummy variable that equals one if the project manager in the guarantee firm had worked for 8 years or more at the year of loan application he/she was in charge of, and zero otherwise.	
Master Degree and Above	A dummy variable that equals one if the project manager in the gurantee firm has master's or doctor's degree, and zero otherwise.	
Lending Bank Characteristics		
State-owned Bank	A dummy variable that equals one if the loan-issuing bank is state-owned, and equals zero if not.	
Other Variables		
Loan Default	A dummy variable that equals one if a borrower defaults on its guaranteed loan, and equals zero otherwise. Default occurs if a firm fails to repay any amount of the loan.	This variable is measured within one year after the loan is originated.
Crisis	A dummy variable that equals one if the loan was approved between July 2007 and June 2009, and equals zero if the loan was approved before July 2007.	
Guarantor's Risk Measure	Guarantor's internal ex-ante credit risk measure. The score is between 0 and 1. The higher the score is, the riskier the short-term loan is perceived by the guarantor.	
Qualitative Score	A score given by guarantor. The calculation is based on the borrower's qualitative variables (i.e., borrower manager's ability, the firm's reputation, etc).	
Quantitative Score	A score given by guarantor. The Calculation is based on the borrower's quantitative variables (i.e., financial data, etc).	
Credit Score	The sum of qualitative score and quantitative score.	