Does Informal Finance Help Formal Finance? Evidence from Third Party Loan Guarantees[1]

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January 15, 2011

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 regulator.

[1] We thank Franklin Allen, Yongxiang Wang, Tong Yu, Yiming Qian, Jun Qian, Na Wang, Chenyang Wei, Jingzhi Huang, Maggie Chen, Linkun Shi, Frank M. Song, Wing Suen, Xianming Zhou, Tse-Chun Lin, Hong Liu, Rujing Meng, Chun Xia, Huiyan Qiu, Liu Zheng, Qianqian Du, Jun Yang, Yu Yuan, Chenying Zhang, Henry Oppenheimer, Shaw Chen, Bingxuan Lin, Julian Xu, Jeffrey Jarrett, Fang Chen, Sanker De and seminar participants at The University of Hong Kong, University of Rhode Island, Hong Kong Institute for Monetary Research, 2011 Summer Institute of Finance Conference, TCFA 2011 Best Paper Consortium, 2011 Emerging Markets Finance Conference for helpful comments and suggestions. We thank Kose John, Paul Pengjie Gao, Charles Chang, Ivan Shaliastovich, Chen Lin, Yue Ma, Xueping Wu, Srikant Marakani, David Ng, Ehud Ronn, Yi Wu, Jingting Xu, Thorsten Beck, Ilhyock Shim, Jing Shao for useful discussions. All errors are our own.
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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 the most efficient part of China's 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 about 15,000 firms with "guaranty" in their names. Unlike the banking industry, the credit guarantee firms are lightly regulated 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% of SME loans are guaranteed by third-party guarantee firms. By the end of 2010, outstanding guarantees were in place for RMB893 billion (US$137 billion) notional 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 guarantees 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

assessment of loan risk 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.

Many countries around the world have made credit guarantee funds a central part of their strategy to alleviate SMEs financing constraints (Beck, Klapper and Mendoza (2010). A majority of these guarantee schemes are being operated by government agents, except for only a few countries such as China. One prominent feature of the government-oriented guarantee schemes is high administrative cost and low economic return. Losses from loan default can reach as high as 30% to 40% in Eastern European countries[1]. Under these circumstances, private sectors are increasingly encouraged over the recent years to participate in providing loan guarantees and guarantees for structured financial products such as mortgage-backed securities concerning private sectors' flexibility and advantages in servicing small clients. Could the introduction of private sectors into guarantee markets be a potential solution to the long-standing economic inefficiency borne in guarantee schemes? The prosperity of private loan guarantee market in China, therefore, provides an ideal setting to investigate this.

[1] See, for example, Beck, Klapper and Mendoza (2010), Honahan (2008), Wenli Li (1998), Shim (2006) and consulting firm reports (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)

Chinese banks typically require small borrowers with insufficient collateral to find a delegated guarantor[2], which guarantees repayment of the major part of the principal and interest upon a default event. A guarantor would do a first screening of borrowers and then deliver the list of qualified borrowers to the bank. Banks officers further investigate borrowers' credit worthiness and decide upon loan rates to charge. Presumably, risk assessment by banks is independent from that by guarantors, given that guarantee officers usually keep their risk measure to themselves, while loan officers work with their own credit scoring system. In a typical risk assessment process, loan officers feed into the scoring system with selected variables from the borrower's financial reports and other documents such as borrowing history records, transaction accounts in previous years, etc. After a loan is issued, the borrower is obliged to pay back the principal and interest by installment or by lump-sum at the maturity date[3]. At an event of loan default, the guarantor would be granted the right to take over collateral and make repayment to the bank using money from the collateral liquidation[4].

This paper is a first effort to provide empirical evidence on the pricing and performance of loan guarantees. Specifically, using a unique proprietary database from a representative credit guarantee firm[5] in China, we examine relations of loan risk measures given by the guarantor and lending banks. Our starting point is the puzzling finding that guarantor's risk measure is negatively correlated with loan rates. When the guarantor believes a loan is of little risk, the bank would charge a high interest rate in opposite. One caveat with the use of loan rates as the loan risk measure from

[2] Commercial banks in China typically have 5-6 delegated guarantors each. The number of delegated guarantors varies across banks, depending on the size of SME lending business of the bank and the interaction between the bank and the guarantee market. We thank Maggie Chen for providing information on this.

[3] The 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.

[4] Disposal of collateral depends on the relative bargaining power of guarantors and banks. We thank Jing Shao for illustrating this. The guarantor analyzed in this study takes full control over pledged collateral, which we consider to be natural concerning its leading presence in guarantee industry in terms of market share.

[5] The credit guarantee firm is ranked as top 3 in China, in terms of market share by the end of 2010.

banks' point of view is that loan rates in China are partially regulated by the central bank, leading to the danger that they may not work as a good proxy for banks' view on loan risk. To alleviate this concern, we subtract contemporaneous base rates from loan rates and use the resulted credit spread as an alternative. The negative association between the guarantor's risk measure and credit spread remains significant, after we control for fixed time and industry effects, bank fixed effects, borrower characteristics, loan characteristics, credit history and guarantee officers' characteristics. This "disagreement" finding inspires us to dig deep into the predictive power of the guarantor's risk measure and loan rates over loan default. Our empirical results show that higher loan rates correspond to higher default propensity, while guarantor's risk measure does not have such predictive power.

Next, we explore the "disagreement" finding through the collateral channel, because the major reason for financing difficulties faced by SMEs is lack of collateral, which is also one rationale for the existence of loan guarantees. With a set of controls for borrower and guarantee officer characteristics, we find that loan rates become higher as collateralization rates move up, while the guarantor's risk measure becomes lower (lower loan risk perceived by the guarantor). We interpret the results as follows: the observed collateralization is a net of borrowers' constraints and banks' (or guarantors') requirement. Guarantors tend to give lower risk measure when they see more collateral (or higher-value collateral) posted as guarantors become "protected" by collateral given the arrangement that guarantors are able to take over and liquidate collateral at a default event, while banks do not take as much consideration of collateral when assessing loan risk. With protection from collateral, guarantors become so concerned with collateral value that a "lazy guarantor" phenomenon might occur. This statement is further confirmed by the finding that guarantors' risk measure lacks of predictability for loan default. On the bank side, empirical results show that it is

the leverage component, rather than collateral, that is most likely to enter banks' pricing formula. Banks charge more to "high leverage" borrowers, i.e., firms borrowing large amount relative to their asset value.

Essentially, this study emphasizes that guarantors and banks are likely to be concerned with different parts of risk distribution, which leads to the deviation in their risk measuring and loan pricing. Given the special arrangement for disposal of collateral, guarantors inevitability behave as asset-based lenders, while banks tend to be more sensitive to cash flow prospects. Banks are still concerned, or even more than before, with real business risk borne in underlying projects to be financed by guaranteed loans, given that guaranteed loans are much riskier than normal loans and that banks' claim on collateral is substantially reduced with a guarantor in place. This argument is supported by the finding that loan rates have predictive power on loan default. In addition, banks are believed to be more sophisticated than other small informal financial institutions, in terms of owning advantageous information channel and risk assessment techniques (Mester and Nakamura (2006), Honohan (2008), Beck, Klapper and Mendoza (2010), etc). In contrast, given the option to take over collateral when default happens, guarantors are inclined to depend on collateral so heavily that real business risk is neglected, which is likely to result in biased risk measure. Especially within the context that the credit guarantee markets in China have never been regulated until early 2010, we are suspicious that guarantors tend to be myopia and still limited in risk management.

The above findings are consistent with those in the scarce literature, such as Beck, Klapper and Mendoza (2010), Honohan (2008), and Cowling and Mitchell (2003), all of which argue that the guarantee premium is not reflective of the propensity of loan default. Beck Klapper and Mendoza (2010) raised the critical question that whether the staff of the guarantee scheme or members of

mutual guarantee associations have any advantage in assessing the risk of individual loans. They find that a dearth of schemes base their pricing on risk calculation to minimize loan losses.

Then, why do we still observe a huge market of loan guarantees given that guarantors contribute little in risk assessment? 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. Guarantee schemes can emerge to exploit regulatory arbitrage if the guarantor is not subject to the same regulatory requirements as the lender. A more specific version for this regulatory arbitrage hypothesis is that 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. However, there is no prior study providing direct evidence for this argument.

Our final set of results shed some lights on it. Large commercial banks in China are restricted from lending to small, high risky borrowers by either a regulatory constraint or by banks' management policy. Credit rationing occurs under this circumstance, creating room for loan guarantees to play a role. We develop a simple model to illustrate how the interest rate cap condition affects loan pricing as well as the scenarios in which a guaranteed loan would become feasible. To verify the regulatory arbitrage hypothesis, we aggregate our sample loans by month and create a "range" variable by calculating the difference between the maximum and minimum interest rate charged from the loans issued in that month. We consider a larger range to be a proxy for more flexible lending criteria that guaranteed loans are subject to. Our results show that the

number/amount of guaranteed loans increases as the regulation becomes more flexible, confirming our conjecture.

This study potentially contributes to the scarce literature in credit guarantees, by providing direct empirical tests on the pricing and performance of loan guarantees, and on the role of regulatory arbitrage played by guarantors. This study also adds to the literature on the ex-ante commitment role of collateral (e.g., Liberti (2010)) and on the ex-post hedging view (e.g., Berger, Frame and Ioannidou (2011)). The first group of articles argues that the major role of collateral is to mitigate information asymmetry in bank lending. Therefore, high collateral value signals better borrower credit quality. The second stream of articles argues that observable riskier borrowers are more likely to be required to pledge collateral. Therefore, higher collateralization is associated with higher ex-post default probability. Presence of guarantors and banks in loan guarantees provides an ideal setting for separating and testing the two 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), put increasing emphasis on the value of soft information collected by loan officers. They argue that it is the soft information component that contributes to the predictive power of credit rating. In our study, we notice that guarantee officers tend to collect 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 improvement in risk assessment and lending decision made by financial institutions. Alternative

explanations such as collateral channel and regulatory arbitrage are more relevant and worth studying.

Our results suggest that banks and guarantors do not necessarily agree on loan risk or have consistent pricing formula, given that they have different objective function, which inevitably leads to misaligned incentives. 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. Guarantors' over-reliance on collateral puts them subject to the "lazy lender" phenomenon, eventually leading to biased risk measure. Economic inefficiency, as a result, arises in the course of arbitraging lending system, which is usually believed to generate good outcomes. However, our findings challenge the conventional wisdom by examining guarantor role and revealing frictions in the course of lending with informal financial institutions involved.

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. Our results also have rich implications on, for instance, importance of human capital in bank lending, etc.

We potentially contribute to literature in the following areas: First, to our knowledge, this article is the first empirical study of third party guaranteed loans, using first hand loan-level data. Second, we comprehensively study the relations between loan guarantee pricing, loan default and collateralization rate, shedding light on the potential "lazy guarantor" phenomenon and uncovering the underlying mechanism for loan guarantees. Third, we provide empirical evidence for the regulatory arbitrage hypothesis, a rationale for the rapid growth of credit guarantee schemes.

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. A simple model is presented in Section III. In Section IV, we describe our data source and sample characteristics. In Section V we present the empirical evidence of the disagreement between guarantor and bank. We analyze the underlying mechanism through collateral channel in Section VI. Empirical test results for regulatory arbitrage are provided in Section VII. Section VIII concludes.

II. Third Party Loan Guarantee in China

A. 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 statistics reported by the China Banking Regulatory Commission, the GDP grew by 8.7 percent and reached RMB 33.5 trillion in 2009, while the outstanding balance of loans made by banking institutions increased by RMB 10.5 trillion to RMB 42.6 trillion (by an annual growth rate of 33%). 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 2009[6]. 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.

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

Besides, small firms are faced with higher financing cost. The survey results show that around 60% of big firms obtain bank loans with loan rates equal to the base rate, while this percentage for small firms is only 27.2%. 62.5% of small firms are charged loan rates higher than the base rate. To alleviate the difficulties faced by small enterprises in getting external finance, China government passed the law for "Promoting Small and Medium Enterprises (SMEs) Development" 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 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 tend to substitute bank finance with other sources of finance.

Credit guarantee is considered to be one form of informal finance concerning the fact that guarantors heavily rely on their reputation and personal connections to seek clients, and that it is lightly regulated. Credit guarantee program can be broadly classified into two categories: government-operated and non-government-operated[7].In countries like U.S., Canada, U.K. and Hong Kong, it is the government sectors that implement credit guarantee schemes. For instance, in the U.S., the Small Business Administration (SBA) provides supports to entrepreneurs and small

[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

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 the cases where a business is unable to secure a loan solely because of lack of collateral. SFLG is unique in tackling the specific problem of lack of collateral. SFLG is therefore in 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 usually the case that private sectors are providing credit guarantee services. In these countries, a large number of credit guarantee firms, insurance companies and other financial institutions act as the guarantor under government supervision.

The guarantor plays a key role in bank lending to SMEs. Guarantors develop their own risk measure for loans, screen loan applications and deliver the list of qualified borrowers to banks. Banks then decide upon loan rates. In an event of loan default, the guarantor would be granted the right to take over and liquidate collateral, and be obliged to make repayments to banks. Supposedly, guarantors have incentives to exert efforts in investigating borrowers' creditworthiness and assessing loan risk. Although we use a propriety database from one Chinese guarantee company, its basic line of business, capital requirements and primary rights and obligations apply to its industry peers, since they are operating under uniform laws and regulations. When assessing a guarantee application, a guarantee officer would give two scores: the qualitative score, based on the officer's

[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

subjective judgment of the borrower's market share, competitiveness, credit history and managers' capability, etc; and the quantitative score, calculated by a formula with accounting data as the 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. High risk measure corresponds to higher rate of guarantee fee by design. After a guarantee application is approved by the guarantor, the lending bank would determine a loan rate based on its own risk measure. Risk assessment by banks is believed to be independent of that of guarantors as guarantors usually keep their risk assessment records to themselves, and guarantors would not adjust its pricing of the loan guarantee either even though they may observe the loan rate later[10].

B. Credit Guarantee Market in China

The first set of mutual guarantee funds in China was established in 1992 in the city of Chongqing and Shanghai. One representative scheme is the loan guarantee fund established by the Yangpu Branch of the Bank of Communications and the local government of Shanghai. Independent guarantee agencies have been founded in Beijing, Shanghai and some other big cities in South China, since 1998. These agencies are called loan guarantee funds or loan guarantee centers, which aimed to alleviate the financing difficulties faced by SMEs in China. The issuance of "Guide for Improving Finance Service for SMEs" marked a brand new period of development for credit guarantees. Government agencies and the People's Bank of China started to participate in and provide supports to the SMEs' guarantee market. Private guarantee firms specialized in the 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

[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 fact 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.

2000 has further promoted the development of loan guarantee market. In 2003, the Ministry of Finance started subsidizing state-owned guarantee agencies. However, as the credit guarantee market was becoming much more privatized and competitive, the government has almost stopped funding and implemented little intervention ever since then.

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 had been 4247 guarantee firms in China, providing 1.75 trillion RMB guarantees to 907 thousand SMEs. 1245 or 29.3% of the guarantee firms are state-owned. The guarantee provided for policy-related purposes amounted to 61.54 trillion RMB, representing 26.3% of the total amount. In 2009, the General Office of State Council made policy recommendations advocating local governments to improve the financial condition of guarantee firms by facilitating financing, sharing risks and compensating losses.

C. Recent Regulation

Credit Guarantors had never 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 country level[11]. At the provincial level, guarantee firms are regulated by different government agencies: within the 31 provinces which have guarantee firms operating, guarantors are under supervision from the Office of Public Finance in 19 of them, by the Bureau of SMEs in 10 provinces and by the Department of Finance in the rest of 2 provinces[12].

[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）

Since late 2009, CBRC initiated nation-wide clearing-up of the guarantee business along with 6 government agencies[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 legal guarantee agents. The rest of 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, loan sharking or illegal fund raising. These illegal actions have endangered the reputation of the guarantee market 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 be at least 50 million RMB. In developed area such as cities in the Pearl River Delta, the required minimum book value of shareholder equity is 100 million RMB. In less developed areas, such as Chongqing, the minimum requirement is 30-50 million. This nation-wide regulation aims to clarify the threshold of for setting up guarantee firms, 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 distribute permits for guarantee firms. Those 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 repayment by guarantors is 2.98 billion, representing a percentage of 0.27% of the total guaranteed amount. Compared with 2008, the amount of repayment decreased by 21%.

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

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

III. Theoretical Model and Hypothesis Development

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 loans without guarantees or as a means of spreading and diversifying risk.[15] Only a few studies discuss credit guarantee from regulatory arbitrage perspective. Honohan (2008) and Beck, Klapper and Mendoza (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 likely to occur, imposing the interest rate cap contraint. Firstly, we formulate the payoffs to borrowers, banks

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

and guarantors; next, we impose zero-profit condition[16] and zero-interest rate condition; then we discuss under which of the combinations of collateralization rate and default probability a loan with guarantee/guaranteed loan may become feasible. Finally, we analyze the determinants of loan rate and the rate of guarantee fee.

A. Benchmark Case: Bank Loan without a Guarantee

We first consider the benchmark case in which no guarantee is available. There is assumed to be a continuum of risk-neutral borrowers, each of whom wants to borrow the same amount I and who differ in the amount of collateral cI in the firm (for simplicity equal to existing assets) and the probability π of default. We assume that asymmetric information is not an issue: c is observable and all agents agree on π[17]. If the money is borrowed, the value of the firm at the end of the period is $cI + \tilde{X}$, where $\tilde{X}$ is a random variable taking on the value 0 with probability π (the default case) and $\bar{X}$ with probability $1-\pi$ (non-default case). We assume c and π are exogenous and uncorrelated in cross-section. The loan officer in the bank makes a loan with lending rate r subject to a cap $r \le \bar{r}$, where we take $\bar{r}$ as exogenous and think of it as either a regulatory constraint or a constraint imposed by the bank's leadership as a part of the bank's risk management policy. Denote the bank's financing cost by r_0.

To simplify our analysis, we assume the banks are competitive and therefore set a zero-profit condition[18]. The borrower's firm value can be expressed as $V = \max(cI + \tilde{X} - rI, 0)$. The bank's objective function is $V_B = \min[(1+r)I, cI + \tilde{X}] - (1+r_0)I$. To make sure that the borrower is able to

[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, there are 6030 guarantee firms in China by the end of 2010, representing a highly competitive market structure.

[17] Without changing the analysis too much, we could assume instead that the bank thinks the borrower is naive and biased and does not care about the borrower's beliefs about π.

[18] The zero-profit condition for the bank is: $(1-\pi)(rI - r_0 I) + \pi(cI - r_0 I) = 0$. Here the implicit assumption is $cI < rI$.

pay back the bank loan when the project quality turns out to be good, we assume that $cI + \overline{X} > \bar{r}I$. Imposing the zero-profit condition[19] we derive $r = \max(\frac{r_0 - \pi c}{1-\pi}, r_0)$. If $r > \bar{r}$, the bank would lose money for all feasible r since the bank's profits are decreasing in r. Therefore, we have $r = \frac{r_0 - \pi c}{1-\pi} \le \bar{r}$, from which we can derive $c \ge -\frac{\bar{r} - r_0}{\pi} + \bar{r}$, indicating that the lower bound of the collateralization rate c increases in default probability π. For borrowers with higher propensity to default, the bank is more likely to require a higher collateralization rate. Moreover, the interest rate cap and the 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 $\pi < 1 - \frac{r_0 I}{\overline{X}}$.

To summarize, the borrower can obtain a bank loan without any loan guarantee when the following two conditions are satisfied: (1) sufficient collateral ($c \ge \bar{r} - \frac{\bar{r} - r_0}{\pi}$); (2) low default probability ($\pi < 1 - \frac{r_0 I}{\overline{X}}$). Figure V plots the area where a bank loan without a loan guarantee is possible, with π on the horizontal axis and c on the vertical axis.

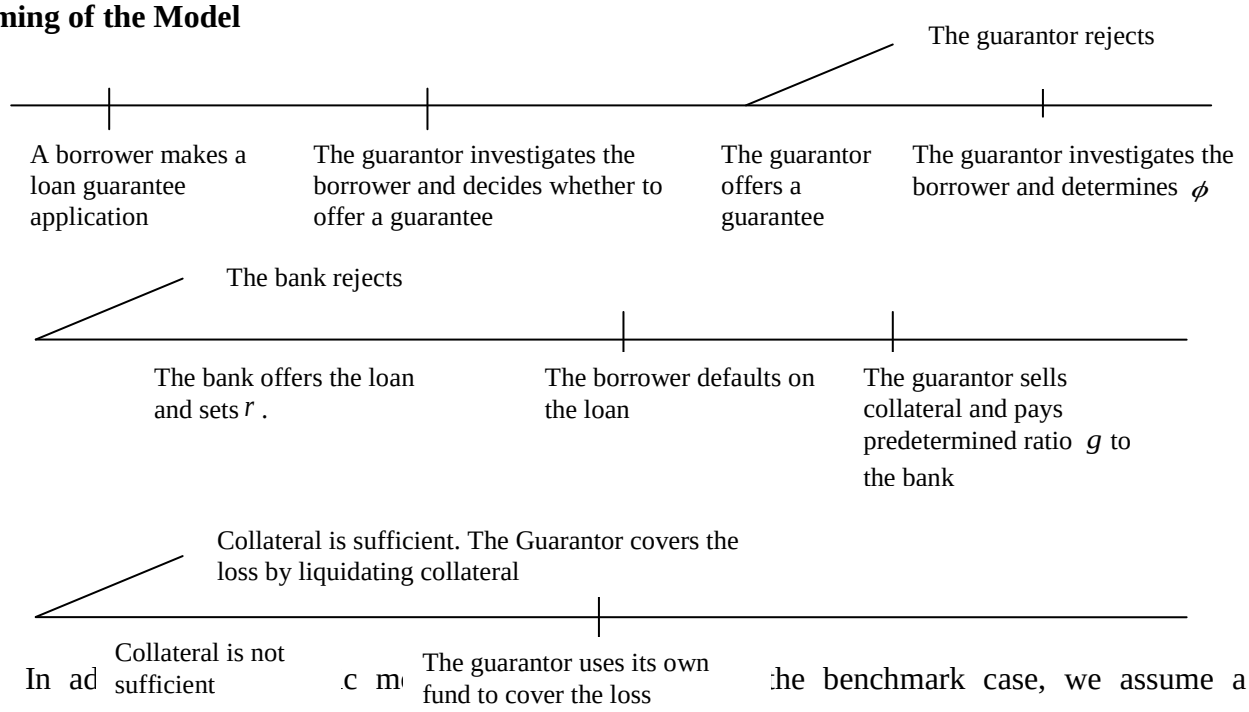
B. Guaranteed Loan

In this sub-section we discuss the scenario in which a loan guarantee is needed. When borrowers are small or start-up firms which are considered to be high-risky, or when the collateral pledged by borrowers is insufficient (relative to the loan size), a loan guarantee is likely to be

[19] 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 $P_B = \begin{cases} rI - r_0 I, 1-\pi \\ cI - r_0 I, \pi \end{cases}$.

required by the lending bank. In can be either the case that a borrower goes to a guarantor directly, or the case that banks give a list of loan applications to its delegated guarantor. The guarantor investigates the borrowing firm's credit worthiness and decides whether to offer a loan guarantee. In both of the cases the borrower has to obtain a loan guarantee in the first place to get its loan application approved by its lending bank. For simplicity we do not distinguish how a guarantor receives a loan guarantee application (either directly from a borrower or from a bank), because the guarantor would do independent risk assessment of the borrower in either case. We illustrate a typical loan guarantee process as follows:

Timing of the Model



In ad c m he benchmark case, we assume a predetermined guarantee rate, denoted by g. That is, when a borrower defaults on its loan, the guarantor would cover a percentage of g of the total loss, while the bank covers the remaining. We think of this portion as exogenous without loss of generality. Let ϕ denote the rate of guarantee fee charged by the guarantor. Let kI denote the operating cost for the guarantor. The borrower's firm

value can be expressed as $V = \max(cI + \tilde{X} - rI - \phi I, 0)$ [20] . The bank's objective function is $V_B = \min[(1+r)I, gI + \tilde{X}] - (1+r_0)I$. To make sure that the borrower is able to pay back the bank loan when the project quality turns out to be good, we assume that $cI + \bar{X} > \bar{r}I$. The zero-profit condition for the bank becomes $(1-\pi)(rI - r_0 I) + \pi(gI - r_0 I) = 0$ [21]. Imposing the interest rate cap condition we obtain $r = g + \frac{r_0 - g}{1-\pi} \le \bar{r}$, from which we see that collateralization rate no longer enters the bank's loan pricing. Lending rate only positively corresponds to borrowers' default probability measure. We can also derive the condition of default probability for a loan guarantee to become possible: $\pi \le 1 - \frac{r_0 - g}{\bar{r} - g}$.

The prediction that interest rate increases with default probability implies that loan rate can be regarded as a proxy for the risk assessment by the bank. To be more precise, we subtract base rate from loan rate to better proxy for the bank's risk assessment of loans because loan officers usually set up a loan rate according to the current base lending rate[22]. Therefore, this prediction serves as the major rationale for the use of loan rate as bank's risk assessment measure in our empirical design.

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[20] The borrower's firm value is expressed as $V = \begin{cases} cI + \tilde{X} - rI - \phi I, 1-\pi \\ 0, \pi \end{cases}$. The bank's payoff is expressed as $P_B = \begin{cases} rI - r_0 I, 1-\pi \\ gI - r_0 I, \pi \end{cases}$. The guarantor's payoff is expressed as $P_G = \begin{cases} \phi I - kI, 1-\pi \\ -kI - gI + cI, \pi \end{cases}$.

[21] For simplicity here we do not consider the possibility for the guarantor to go bankrupt.

[22] The People's Bank of China serves the role of central bank and has the authority to set up base rate. Meanwhile, commercial banks are authorized to decide on their own reference lending rates for different types of loans, different segments, or different geographic areas. We thank Pan Liu for discussions on this. In this paper, we do not think variation in base rates across banks is an issue as all sample loans are for SMEs with maturity of one year.

We have also assumed complete competitive market for the guarantor[23], from which we derive $\phi = \frac{(g-c)\pi}{1-\pi} + \frac{k}{1-\pi}$. The first order condition with respect to π shows that ϕ decreases with c and increases with π. According to this pricing formula, the guarantor charges higher rate of guarantee fee from borrowers with lower collateralization rate or with higher default probability. Moreover, positive NPV of the project requires that $E(\tilde{X}) = (1-\pi)\bar{X} > (r_0 + k)I$. Therefore, the condition of borrowers' default probability for a guarantee loan to become possible is $\pi < 1 - \frac{(r_0 + k)I}{\bar{X}}$.

Different from that in the benchmark case, collateralization rate does not enter the bank's loan pricing in the case of loan guarantee. Loan rate is only associated with the borrower's default probability. However, the pricing of loan guarantee is still affected by both default probability and collateralization rate. Higher collateralization rate would result in lower rate of guarantee fee charged by the guarantor. The intuition behind is that collateral would be taken over by the guarantor instead of by the bank in the event of loan default. In other words, the guarantor becomes "protected" by collateral in the event of loan default, while the bank becomes exposed to the loss, despite the fact that the bank only has to cover a minor portion of the loss. The above analysis leads the following hypothesis:

Hypothesis 1. *Higher collateralization rate is associated with lower default probability measure given by the guarantor.*

As figure VI shows, when collateral is insufficient and default probability is low, a guaranteed loan would take over direct bank loan and serve as an important resort for firms which demand for credit. The use of loan guarantee makes bank loans to borrowers with insufficient collateral

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

available. To make sure a loan guarantee is necessary, we impose an additional condition $c < g$ [24]. Figure VI shows the combination of collateralization rate and default probability in which a loan guarantee may occur. The model makes two main predictions: First, a guaranteed loan would occur when borrowers have insufficient collateral ($c < \bar{r} - \frac{\bar{r} - r_0}{\pi}$) and default probability is low ($\pi < 1 - \frac{(r_0 + k)I}{\bar{X}}$); second, rate of guarantee fee is negatively associated with lending rate given borrower default probability and collateral level, indicated by $\phi = -r + \frac{r_0 + k - c\pi}{1 - \pi}$. This prediction is equivalent to the following hypothesis:

Hypothesis 2. *The guarantor and the bank tend to disagree on loan pricing. Higher default probability measure given by the guarantor is associated with a lower loan rate.*

One important implication from the model is that guarantors and banks care about different parts of distribution of loan risk, which may result in their disagreement when measuring loan risk. We conjecture that collateral works as an important channel to explain such disagreement. As one way to cover the ex-post loss from loan default, the pledge of collateral is likely to be perceived as a signal indicating low loan risk by the guarantor. Protected by collateral, guarantors are inclined to ignore real business risk of the financed project and face the "lazy lender" phenomenon, which may cause guarantors' risk measure to be biased. We conjecture guarantors' incentive to screen projects by real business risk is substantially reduced due to the presence of collateral. However, from the

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[24] Combined with the interest rate cap condition, if $g \geq \frac{r_0 \bar{X} - \bar{r}(r_0 + k)I}{\bar{X} - (r_0 + k)I}$, zero-NPV line would lie at $\pi = 1 - \frac{(r_0 + k)I}{\bar{X}}$; if $g < \frac{r_0 \bar{X} - \bar{r}(r_0 + k)I}{\bar{X} - (r_0 + k)I}$, zero-NPV line would shift to left, and the zero-NPV line would lie at $\pi = 1 - \frac{r_0 - g}{\bar{r} - g}$. We do not plot this to keep a neat format.

bank's view, collateral still mainly works as an attempt to reduce contracting frictions in the presence of asymmetric information (Liberti (2010)), in which case collateral is mainly used as an ex-post compensation for loss in the event of loan default, and therefore does not necessarily reflect borrowers' default risk. In this regard, we do not expect the same negative relation between collateralization rate and loan rate to hold.

The disposal of collateral at loan default may lead to an interesting "reversal of seniority" of guarantors and banks. Concerning the large portion of loss that guarantors have to cover, they are regarded as "junior" bondholder, while banks are "senior". However, the seniority would reverse in the case of guaranteed loan, because guarantors are granted the right to take over collateral and cover its assigned portion of loss by liquidating collateral, while banks are derived of its claim on collateral value and become totally exposed to the remaining loss. Banks become the new junior bondholder. Therefore, we expect banks to be more concerned with real business risk, compared with guarantors, and would evaluate project quality more carefully.

Furthermore, apart from the incentive perspective and collateral channel discussed above, banks, as the most important financial intermediary with considerable experience in credit supply, are supposed to be more sophisticated in screening projects and managing risk. Mester, Nakamura and Renault (2006) provide solid evidence that transaction accounts help financial intermediaries monitor borrowers, by checking ongoing data on borrowers' activities. Initiated by the People's Bank of China and the four state-owned commercial banks, China's banking sector has started constructing a comprehensive internal information system. It contains information of credit history of all Chinese enterprises which have set up a bank account[25]. In addition to informational advantage, loan officers are considered to assess loan risk with less discretion. A typical process for risk assessment is that loan officers feed financial data and other relevant information into their

[25] We thank Frank Song and Chen Lin for providing the information.

credit scoring system, and then a recommended loan rate is output[26]. In contrast, guarantor officers rely much more on soft information and inevitably, more subjective judgment would be involved in. Compared with loan pricing, guarantee pricing involves more discretion and is likely to be biased. Beck, Klapper and Mendoza (2010) points out that very few guarantee schemes all over the world use a risk-base pricing structure. This is not stemmed from different ownership of guarantee funds, but due to a dearth of risk management on guarantor side. Based on the above evidence and arguments, we propose another hypothesis as below:

Hypothesis 3. *Higher loan rate is associated with higher default propensity, while guarantor's risk measure has little predictive power on loan default.*

IV. 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 top-three guarantee firm (in terms of market share) in China; (2) the base rate and reserve ratio data from the website of the Peoples' Bank of China. The loan guarantee dataset contains all loan guarantee issued by the representative 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 with maturity of 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

[26] We thank Yi Wu for the description and illustration.

the guarantor. The information helps us understand borrowers' credit quality from the guarantor's view. Second, it provides private information about the borrowers, which could not be easily obtained from other institutions. For example, it reports information such as whether the managers' relatives are working for the firm, whether these shareholders have a political background (ever been elected as a representative of People's Congress of China), 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 for 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 start-up firms and special projects, and trust loans, with the guarantor acting as the lender[27]. To make consistent analysis, we mainly focus on bank loans in our subsequent discussion. The guarantor sold the 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%, which echoes the evidence from previous literature that lack of collateral is a prominent feature in bank lending to SMEs (Shim (2006), Li

[27] Loan guarantors are prohibited by law from direct lending in China.

(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%. Note that the rate of guarantee fee exhibits a decreasing trend over the years, dropping from 1.91% in 2006 to 1.47 in 2009, which signs the increasingly competitive loan guarantee market in China.

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 lenders, representing 75.85% of the sample. The largest lender, Shenzhen Ping An Bank, made 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 firm-specific assets and non-firm-specific assets. The former refer to inventory and machinery, and the later refer to property, deposit, cash, etc. We observe higher collateralization rate for the group of borrowers pledging firm-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 by 2.02%, significant at 5% level. The average total asset of borrowers is 70 million RMB, and the average annual revenue is 98.55 million RMB. 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[28]. The mean of the guarantor's risk measure is 0.494. The negligible difference in guarantor's risk measure for default and non-default borrowers suggests that the guarantor may not price loan risk correctly. 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

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

expectation, higher guarantor's risk measure leads to higher rate of guarantee fee. Borrowers with higher collateralization rate are perceived to be less risky by the guarantor. We learnt from the correlation table that guarantee officers tend to give higher credit scores to borrowers with larger size (measured by the logarithm of total assets), higher profitability measured by ROA, and higher asset turnover ratio.

V. 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 specifications as controls.

A. Guarantor's Risk Measure Inconsistent with Loan Rate

A.1. Risk Measure by Bank and Guarantor

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

$$Loan\ Rate_i = \alpha_i + \beta_{1i} Guarantor's\ Risk\ Measure_i + \beta_{2i} Collateralization_i + \beta_{3i} X_i + \varepsilon_i$$

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). The above variables are used as proxy for hard information used by lending banks and are considered to potentially affect lending dicisions. 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 ever been financed by bank loans before. Current Loan indicates the amount of outstanding loans that the borrower currently has. Rating is a dummy variable indicating whether a borrower has a credit rating given by an independent rating agency[29].

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. An increase of 1% in lending rate corresponds to 1.6% decrease in guarantor's risk measure. To correct for the possible heterogeneity in loan rates suggested by Cerqueiro, Degryse, and Ongena (2011), we use GMM estimation in some of the regressions. Column 2 and 6 reports the corresponding results. Across all specifications, the negative association remains statistically significant[30].

Our findings reveal that guarantors and banks have "disagreement" on loan risk assessment. It motivates us to explore the reason through different possible channels. First, the disagreement could be stemmed from the repayment arrangement specified by a loan guarantee contract in an event of loan default. A common guarantee contract would grant the guarantor with the obligation to cover major loss at loan default, as well as the right to take over collateral. Therefore, guarantors tend to put too much emphasis on collateral value when assessing borrower risk as collateral provides the major funding source. In contrast, banks would lose its control over collateral and be exposed to the remaining loss. In this sense, it is likely that banks and guarantors use different inputs when scoring

[29] The credit rating agency involved in this study is the SME Association of Guangdong Province.
[30] Results remain robust in the test where we did the same regression using winzorized data at 1% and 5%.

borrower creditworthiness and evaluating loan risk. We provide empirical test on this collateral channel in the next section.

Second, the disagreement could be due to different information collected by banks and guarantors. Banks may own informational advantage by keeping track of borrowers' transaction account and by recording their clients' lending history. For instance, 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 may potentially have information advantage generated from lower cost of information collection. If this conjecture is true, we should expect that banks are better able to measure borrower risk. We confirm our conjecture by testing the predicative power of loan rate on loan default.

Finally, the disagreement results might be suggestive of different risk assessment process for banks and guarantors. On banks' side, loan officers feed borrowers' information into their credit rating system and a reference loan rate is calculated automatically. Arguably, the loan rate setting process is objective and impersonal. In contrast, guarantee officers collect much more soft information than loan officers. During investigation period, they may visit the borrower's workplace, inspect its operation and talk to the managers. Both the information collection and the scoring process would involve more subjective views and discretion, which may potentially lead to deviations in risk assessment.

However, a parent drawback of the second and third explanations lies in that different information channel and risk assessment process may result in uncorrelated risk measures by banks and guarantors, but not necessarily contradicting ones. To test these explanations, we create proxies for hard and soft information, respectively, but we do not find solid evidence[31].

A.2. Identification Issue

A caveat with the use of raw interest rate is that loan rates are regulated by the central bank (PBRC) in China and therefore, may not effectively reflect borrower creditworthiness. To address this issue, we construct Credit Spread by subtracting contemporaneous base rate from loan rates, and examine the relation between credit spread and guarantor's risk measure. As the base rate set by CBRC varies over time, credit spread potentially excludes the macro-control components, and therefore can work as a better proxy for banks' view on loan risk. The results are presented in Table IV. Similarly, we control for borrower characteristics, loan characteristics, credit history, etc. As the table shows, significance of the negative association between the risk measure by bank and guarantor in the baseline regression reduces slightly, but is still significantly negative at the 5% level. When the bank adjusts credit spread 1% upward, the guarantor would lower its risk measure by approximately 0.49%.

B. Who is Correct?

So far we have shown our major observation that guarantor's risk measure is inconsistent with loan rate. Naturally, the next question would be which of the two better describes loan risk. Our approach is to examine the ability of loan rate and guarantor's risk measure to predict loan default.

[31] 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. Our findings suggest that neither of these scores can 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 payment at any point within one year from the date when the loan was initiated. Table V reports the estimation of the following probit model:

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

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 rates are associated with higher default probability, *ceteris paribus*. Its predictive power is statistically significant at the 5% level.

We examine the predictability of guarantor's risk measure in the same way. But we do not find significant results. To save space we do not report the estimation results. This suggests that, guarantor's risk measure has no predictive power on loan default. Guarantor's risk measure is likely to be biased in terms of describing default probability. In other words, guarantors are found to make mistakes in evaluating loan risk.

This finding 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 which is more fundamentally relevant to loan risk. 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 are exposed to. Therefore, loan rates are expected to be more suggestive of project quality, which is measured by ex-post default rate, than guarantor's risk measure is.

The finding that guarantors' risk measure lacks of predictability on loan default is consistent with that in Beck, Klapper and Mendoza (2010), which studies global credit guarantee schemes and finds that very few guarantee schemes use a risk-base pricing structure. They examine whether the success of repayment of loans lowers future servicing prices and draw the conclusion that credit guarantee pricing has much less risk component then we expect. This is not stemmed from different ownership of guarantee funds, but due to a dearth of risk management on guarantor side.

C. "Lazy" Guarantor?

Presumably, without protection from collateral, guarantors would take the first and major loss at loan default and behave like "junior bondholders" at loan default, while banks only need to cover the minority of loss and behave as "senior bondholders". However, the risk sharing mechanism with guarantor's take-over of collateral may revere the seniority of banks and guarantors, which can potentially result in deviation in risk measure by banks and guarantors. In an event of default, guarantors would be granted with the right to take over and liquid collateral. They make repayments to banks using money from the liquidation, while banks lose their control over posted collateral and become exposed to the remaining part of the loss. In this scenario, guarantors become the "senior bondholder". Seniority of banks and guarantors is reversed. Banks would become the one who is really concerned with borrowers' real business risk without of protection from collateral, while the incentives for guarantors to evaluate real business risk is reduced as they put more emphasis on the cash flow to be generated from liquidation of collateral.

Guarantors' over-reliance on collateral echoes the "lazy lender" theory, 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, as banks have considerable experience in appraising similar projects and may be more familiar with general economic trends. However, if the screening services of banks could 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" phenomenon. In bank lending with loan guarantee, guarantors take over banks and become highly protected by collateral. It is very likely that protection from posted collateral would reduce guarantor's incentive to screen and monitor, leading to the arising of inefficiency. In the next section, we examine the relation between guarantor's risk measure and collateralization rate. Our empirical results provide strong evidence showing that guarantors are subject to the "lazy lender" phenomenon.

VI. 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. Explanations 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 regress loan rates on collateralization rates, with borrower characteristics as controls. We are primarily interested in the sign of the coefficients. 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. To account for discrepancy of the information collected by the guarantor and potential heterogeneity in guarantee officers' capacity, we allow guarantor's private Information and guarantor characteristics enter specifications.

Guarantor's Private Information includes Guaranty History, Loan History and Political Background. Guaranty History is a dummy variable indicating whether a borrower has been 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[32]. 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 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.

VII. Discussions: The Role of Guarantee

A. Regulatory Arbitrage

So far we have shown the evidence that guarantors' risk measure has little predictive power on loan defaults and that guarantors put large weight on collateral value in evaluation of loan risk. We try to push the investigation even further to explain the rationale of guarantee schemes. As discussed by Honahan (2008), Beck, Klapper and Mendoza (2010), guarantee schemes can emerge to exploit regulatory arbitrage if the guarantor is not subject to the same regulatory requirements.

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

Commercial banks in China are restricted from charging unlimited high interest rate from high risk borrowers, while guarantee industry has never been regulated until the end of 2009. Arguably, the discrepancy in strength of banking regulation and guarantee regulation is likely to create room for guarantors to seek arbitrage opportunities. A natural approach is to use base lending rate set by PBRC as proxy for regulatory arbitrage opportunity[33]. However, base rates can affect issuance of guaranteed loans through several different channels: first, raising base rate indicates central bank's intention to tighten credit supply. High base rate has strong adverse effect on credit demand and therefore can shrink direct bank lending. Borrowers may turn to guarantors in order to get a loan. Second, *ceteris paribus*, raising base rate creates higher interest rate cap, which translates to larger room for lenders to adjust loan rate up. This effect can potentially increase direct bank lending capacity and reduce demand for guaranteed loans. We are faced with the caveat that the two effects cancel out if we use base rate as proxy for regulatory arbitrage opportunity.

To separate the first credit supply channel and leave regulatory arbitrage effect alone, we design a "range" variable to measure restriction on guaranteed loans. Less restriction on guaranteed loans is expected to increase the volume. We aggregate the number of guaranteed loans by month, and regress it on the difference between maximum and minimum lending rate of all loans issued in that month. Specifically we estimate the following model:

$$\begin{aligned} &No.of\ Guaranteed\ Loans / Amount\ of\ Guaranteed\ Loans_t = \alpha_t + \beta_{1t} Loan\ Rate\ Range_t \\ &+ \beta_{2t} Borrower\ Financial\ Constraints_t + \beta_{3t} Credit\ History_t + \beta_{4t} Borrower\ Investment\ Opportunity_t \\ &+ \beta_{5t} Base\ Rate + \beta_{6i} Reserve\ Ratio_t + \varepsilon_t \end{aligned}$$

[33] An alternative is to use reserve ratio. As another major monetary policy tool, it movement has been highly correlated with base rate during sample period. The central bank tends to adjust base rate and reserve ratio in the same direction at the same time.

The first three columns in Panel A of Table X reports the regression results. Larger pricing range results in more guaranteed loans issued. One concern is that variation in lending rates increases as we have more observations. To alleviate the endogeneity problem we allow borrower financial constraints (size, ROA, cash ratio), credit rating and investment opportunity into regression. We also control for base rate and reserve ratio in the corresponding period to eliminate effect of central bank regulation on total credit supply. Model 2 and 3 show that positive association between lending flexibility and volume remains significant with controls. We report similar results in model 4 to 6 with aggregate loan amount as the dependent variable.

We use range of guarantee fee rate as alternative for the same test. Results are reported in Panel B of Table X. Similarly, larger range of guarantee fee rate corresponds to larger volume of loan guarantees, supporting our hypothesis that less restriction on guarantors encourages more credit guarantees to be issued. One important role of guarantors in China is to exploit regulatory arbitrage in bank lending.

B. Alternative Explanations

There might be other explanations for the rationale of guaranteed loans coexisting with regulatory arbitrage hypothesis. For example, one might be suspicious that disagreement between guarantors and banks is stemmed from the potential corruption between guarantors and banks. Specifically, loan guarantors might be not independent from banks when pricing a loan guarantee. If there exists such a corruption channel, we may expect that a more experienced guarantee officer is able to get a lower interest rate for its clients, in exchange for a higher guarantee fee. But empirical results do not support this conjecture. As for the finding that guarantor's risk measure is lack of predictability on loan default, one may argue that guarantor's failure is due to corruption by borrowing firms. This conjecture would naturally leads to the observation that borrowers having

better access to funding sources are likely to get guaranteed loans with lower interest rate or lower guarantee fee. But again, we rule out this possibility by examining whether the borrowing firm's manager's political background can affect guaranteed loan terms. In addition, we incorporate individual guarantee officers' characteristics (education background, working years, marital status, etc) into all specifications to investigate whether they can affect guarantee terms, but no consistent results have been found.

VIII. Conclusion

Using a unique proprietary data set on third-party guaranteed loans 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 efficiency 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 contributes to resolving 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. We provide preliminary evidence for the regulatory arbitrage hypothesis. 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.

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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 property, cash, deposit and car as non-firm-specific assets; while collateral consisting of machine, inventory and private equity as firm-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%

Trust 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%
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%
Private Equity	3	0	59.00%	1.43	5.01	1033.33	193.46%	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) Loan Rate; (2) Guarantor's Risk Measure; (3) Rate of Guarantee Fee; (4) Size; (5) Leverage; (6) ROA; (7) Asset Turnover; (8) Cash/Total Asset; (9) Sales Growth; (10) Log (Loan Amount/Total Assets); (11) Collateralization Rate. 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)	(10)	(11)
Loan Rate	1.0000										
Guarantor's Risk Measure	-0.1805 <.0001	1.0000									
Rate of Guarantee Fee	0.0578 0.1536	0.1753 <.0001	1.0000								
Size	-0.1561 0.0009	0.0710 0.1346	-0.1970 <.0001	1.0000							
Leverage	-0.0906 0.0554	0.1426 0.0025	-0.0297 0.5303	0.2520 <.0001	1.0000						
ROA	0.1109 0.0189	-0.1907 <.0001	0.0270 0.5690	-0.3197 <.0001	-0.2260 <.0001	1.0000					
Asset Turnover	0.1214 0.0101	-0.1381 0.0035	-0.0252 0.5951	-0.2044 <.0001	0.0590 0.2126	0.2499 <.0001	1.0000				
Cash/Total Asset	0.0681 0.1500	-0.0203 0.6688	0.0450 0.3424	-0.0164 0.7297	0.1013 0.0320	0.0751 0.1129	0.0449 0.3433	1.0000			
Sales Growth	-0.0183 0.7001	0.0318 0.5041	-0.1353 0.0042	0.5200 <.0001	0.1862 <.0001	-0.0970 0.0407	0.2537 <.0001	0.0740 0.1184	1.0000		
Log (Loan Amount/Total Assets)	0.1554 0.0010	-0.0995 0.0357	-0.0500 0.2911	-0.2943 <.0001	-0.1983 <.0001	0.1757 0.0002	0.1702 0.0003	0.0413 0.3833	-0.1596 0.0007	1.0000	
Collateral Value/Loan Amount	0.0398 0.3261	-0.1748 <.0001	-0.0544 0.1797	0.0775 0.1019	-0.0248 0.6014	-0.0057 0.9044	-0.0407 0.3909	-0.0856 0.0705	-0.0066 0.8888	0.0500 0.2912	1.0000

Table III

Loan Rate Decreases 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. Panel A reports aggregate regression results. Panel B reports regression results by year. Model 2 to 6 in Panel A are estimated with fixed year and industry effect controls. Model 2 and 6 are estimated with GMM to correct for heteroskedasticity. Model 4 to 6 are estimated with bank fixed controls. Model 2, 4, 6 and 8 in Panel B are estimated with fixed 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.

Panel A. Disagreement between Guarantor and Bank - Aggregate

Variable	Model 1	Model2	Model3	Model4	Model5	Model6
Guarantor's Risk Measure	-1.6074	-2.0999	-2.1120	-2.4919	-0.7576	-0.7225
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0066)***	(0.0099)***
Collateralization			0.0039	0.0230	0.0162	0.0135
			(0.9405)	(0.5708)	(0.5862)	(0.6504)
Borrower Characteristics						
Size				-0.0920	-0.2210	-0.2171
				(0.0514)*	(0.0000)***	(0.0000)***
Cash/Total Asset				0.7746	0.3812	0.4055
				(0.1973)	(0.3856)	(0.3566)
Loan Characteristics						
log (Loan Amount)					0.1670	0.1670
					(0.0013)***	(0.0013)***
Credit History						
Loan History						0.0038
						(0.9563)
Rating						-0.0894
						(0.1889)
Intercept	7.8956	1107.87	1005.60	1024.11	574.976	553.873
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Bank Fixed Effect Controls	No	No	No	Yes	Yes	Yes
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
White Correction for Heteroskedasticity	No	Yes	Yes	No	No	Yes
Adjusted R-square (%)	14.24	3.59	18.11	15.33	42.21	9.96
No. of Observations	616	616	616	616	616	616

Panel B. Disagreement between Banks and Guarantors - by Year

	2006		2007		2008		2009	
Variable	Model1	Model2	Model3	Model4	Model5	Model6	Model7	Model8
Guarantor's Risk Measure	-0.9326	-0.8051	-1.4756	-0.9457	-1.6215	-2.5895	-0.3502	0.2708
	(0.4787)	(0.6852)	(0.0000)***	(0.0186)**	(0.0163)**	(0.0014)***	(0.3427)	(0.6638)
Borrower Characteristics								
Size		0.0422		-0.1490		-0.3498		-0.0597
		(0.8665)		(0.0891)*		(0.0186)**		(0.5390)
		(0.4719)		(0.4847)		(0.9983)		(0.6867)
Cash/Total Asset		-1.3378		0.4553		1.7308		-0.6277
		(0.5992)		(0.4917)		(0.1337)		(0.4442)
		(0.4923)		(0.8110)		(0.7588)		(0.9208)
Loan Characteristics								
Log (loan Amount)		0.0724		-0.0101		0.3915		-0.0431
		(0.7980)		(0.8960)		(0.0097)***		(0.6376)
Credit History								
Rating		-0.2893		0.0412		-0.3571		-0.2156
		(0.3781)		(0.6860)		(0.0490)**		(0.0788)*
Intercept	7.1618	6.3298	8.1316	9.1600	8.3446	9.1317	5.7895	6.2178
	(0.0000)***	(0.0438)**	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Industry Fixed Effect Controls	No	Yes	No	Yes	No	Yes	No	Yes
Adjusted R-square (%)	1.81	26.00	8.37	6.77	2.64	25.22	0.87	22.05
No. of Observations	30	30	262	262	218	218	106	106

Table IV

Credit Spread Decreases 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. Model 4 to 6 are estimated with bank fixed 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	Model6
Guarantor's Risk Measure	-0.4888	-0.6597	-0.9162	-0.8055	-0.7576	-0.7225
	(0.0278)**	(0.0008)***	(0.0004)***	(0.0042)***	(0.0066)***	(0.0099)***
Collateralization			0.0068	0.0227	0.0162	0.0135
			(0.8124)	(0.4490)	(0.5862)	(0.6504)
Borrower Characteristics						
Size				-0.1320	-0.2210	-0.2171
				(0.0002)***	(0.0000)***	(0.0000)***
Cash/Total Asset				0.4541	0.3812	0.4055
				(0.3059)	(0.3856)	(0.3566)
Loan Characteristics						
log (Loan Amount)					0.1670	0.1670
					(0.0013)***	(0.0013)***
Credit History						
Log (Current Loan)						0.0038
						(0.9563)
Rating						-0.0894
						(0.1889)
Intercept	0.7726	393.086	463.144	585.242	574.976	553.873
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Bank Fixed Effect Controls	No	No	No	Yes	Yes	Yes
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
White 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 6 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.

Loan Rate and Loan Default						
Variable	Model 1	Model2	Model3	Model4	Model5	Model6
Loan Rate	0.2831	0.3280	0.3240	0.4748	0.4753	0.5736
	(0.0264)**	(0.0307)**	(0.0338)**	(0.0226)**	(0.0177)**	(0.0126)**
Collateralization			0.0445	0.0183	0.0374	0.0224
			(0.5671)	(0.8391)	(0.6526)	(0.8194)
Borrower Characteristics						
Size				0.1232		0.1757
				(0.5259)		(0.4433)
Cash/Total Asset				1.0589		1.8438
				(0.6093)		(0.4177)
Firm Age				-0.1111		-0.1070
				(0.0813)*		(0.1317)
Loan Characteristics						
log(Loan Amount/Total Assets)				-0.2003	-1.7972	-2.0553
				(0.5382)	(0.4141)	(0.4217)
Credit History						
Loan History						-1.0121
						(0.0143)**
Rating						-0.3787
						(0.3451)
Intercept	-4.2287	574.494	586.437	330.772	422.077	127.825
	(0.0000)***	(0.1866)	(0.1814)	(0.5834)	(0.4557)	(0.8527)
Year Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	Yes	Yes	Yes
Wald Chi-square Score	4.93**	7.42*	7.82*	10.16	7.07	13.68
McFadden's R-square (%)	4.99	9.22	9.47	16.45	11.75	27.96
No. of Observations	616	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 1 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.

Collateralization and Loan Rate					
Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Collateralization	0.0542	0.0855	0.0695	0.0645	0.0553
	(0.04)	(0.04)**	(0.04)*	(0.04)	(0.03)*
Borrower Characteristics					
Size		-0.1564			
		(0.06)***			
Cash/Total Asset		0.0001		0.9167	0.9718
		(0.00)		(0.62)	(0.51)*
Loan Characteristics					
log (Loan Amount/Total Assets)			1.6095	1.5860	1.4010
			(0.60)***	(0.60)***	(0.49)***
Credit History					
Loan History				0.1245	0.0261
				(0.10)	(0.08)
Rating				-0.2100	-0.1933
				(0.10)**	(0.08)**
State-owned Bank					0.3269
					(0.09)***
Crisis					1.1160
					(0.08)***
Intercept	1011.80	936.191	958.403	906.790	942.046
	(104.85)**	(116.83)**	(115.80)**	(117.41)**	(97.80)***
Year Fixed Effect Controls	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect Controls	Yes	Yes	Yes	Yes	Yes
Adjusted R-square (%)	12.88	14.47	14.66	15.51	43.43
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	-0.0213	-0.0211	-0.0254	-0.0252
f	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Loan Rate			-0.0344	-0.0341		
			(0.0000)***	(0.0000)***		
Borrower Characteristics						
Size			-0.0035	-0.0016	-0.0014	-0.0016
			(0.6522)	(0.8354)	(0.8572)	(0.8819)
ROA			-0.1201	-0.1230	-0.1250	-0.1212
			(0.0077)***	(0.0067)***	(0.0076)***	(0.0083)***
Leverage			0.0966	0.0983	0.0877	0.0891
			(0.0044)***	(0.0043)***	(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			-0.0094	-0.0097	-0.0111	-0.0110
			(0.0388)**	(0.0352)**	(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)
Relatives				-0.0008	0.0020	0.0020
				(0.9425)	(0.8563)	(0.8609)
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)
Education Background					-0.0259	-0.0259
					(0.1328)	(0.1964)
Loan Characteristics						
Loan Amount						-0.0005
						(0.9708)
Intercept	0.4721	45.7683	72.4258	74.7621	36.5593	36.6564
	(0.0000)***	(0.0006)***	(0.0034)***	(0.0000)***	(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

Table X. Test of Regulatory Arbitrage

This table reports the regression results for testing regulatory arbitrage hypothesis. The dependent variable is logarithm of number of loan guarantees and logarithm of total amount of loan guarantees issued within each month. Panel A reports the regression results with range of lending rates of all loan guarantees issued within each month as proxy for regulatory arbitrage opportunity. Panel B reports the regression results with range of guarantee fee within each month as the proxy. Base rate and reserve ratio are monthly average. Observations with unavailable loan rate or zero loan rate are excluded from the sample. Model 2, 3, 5 and 6 are estimated with fixed time and industry effects. Values in parentheses are p-values. See Appendix I for variable definitions. ***, **, and * mean significant at the 1%, 5%, and 10% level, respectively.

Panel A. Lending Rate Range as Proxy

	No. of Loan Guarantees			**Amount of Loan Guarantees**		
Variable	Model1	Model2	Model3	Model4	Model5	Model6
Lending Rate Range	2.9155	2.3141	2.0311	3.0149	2.6584	2.5365
	(0.0003)***	(0.0117)***	(0.0159)***	(0.0015)***	(0.0187)**	(0.0077)***
Credit Supply Controls						
Base Rate		0.0084	-0.0077		-0.0979	-0.1445
		(0.9685)	(0.9692)		(0.7091)	(0.5188)
Reserve Ratio		0.0898	0.0871		0.0909	0.0666
		(0.0431)**	(0.0811)*		(0.0949)*	(0.2239)
Borrower Financial Constraint						
Size			-0.0623			0.3400
			(0.8695)			(0.4243)
ROA			-3.8965			-1.3974
			(0.1786)			(0.6601)
Cash/Total Asset			13.1273			22.5390
			(0.0285)**			(0.0014)***
Borrower Credit History						
Rating			-0.5003			0.5453
			(0.4540)			(0.4638)
Intercept	1.7169	0.6688	1.5819	7.8981	7.4550	3.6604
	(0.0000)***	(0.5914)	(0.6490)	(0.0000)***	(0.0000)***	(0.3478)
Year Fixed Effect Controls	No	Yes	Yes	No	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	No	Yes	Yes
Adjusted R-square (%)	33.09	41.90	51.39	26.57	32.98	58.59
No. of Observations	35	35	35	35	35	35

Panel B. Guarantee Fee Range as Proxy						
	No. of Loan Guarantees			Amount of Loan Guarantees		
Variable	Model1	Model2	Model3	Model4	Model5	Model6
Range of Guarantee Fee Range	1.0229	1.0100	0.9111	1.0042	0.9938	0.8279
	(0.0002)***	(0.0000)***	(0.0000)***	(0.0021)***	(0.0008)***	(0.0018)***
Credit Supply Controls						
Base Rate		0.2711	0.1873		0.2076	0.1155
		(0.0719)*	(0.1862)		(0.3172)	(0.5377)
Reserve Ratio		0.1136	0.1332		0.1180	0.1143
		(0.0020)***	(0.0016)***		(0.0179)**	(0.0332)**
Borrower Financial Constraint						
Size			-0.4785			-0.0912
			(0.1193)			(0.8205)
ROA			-4.1802			-1.9875
			(0.0695)*			(0.5078)
Cash/Total Asset			12.9095			22.4293
			(0.0077)***			(0.0009)***
Borrower Credit History						
Rating			-0.5400			0.5325
			(0.3080)			(0.4511)
Intercept	1.7877	-1.4415	3.0998	8.0119	5.1358	5.1108
	(0.0000)***	(0.1179)	(0.2652)	(0.0000)***	(0.0003)***	(0.1730)
Year Fixed Effect Controls	No	Yes	Yes	No	Yes	Yes
Industry Fixed Effect Controls	No	Yes	Yes	No	Yes	Yes
Adjusted R-square (%)	34.84	62.38	69.72	25.21	44.33	62.71
No. of Observations	35	35	35	35	35	35

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.

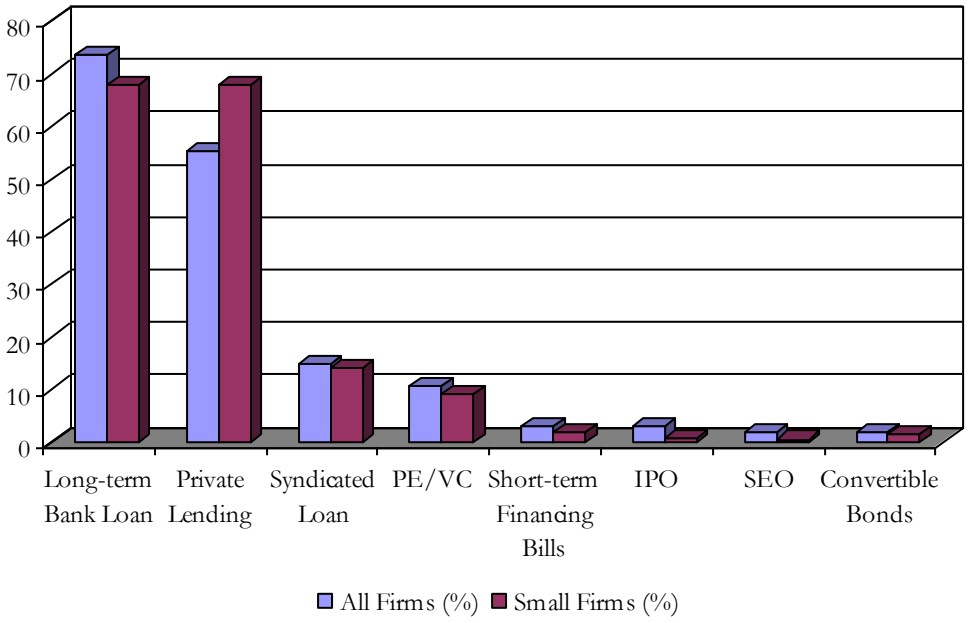


Figure II. Development of China Guarantee Market

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.

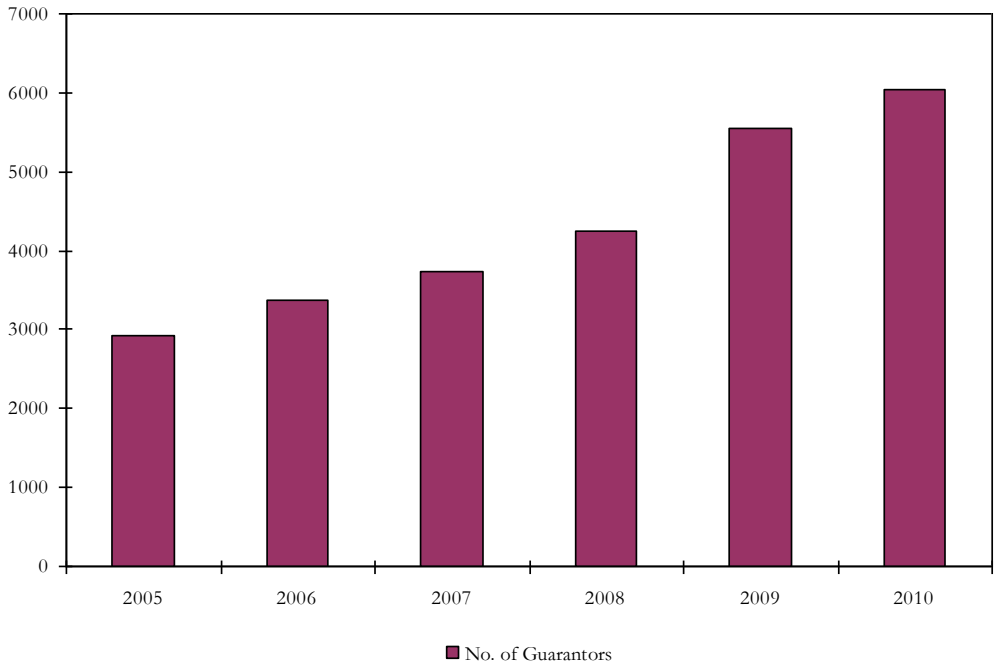


Figure III. Number and Type of Guaranteed Loans by Year

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

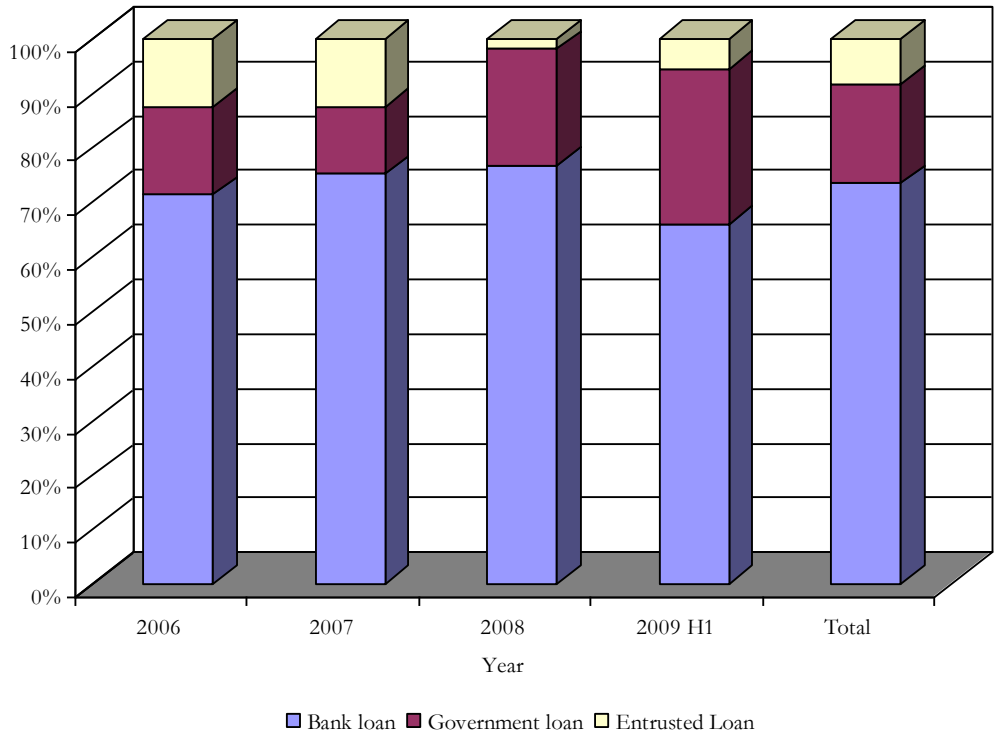


Figure IV. Number of Guaranteed Loans by Industry

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.

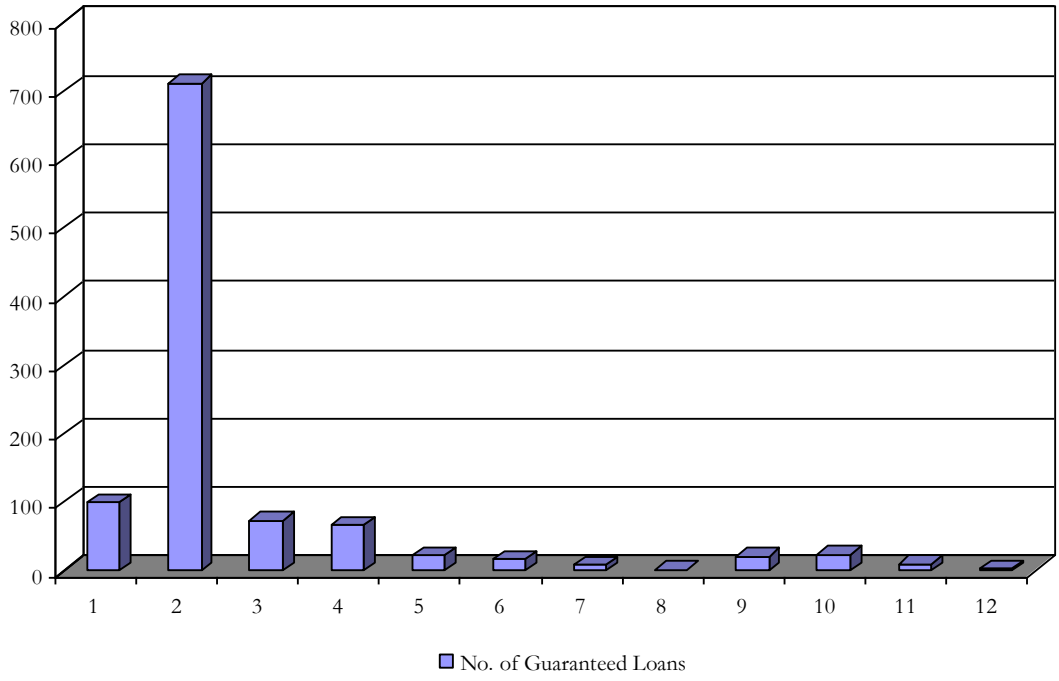


Figure V. Benchmark: Direct Bank Loan

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.

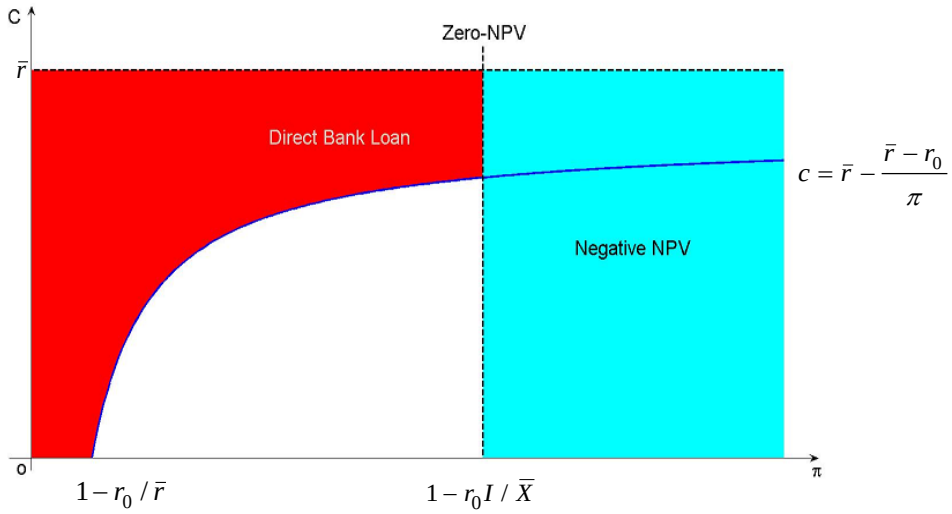
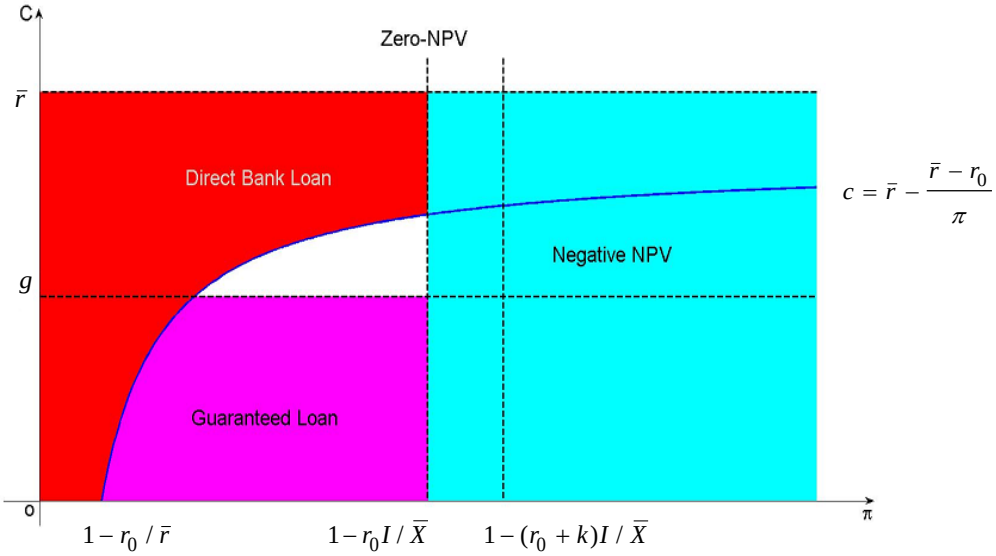


Figure VI. Guaranteed Loan

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		These variables are measured at one year before the year when the loan was approved.
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.	
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 guarantee 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.	