Risk Contagion along Loan Guarantee Chain: Evidence from Court Enforcement in China*

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Abstract

Using a unique dataset of guaranteed loan and a sample of lawsuits by lending banks against the guarantors in China, we study the impacts of a firm's loan default on its guarantors. We find that guarantor firms experienced a significant negative equity return around lawsuit announcement days with 11-day CAR to be -2.32%. We also document that the financial distress risk of guarantor firms, as measured by *Altman's Z-score*s, increased at the year of the announcement although the effects decayed over time. We further shows that this impact results from both *credit loss* and *demand shrinkage* channels. In the end, we explore and document that bank forgiveness was helpful for guarantor's recovery. Our evidence points out the existence of an important channel of risk contagion in China – loan guarantee chain.

JEL classification: G15, G21, G32.

Keywords: Risk Contagion; Implicit Collateral; Court Enforcement; Guarantee; Forgiveness.

1 Introduction

The global financial crisis during 2007-2008 has renewed the interest in understanding how a small negative shock of one firm can transmit to other firms and in the end amplify into a severe crisis. Many studies have been devoted to studying the mechanisms of risk contagion across different parties. Among these studies, most of them focus on the contagion across financial institutions (Allen and Gale (2000) , Leitner (2005), Elliott et al. (2014), Babus (2016) and Helwege and Zhang (2016)). Several other papers address contagion across supply chain (Jorion and Zhang (2009), Kolay et al. (2016)) or called counterparty contagion.

In this paper, we investigate a new channel of risk contagion – loan guarantee chain. Using a unique proprietary dataset of corporate-level guaranteed loans and a sample of lawsuits by lending banks against the guarantors, we study the impacts of a firm's loan default on its guarantors. Our sample contains 57,246 guaranteed loans of Chinese companies listed on the Shanghai and Shenzhen Stock Exchanges from 2004 to 2016. During this period, there were 405 lawsuits against guarantors by the lending banks after the borrowing corporate defaulted. We find significant contagion effects due to the lawsuits at both short and long horizons. Guarantor firms experience a significant negative equity return around lawsuit announcement days at the level of -1.3% measured by 3-day CAR, -2.32% by 11-day CAR and -10.17% at 71-day window, respectively. We also document that the risk of financial distress of guarantor firms, as measured by *Altman's Z-score*s, does increase at the year of the announcement although the effects decay over time. We further shows that this impact results from both *credit loss* and *demand shrinkage*. To further explore the impact of loan guarantee chain contagion on the macro economy, we construct a regional contagion measure at provincial levels. We find that banks forgave those defaulted guarantors by expand more loans to them which help them recovered soon. This evidence provides at least a partial explantation for *credit-induced boom and bust* (Di Maggio and Kermanai (2017)) of the guarantee loan markets in China.

China provides an ideal laboratory to investigate the issue of risk contagion through loan guaranteed chain channel because bank loans are by far the most important form of finance for firms in China (Qian et al. (2015), Allen et al. (2012)),(Jiang et al. (2016)). Guarantee is an important mechanism to get bank loans for firms without collateral as explained by chief risk officer at Industrial & Commercial Bank of China Ltd., Wei Guoxiang, "risk prevention relies excessively on third-party guarantees...to the extent that the guarantee is the main basis on which credit decisions are made,". [1]. At the end of October 2014, about a quarter of the 13 trillion in total outstanding loans was guaranteed loans.[2] These guarantee network

[1]China Finance, 2014, June.

[2]Wall Street Journal, 24 Nov 2014, "Loan 'Guarantee Chains' in China Prove Flimsy; Companies Renege

helps firms, especially small and med-sized enterprises (SMEs) in China to get large amount of external finance, which relaxes their financial constrains. However, it also posts high risk of contagion along the guaranteed chain. In fact, guaranteed chain posed an important threat of systematic risk in China. In 2012, more than 100 entrepreneurs united to write to the mayor of Hangzhou [3], capital of Zhejiang Province, complaining ongoing bankruptcy and bank's threats because they had to repay as guarantors after borrower's default. In July 2014, the China Banking Regulatory Commission issued a notice to banks, warning that bankruptcies in these "guarantee chains" could "trigger regional financial crises." [4] This crisis firstly burst in Chinese developed area, Zhejiang Province and Shanghai, then it spread to the whole mainland and resulted in a historical peak of default rate at the end of 2015[5] Understanding the impact of risk contagion along guaranteed chain is the first step in finding out the solution for preventing the risk contagion. Our study is not only important for academic literature, but also have important policy implications for China.

The loan guarantors don't have to be the customers or suppliers of the borrower firms. Also, the guaranteed loan is different from the trade credit as it could be used for new investment instead of as part of firms' existing business. Thus the loan guaranteed chain channel is distinct from the risk contagion channel along the supply chain. Also differing from the existing literature, in our setting, we have already observed the direct impact of contagion: the lending bank sued the guarantors due to the borrowers' default. This unique setting allows us to clearly identify the effects of risk contagions.

The rest of the paper is organized as follows. Section 2 reviews literature. Section 3 introduces the institutional background. Section 4 describes the data, including event descriptions and court enforcements and the identification methodology. Section 5 presents guarantor's market reaction on announcement of being filed by the lender, and two channels of credit contagion on market reaction. Section 6 traces two further measurements of risk contagion, guarantor's propensity of financial distress and loan capacity. Section 7 are robustness checks. Section 8 concludes.

on Promises to Pay Up in a Default".

[3]That's very abnormal in China. Entrepreneurs and officers are belonging to two different classes. For thousands of years, entrepreneurs have been at officers' service without any words. But this time, they wrote to the mayor to complain on their implied debt caused by guaranteed loans, which means how much they were concerned on the guaranteed loans.

[4]Note about risk detection and prevention of corporate loans along guarantee chain by China Banking Regulatory Commission, 2014, No. 214 note.

[5]The cures and recovery of guaranteed chain is successful in Zhejiang Province, which is one of the reasons why the mayor who was written to by the 100 entrepreneurs has promoted to be the municipal party secretary, the first hand, of Beijing-Capital of China-now.

2 Literature review

Guaranteed bank loan is an exotic tool to deal with *tyranny of inequality* in bank loan contracts. [6] Rajan and Zingales (2000) firstly introduced in tyranny of inequality. When parties are very unequally endowed, agreement may be very difficult to reach, and fungible resource can be transferred to compensate the losing party. Tyranny of collateral is popular in developing countries because it is too costly for them to get title to their property and therefore they have no collateral to offer (Mishkin (2016)).

Bolton and Scharfstein (1990) interpreted that a monopolistic financier uses the threat of not refinancing its borrowers as a way to enforce debt payment. Cunat (2007) examined how suppliers have a comparative advantage over banks in lending to customers by stopping the supply of intermediate goods.

Contagion across financial institutions are studied in (Allen and Gale (2000) , Leitner (2005), Elliott et al. (2014) and Babus (2016)). Contagion across non-financial firms are first addressed in Das et al. (2007) who found evidence of default clustering using data on U.S. corporations [7].

The difference to the prior research is that we investigate the contagious channel of credit risk when the financing contract provides the bank with the option to transfer the counterparty risk to the guarantor corporation. Guarantees are insurance policies that oblige the guarantor to make the promised payment on a financial contract if the issuer fails to do so (Merton and Bodie (1992)). In the guaranteed bank loan, borrower, lender and guarantor form a more complicated triangle than the standard lending relationship. An external guarantee from a related or unrelated corporation expands the borrower's access to credit, transferring from a *liar's loan* with no-or low-documentation mortgage of borrower itself into a full-documentation mortgage product of guarantor corporation. [8] This restructuring of credit brought new challenges to risk management theory, but the empirical advantage is also obvious because guaranteed bank loan can uncover the observations on *frailty correlated default* (Duffie et al. (2009)) [9]. When borrowing corporation defaults, lending bank has the

[6] Zhang (2015) summarized the bank loans of Chinese private-owned enterprises which implied that the guaranteed loan dwarfs other bank loans until 2014. She used Placebo tests and DiD analysis based on events revealing the double-edged sword of guaranteed loans. On one hand, guaranteed loans do relieve financial constraints in the future, while non-guaranteed bank loans can't. On the other side, guaranteed loan raises the risk of bankruptcy which is stronger than the non-guaranteed loan and its impact is even longer.

[7] Their sample consists of 2,770 firms for the period 1979 to 2004, including 495 defaults. But their assumption is violated in the presence of contagion or *frailty*, because of unobservable explanatory variables that are correlated across firms. Lando and Nielsen (2010) tested it with an almost identical set of default histories, but finds no evidence of default contagion.

[8] *Liar's Loan* refers to low- and no-documentation mortgage loans. Jiang et al. (2014) presented analysis of mortgage delinquency, which found strong evidence of information falsification among those liar's loans.

[9] Duffie et al. (2009) estimates the probability of extreme default losses based on US pubic non-financial

option of transferring this counter-party risk to the guarantor rather than being exposed to the risk of contagion in the standard lending relationship.

Bae et al. (2003) measures contagion using market reaction and Jorion and Zhang (2009) found that bankruptcy announcements cause negative abnormal equity returns and increases in CDS spreads for creditors.

3 Institutional background

3.1 Guaranteed bank loans in China

Firms in China, especially SMEs, face sever financial constrains and bank loan has long been the main financing channels for Chinese firms. For a private firm, going IPO to get access to equity market, has high standard. Besides the high listing standard, IPOs is under approval system even until now. There are long and uncertain waiting time. Even for a public firms, seasoned equity offerings still need application and getting approval by China Security Regulatory Commission. Corporate bond market is rather limited in China and it's mainly for large and stated owned enterprises. The shadow banking system emerged in recent year in China such as peer-to-peer financing. However, the financing cost is rather high. An average borrowing rate from the peer-to-peer financing channel is as high as 25% per year. On the other hand, bank loan has average interest rate around 10% per year. As a result, bank loan has the top priority, if not as the only choice, in firms' financing options.

Chinese banks prefer guarantee or collateral when extending loans. When firms cannot provide collateral, guarantee is popularly used as explained by chief risk officer at Industrial & Commercial Bank of China Ltd., Wei Guoxiang, "risk prevention relies excessively on third-party guarantees...to the extent that the guarantee is the main basis on which credit decisions are made,". [10] Guaranteed loans thus have huge demand in the market. Guarantors prefer to use guarantee instead of providing funds directly for couple of reasons. First, providing financing across firms are strictly regulated. People's Bank of China the central bank of China, issued *General Provision of Lending* in 1996, which requires the lender of a loan to be financial institutions. The provisions essentially prevents corporations to provide financing to each other directly. Or in another word, direct financing among corporations are not protected by laws. A corporation lender cannot claim interests on a loan during a lawsuit in case of borrower default because the lending contract is an invalid contract. The

firms between 1979 and 2004, which is much greater than would be estimated under the standard assumption that default correlation arises only from exposure to observable risk factors.

[10] China Finance, 2014, June.

financing has to use bank as serving agents, named as entrusted loans.[11] Second, providing guarantee doesn't counted as debt on guarantor firms' balance sheet. It will not increase guarantor's leverage ratio. Third, the payment of guarantee service is non-trial. On average, around 4% of the total amount of the loan is paid to the guarantor when the guaranteeing contract is signed. With both demand and supply, guaranteed loan has became a sizeable market in China.

Figure 1(a) shows the time evolution of the amount of guaranteed loans used by publicly listed companies from 2007 to 2014. Detailed data description is provided in next chapter. The figure shows that guaranteed loans amount has grown exponentially since 2007. The total amount of guaranteed loans was 100.45 billion RMB in 2007 and rose to 2805.19 billion RMB in 2014. Red line in Figure 1(a) is the amount of the principles the guarantor were filed to repay after the borrowing companies defaulted . It was 2396 million RMB in 2007 and dropped to 105 million RMB in 2014, which shows a very obvious decline since 2011. Figure 1(b) shows the distribution of claims in provincial level. Sichuan, Guangdong and Shandong provinces has the largest usage of guaranteed loan, followed by Fujian, Hubei and Jilin provinces.

[Insert Figure 1 near here]

3.2 Credit contagion to guarantors

Another unique feature of China's guarantee loan chain is its complexity. The guarantee of one loan would be the guarantor of another loan. As a result, the loan guarantee chain could be very long. Also, sometimes one corporation has multiple guarantors and one guarantor can provide guarantee for several corporations. In the end, the loan guarantee chain become a loan guarantee network.

Figure 2 provides an example of the complexity of the guarantee network. Dunan Environment Co. (stock code 002011), is a public listed firm on Shanghai Stock Exchange. It provides guarantee for seven firms, including its subsidiaries, such as Dunan Photovo. However, it also provides guarantee to Jiangnan Chemical Engineering, which is not its subsidiary. On these guarantee network, some corporations provide mutual guarantee, such as Dunan and Haiyue. Haiyue further provides guarantee for Qianzu, which provide guarantee for Dunanjinggong, which is a subsidiary of Dunan Environment Co. In this particular example, many firms are connected to each other into a guarantee network. Once one firm in

[11] See Allen et al. (2015) and Jiang (2015) for studies on entrusted loans.

this network got a negative shock, it's possible that the shock will spillover to other firms throughout this network.

[Insert Figure 2 near here]

The restructure of ZhongCheng Construction Group Co. is one example of contagion along the guarantee chain. On 2011, the board of director of SinceTech Group, Hu, Fulin, not being able to pay back his company's claimed 2 billion debt, chose to escape to US. [12]. The huge debt of SinceTech involves many guarantors, one of which is ZhongCheng Construction Group Co, one of the top 500 private owned enterprises in China. As a guarantor, ZhongCheng paid 63.29 million of SinceTech's debt. According to the incomplete statistics, ZhongCheng served as guarantors for at least 0.3 billions debt. Wasn't able to pay back all of its explicit and guaranteed debt, ZhongCheng filed bankruptcy on 2015.

The example of SinceTech and ZhongCheng is just a tip of the iceberg. Due to global financial crisis, Chinese firms suffered historically high recession on exports around 2008. Some borrowers defaulted on their bank loans because of business losses. More borrowers' defaults result from the credit contagion in which they were also joint guarantors for entrusted loan or private lending with at least twice higher in interest cost than their own debt. Credit distress began spreading at the end of 2011, and still goes on and on, from private lending to formal bank loans. [13] Figure 3 shows the global and China default lines which is rising since 2011.

[Insert Figure 3 near here]

Figure 4 shows more Chinese companies suffered loss since 2011 than before, in which the red line is higher after 2011. The blue dashed line shows a decreasing trend, which means Chinese companies may lend less while they suffered business loss.

[Insert Figure 4 near here]

On the bank side, banks suffered liquidity crunch as well. Amiti and Weinstein (2011) and Chodorow-Reich (2014) considered real effects of bank lending channel from the credit

[12] "Behind the runway Wenzhou entrepreneurs: They would have had a better ending" Zhuoying Jiang, 21st Century Business Herald, September 9th, 2011

[13] Wenzhou, a city in Zhejiang Province, became the first region where the guaranteed chain crisis took place. There are 28 guaranteed network, covering 50.7 billion RMB, with 11.8% of Wenzhou's GDP in 2013. Then the crisis spread to Hangzhou, the capital city of the same province with Wenzhou, where 600 firms wrote to the mayor for help on dealing with their guaranteed chains. In 2014, the risk propagated to the two nearest province, Jiangsu and Shanghai. The three provinces constitute in the Yangtze River Delta, the most prosperous region in China. As the risk spread along the guaranteed chains, the bank loan defaults took a hit which grabbed market attention at the end of 2015, reflecting market concerns about China economic growth and corporate risk management.

shock of financial crisis. Chinese SHIBOR rate jumped to 13.44%, and Repo rates even up to historical top, 30% in June, 2013. For lending bank, it implies that bank's borrowing cost surpasses its return on asset. China also suffered land market's collapse during this period. Gan (2007) examined the shock from land market collapse to collateral value in Japan influencing firm's debt capacities and investments. Chaney et al. (2012) studies the impact of real estate prices on corporate investment. Their research implied that a $1 increase in collateral value leads the representative US public corporation to raise its investment by $0.06 over the 1993-2007 period. Figure 5(b) shows the amount and price of the Chinese industrial land market. There was a price collapse at the end of 2010. As the main collateral channel of corporate bank loan, real estate price shock is a critical exogenous shock indeed.

[Insert Figure 5 near here]

Borrower's failure and bank's liquidity shock appeared at the same time, which causes the guarantor never sit there steadily counting his 4% guarantee profit. Guarantor has to pay the bill when downstream contagion takes place. His repayment is 27.5 times the amount of its initial profit from guarantee fee, more than enough to get guarantor's pulses racing. It will be even more penalties if the guarantor refuses or delays to repay.

Figure 6 describes the channels of credit risk contagion in guaranteed bank loans. After the borrower defaults, lending bank will file a lawsuit against the guarantor for the promised repayment. The lawsuit announcement is likely going to have negative consequences on the guarantor's equity price, increasing the risk of bankruptcy. [14]The dashed purple rectangle describes the risk contagion in Wall Street. Although banks try to set safe bars to against default risk by transferring the counter-party risk to the guarantors in Main Street, the risk still propagate to Wall Street because equity price of the guarantor declines as a result of the announcement of being files as a defaulted guarantor. The red polygon in Figure 6 shows the contagion channel in Main Street, implying that the lawsuit will put the guarantor into financial distress, which will also propagate through supply chain and may result in regional clustering. These two parties let us explain how the lawsuits give rise to risk contagion both in Wall Street and in Main Street.

What role does the bank play in this picture of risk contagion? Obviously, he is the source of the risk propagation because he raises the curtain by filing the guarantor for repayment. In fact, he is not willing to take the counter-party risk at the beginning of the loan contracting. We find another role at the right top of Figure 6. After the lawsuit, if the

[14]Subsequent effects also show up in guarantor's economic behavior, such as investment, cash flow, employment, et al. The influence on guarantor is stronger as the relationship between borrower and guarantor gets closer.Calomiris et al. (2017)demonstrate the sectoral activity and lending shaped by collateral laws. Our paper aim to focus on the short-term market reaction, financial distress and loan capacity.

lending bank chooses to punish the guarantor, by shrinking their bank loan to the guarantor, this will worsen the financial distress of the guarantor and even propagate through supply chain or regional clustering, which is indicated by the navy arrow on the right of Figure 6. On the contrary, if he chooses to rescue the guarantor by expanding loans to them, we will see a credit boom as China shows in the recent high-speed growth after the financial crisis. Our analysis shows a complete risk contagion and the important role bank plays, he is the initiator of evil, and the protagonist deciding comedy or tragedy.

[Insert Figure 6 near here]

4 Data and summary statistics

4.1 Sample and data construction

Our main sample is collected from Chinese companies listed on the Shanghai and Shenzhen Stock Exchanges which were filed by lending banks due to borrower's default, announced between January 1, 2006 to December 31, 2014. All the lawsuit announcements are obtained from the Wind database (the most commonly used databases covering public companies and other macro indexes in China). There are 567 cases filed against guarantors due to guaranteed finance, announced by the Chinese listed companies. 412 cases among of them were filed by lending banks, in which banks sued the listed companies as guarantors to ask them to fulfill their repayment responsibilities. In order to pin-point the differences from creditors, we focus on the cases in which the accusers are banks, dropping off the cases filed by individual, underwriting companies, investment companies, government departments, financial lease companies, trust companies, micro-lending companies and other companies. The announcement of being sued includes the following information, the listed companies' code and name, the defendant of the case, announcing date, filing date, creditor names, the amount of the loan and the details on the cases including court enforcements. There are 7 cases missing loan amount. These above result in 405 cases finally. In order to make sure that our results are not distorted by outliers, we have chosen to winsorize the financial ratios according to the 1st and 99th percentile.

Our proprietary dataset contains all 57,246 guaranteed loans of Chinese companies listed on the Shanghai and Shenzhen Stock Exchanges from 2004 to 2016. We use the loan information to construct the control group in Section 6 for comparing the long term impact from the lawsuit announcement. Since the lawsuits happened after the guarantor firms guaranteed the borrower for bank loan 2 years before the lawsuits in average, we firstly search the

guarantor 2 years before each year and match estimator to the guarantor being filed in that year, using net worth as the matching estimator. For example, for the filed guarantor i in year t, we will go to the guarantors in year $t-2$ matching the net worth in year t. We use one-to-one nearest neighbor PSM, therefore, we finally got 405 guarantors without filing to construct controlled group.

As a major announcement, China's listed companies are required to disclose the details of the lawsuit against repayment as a guarantor. The detailed information includes announcing date, claim amount, name of the accusing bank which can be traced into specific branch, whether there are more than one lending bank or co-guarantor, e.t.c. The description of the case also includes the relationship with the borrower whether they are related, which we have also checked whether they were shareholders of each other. The announcement also disclosed the case outcomes, including the details of court enforcements, which we collect into different pattens, dismissed by filing banks, partial repayment, creditor changing, frozen real estate, frozen equities, frozen equipments, frozen bank accounts or movable assets or regular repayment. We'll provide the summary in section 4.3. For the first dimension of risk contagion we follow Jorion and Zhang (2009) and Haslem et al. (2017), using the market reaction from the event of lawsuit announcement,described as CARs.

The second key variable in our analysis is proxy for credit risk. Following Baron and Xiong (forthcoming)'s country-level credit expansion, we modify their index to express firm-level credit expansion, with fixed asset as dominator rather than their dominator of GDP [15]. First I will exploit the ex ante effect adjusting Baron and Xiong (forthcoming)'s bank credit expansion.It is expressed mathematically as

$$\Delta_{-}\left(\frac{bankloan}{asset}\right)_{ijt}=\frac{(\frac{bankloan}{asset})_{i,t}-(\frac{bankloan}{asset})_{i,t-j}}{j} \tag{1}$$

where j=1,2,3 indicates the credit expansion at the end of the lawsuit year over 1-,2-, or 3-year before the announcement year.This indicator shows the credit change at the end of the lawsuit. In order to evaluate the ex post effect on guarantor's bank loan capacity, the following indicator is constructed as,

$$\Delta_{+}\left(\frac{bankloan}{asset}\right)_{itk}=\frac{(\frac{bankloan}{asset})_{i,t+k}-(\frac{bankloan}{asset})_{i,t}}{k} \tag{2}$$

where k=1,2,3 indicates the credit expansion of 1-, 2- or 3-year after the announcement year. We also calculate broader impact on regional clustering, where the regional-level is

[15]Benmelech and Bergman (2011)documented the effect of bankruptcy-induced collateral shocks on credit spreads using loan-to-value (LTV). The indicator we construct is more like their LTV. We also use total asset and net worth as dominators, which are consistent with the results using fixed asset.

calculated by provincial level [16].

In order to investigate the long-term impact on guarantor's, the third proxy for risk contagion is propensity of financial distress, which is examined based on the unit of observation of firm. We use *Altman's Z-score* to describe its risk of bankruptcy, regarding it as being in financial distress if its *Z-score* is below the cut-off of zero for two continuous years.

Other variables include *distance*, the address of the guarantor and the names of the bank branch are helpful to find the distance between the guarantor and the lending bank, which is used as an instrumental variable, IV, in section 5.3. The other IV, $CEOchange$, and an extra variable in the system of equations, $CEOmale$, a dummy of its CEO gender, were collected from its annual reports and online news. [17]

4.2 Event descriptions

Table 1 reports descriptive statistics of the sample cases. Panel A is the summary by announcing year. It implies that the announcement of being sued dropped down since 2011. [18]The mean credit amount is 31.79 million RMB, with the median of 20 million RMB of the total sample. Panel B reports the frequency of being sued. 75 companies were sued only once. Around 20 companies were sued twice or three times, respectively. 10 companies were sued 4 times. Less than 10 companies were sued more than 5 times, respectively.

We also report the summary by lending banks, in Panel C. There were 2 political banks and 5 dominated state-owned banks, which sued 7 cases and 213 cases, respectively. Other national commercial banks filed 149 cases. Local banks refer to urban and rural credit cooperatives, which only sued 36 cases. Both the number of event and the credit amount of

[16]We do collect the information on zip codes which was exploited by Mian and Sufi (2009). Since China bank loan strategies are different in provincial level, we use provincial level as regional clustering

[17]My dataset dropped the period when China was facing economic slowdown and volatility in the stock market since the second quarter of 2015. Chinese stock market suffered high volatility since the second quarter of 2015, with booming up during the summer and collapsed down at the beginning of 2016 which was caused by China's currency crisis and introducing of circuit breaker. My research doesn't cover this shaking period which is helpful to focus on the announcing effect without considering any other macro volatility and regulating policy shock.

[18]There are two reasons why the number of events drops down. First is learning effect, which shows a total decline trend because the corporate will avoid guarantee other companies' bank loan and complete its subsequent debt management if it has been sued. The second reason is substitution effects. As our research group investigated guaranteed loan loops in Wenzhou, a frontier of Chinese economic reform because of its active financing environment, loan default rate has pumped up since 2011. There were a lot of cases mounted in the court which resulted in reducing the course procedures and judicial officers' work overtime. The banks focuses on a great number of guaranteed loan defaulted by small-sized firms, having no time to sue the listed companies. It's a huge work to collect and analysis those small-sized guaranteed loan because the information is not complete, neither observable lending relationships nor standard financial variables. But we still can trace the impact on guarantors using listed companies which will highlights common characteristics of guaranteed loans.

loan are high in dominated state-owned bank loans.

There are some interesting cases as follows. Company Rui Mao Tong (Code: 600180) was the case with top individual filing amount of 515 million RMB. It was sued 7 times, including 5 cases from dominated state-owned banks and 2 cases from other national commercial banks. Company Shi Da Group (Code: 600734) is the top 1 in filing numbers with 13 filing cases. It was deep in the course enforcement between 2008 and 2013, whose filing banks include 4 dominated state-owned banks, and other 4 national commercial banks.

[Insert Table 1 near here]

4.3 Court enforcement

Details on court enforcement are collected following Baird (2014). The basic enforcement is that the guarantor should repay the credit principle and the interests by cash. There are 63 cases of basic enforcement, including the case that the guarantor should pay the residual if the borrower can afford part of the repayment. In 36 cases, lending banks made concessions in which the guarantor was agreed to pay the principles forgiving the interests, or even partial amount of the principles. In 11 cases, the guarantor reached an agreement with the bank, ending in dismissing the lawsuit by the bank.

In the above cases, banks made some renegotiation. On the contrary to the above who required less repayment than in basic enforcement, more banks asked for more penalties. Some lending banks asked for more interests, for example, court judged the guarantor to pay banks double interests for the delay in addition to the principle and the original interests. 10 cases changed the creditors which is regarded by the bank as a bad loan. 42 guarantors can't afford, whose banking account was frozen and the guarantor's saving was transferred to the creditors, otherwise their assets or equities were frozen for sale. Industrial real estate or land was commonly the asset frozen by court enforcement. There are 45 cases in which assets are frozen or in auction, 64 cases with frozen equities, 22 cases with both these two penalties. 10 companies try to declare that their guarantee's default and the lawsuit would have no effect on themselves. In these details, we can observe that there were some bankers cheated the guarantor corporation to attend in the bank loan for their own benefits, but the contract is still the contract. Most of the guarantors had to repay although they considered the guaranteed contract as a cheating.

In summarize, there are 63 cases with basic repayment, 47 cases reducing the repayment, 176 cases with more penalties. Therefore, *stick* is bigger than *carrot* in my sample, i.e., more banks prefer punishing the guarantors rather than forgiving them in the renegotiation after

corporate default. Carrots appeared in some frequent sued companies, such as Company Shi Da Group, mentioned as the top 1 in sued number. This company was forgiven with reducing repayment in 6 cases, other 1 case was even dismissed. There are 4 cases with basic repayment. Only one case was enforced frozen assets. Weak enforcement and penalties results in frequently being filed. But this case also shows a time trend that the banks asked for more, i.e., the reducing penalty hasn't show up since 2010. This means Chinese banks have tightened their regulation on guaranteed loans since then.

[Insert Table 2 near here]

4.4 Firm Characteristics

Table 3 reports descriptive statistics for a set of firm-specific variables that characterize the firms in this paper. The table is organized for all firm-years, and for the two sub-periods that were associated with being filed as a guarantor, deleting the financial companies. The first two columns show that the average amounts of claim-to-market value are 2.69% and 1.35%, respectively. The median of claim-to-fixed asset and to-total asset are 14% and 2%, respectively. The median of claim-to-sale is 5%. Overall, the claims are small part of market value, total asset, or sale, which is no more than 5%, but we will see its significant impact on market reaction and financial distress in section 5 and section 6.

The table further shows a concern on the structural change. The last four columns compare the mean or median of the two sub-periods breaking by the year of 2011. The question is why the amount of lawsuits has reduced since 2011. We explain this question by fixed year effect before/after 2011 in Table 5 and analysis the role of forgiveness or penalties in Table 6 and exogenous shock in Table 12.

[Insert Table 3 near here]

5 Market reactions of default events

5.1 Cross-sectional analysis of lawsuit announcement

We start with event observation to examine the market reaction on the announcement of being filed as a guarantor. Following Jorion and Zhang (2009), we choose the event window from 5 days before the announcement date and 65 days after announcement date. We calculated abnormal returns, AR_{jt} for firm j at time t using the market model methodology

following MacKinlay (1997) and Jorion and Zhang (2009), with parameters estimated over a window ranging from 1 year before the event date to 2 months before the event date, where the market index is CSI 300 Index. Cumulative abnormal returns, CARs, are then computed from time t_1 to t_2. Table 4 reports guarantors' ARs for every single day in the period and CARs of 3 days, 5 days, 7 days, 11days, [-5,35] and [-5,65]. Aggregating the data for the same corporation and same event date, there are finally 286 observations of each AR or CAR.

In the announcement of the arbitration proceedings caused by the default events, listed companies should disclose the features of the lawsuits such as the involved amount of money, the identity of the default party, the basic situation of the secured party and so on. The information related to the credit risk of default provides available data for studying the financial contagion on guarantors. Table 4 shows that the announcement of default events do have negative impact on the guarantor's equity return. Jorion and Zhang (2009) reported that creditor's equity price decreased 0.33% on the announcement day, -0.30% and -0.26% for 1 day and 3 days after the announcement. 4 shows the same ex post market reaction with Jorion and Zhang (2009). ARs of day 0, 1 and 3 are significantly negative, -0.89%, -0.3% and -0.35%, respectively. We find China's market reacted a stronger decline than U.S. market in Jorion and Zhang (2009). For the ARs before the announcement, 5-day, 4-day and 3-day before the announcement are significantly negative, while Jorion and Zhang (2009) found only 1-day prior was significantly negative. This implies that leakage of information may be stronger in China market than in U.S.

Table 4 reports the average CARs are -1.34%, -1.89% and -11.3% for [-1,1], [-5,5] and [-5.65] event windows. Those CARs were -0.9%, -1.90% and -7.93% in Jorion and Zhang (2009). This implies that , -2.29% for the 11-day event window, and -9.56% for the event window of [-5,65]. We find the same impact on guarantors rather than the creditor Jorion and Zhang (2009) studied, an average announcement day abnormal return of -0.89% on the announcement day, -1.34% for 3-day CAR, -1.89% for 11-day CAR. CARs in event windows of [-5,35] and [-5,65] are -6.87%, and -11.3% with 1% significance, respectively. Bae et al. (2003) addressed that China has the highest average daily return (0.087%). Table 4 implies that the risk contagion in China is as almost the same scale as that in U.S. although China owns the top return in equity market if we only regard the 3-day and 11-day event windows. As a matter of fact, China has a significant stronger impact because the longer event of [-5,65] shows a much lower reactive. Therefore, we continue to examine the other proxies for long-term risk contagion in the next section.

Table 4 also broadens the conclusion of Jorion and Zhang (2009), the risk contagion is not only propagated to creditors but to guarantors as well. Recently, Haslem et al. (2017)

examined how much corporate defendants lose. They found that US companies lose 0.615% for the [-1,1] event window. In this paper, the results show that the contagion impact is even stronger than Jorion and Zhang (2009) and Haslem et al. (2017) found.

We also check the differences of the subsample of industrial companies in Table 4. We dropped off the financial institutions as guarantors in the subsample. Jorion and Zhang (2009) implied that financial institutions are less affected by counter-party credit losses than industrial firms. Our empirical analysis uncovers that if the counter-party risk is transferred to a guarantor, there is no difference whether it is financial or not. [19]

[Insert Table 4 near here]

5.2 Implicit collateral channel

In this section we apply fixed effect model to address the following question: conditional on the existence of corporate default and being filed by banks, what's the other factor that should drive the drop of equity price which is omitted in Jorion and Zhang (2009)?

The answer is hided in the lawsuit itself. The first factor is claim. Benmelech and Bergman (2011) analyzed the collateral channel in which a firm's bankruptcy reduces the collateral value of other industry participants, discussing how the collateral channel may lead to contagion effects. [20]Chaney et al. (2012) computed the sensitivity of investment to collateral value which also demonstrated that collateral is an important channel. In guaranteed loan, the collateral is guarantor's guarantee, therefore it is an implicit collateral. Since the dependent variable is CAR, its value should be adjusted by market value. We look back the announcement of each case, using $Claim/MV$, the percentage of claim to market value 1 business day before announcement, to trace the impact of the lawsuit announcement of dual defaults of both borrower and guarantor. [21]

The second factor on lawsuit is the court enforcement. Campello and Larrain (2016) examined the collateral menus enlarged to include movable assets and found that firms operating more movable assets borrowed more. Figure 7 shows the effects from court enforcement on freezing immovable assets or movable assets. The navy solid line in the left

[19]We use the subsample of the industrial companies in the following sections based on two reasons. First is that the conclusion can be compared with Jorion and Zhang (2009). Second is financial companies do have different features not only on financial variables but also on economic activities.

[20]They documented that due both to increased supply and reduced demand for industry assets, the collateral channel implies that bankruptcies increase the likelihood of asset fire sales, reducing collateral values industry wide.

[21]The median of $Claim/MV$ is 1.4%. The following sample is based on the cases dropping off 12 cases of financial companies, totally 393 cases.

subfigure represents the court enforcement freezing guarantor's immovable assets. The red solid line in right subfigure represents the court enforcement freezing guarantor's movable assets. Those two lines are both above the dashed lines, which means the implicit collateral relieves the equity decline compared with others, but the court enforcement on immovable or movable assets may have different impact. Considering collateral as an important channel, we modified Jorion and Zhang (2009)'s model by considering different court enforcement on immovable or movable assets. In addition, we extend to explore 11-day window other than 3-day window they tested.

[Insert Figure 7 near here]

Unlike the complete information releasing in developed countries, Chinese listed companies hasn't disclose their credit rating. This is partially because there is no unique credit rating system in China, the same company may have different credit ratings in different banks. Considering the availability of data, my cross-sectional model based on default cases is as follows,

$$CAR_{it} = \mathbf{1}'\boldsymbol{\alpha}_{it} + \beta_1 Claim_{it}/MV_{i,t-1} + \beta_2 Claim_i/MV_{i,t-1} \times Dummy_i + \boldsymbol{\gamma}'\mathbf{X}_{i,t-1} + \epsilon_{i,t}. \quad (3)$$

where dependent variable is CAR^3, the 3-day CAR around the event date, and CAR^{11}, the 11-day CAR around the event date, respectively. $\mathbf{X}_i$ represents control variables that play an important role and include $z-score$, $leverage$, vol as the factors in Jorion and Zhang (2009)'s regression. [22] The regression model is a little different from Jorion and Zhang (2009). I use fixed effect to reduce endogeneity, which is recently identified by current papers, e.g., Fisman et al. (2017). The vector $\boldsymbol{\alpha}_{it}$ comprises a set of time-, industry-, creditor- and SOE-fixed effects (Shi and Zhang (forthcoming))to control for the impact of business cycle fluctuations, industry belongings, geographic location, and firm state-ownership, respectively. Time-fixed effect is introduced by using a 0-1 dummy variable, which equals 1 if the lawsuit happened after 2011, otherwise is 0. The creditor-fixed effect is also considered as 0-1 dummy, which equals 1 if the bank belongs to political bank or dominated state-owned banks, otherwise is 0. [23]

$Dummy_i$ is a variable based on the patterns of court enforcement, which is identified as movable or immovable asset. Campello and Larrain (2016) identified information on

[22] I also tested State dummies, the state where the guarantor located, which is not significant.

[23] I also tested State dummies, the geographic location where the guarantor located, is not significant. Firm age fixed effect is also exploited, but it is also insignificant. Since CARs are calculated as the abnormal return above market index, the macro variable is not included in my model, the same as Jorion and Zhang (2009).

the decomposition of firm's fixed assets between movable assets and immovable assets, in which movable assets refer to machinery and equipment, immovable assets refer to land and buildings. [24] As Table 2 has shown, 63 guarantors paid the bill without asset sale after the filing, 45 corporations were frozen real estates, 64 corporations were frozen equities, 22 corporations were frozen both real estates and equities, and 42 companies were frozen bank account or movable assets. $Dummy_i$ equals 1 if the court enforcement is freezing the guarantor's immovable asset or movable asset, respectively.

Table 5 reports the regression results. Column (1) is modifying Jorion and Zhang (2009)'s model by adding fixed effects which is helpful to reduce endogeneity, in which the four factors are those in their model. After adding the fixed effects, $Claim/MV$ and Vol become insignificant, and the sign and significance are consistent even considering implicit collateral categories of court enforcement in Column (2)- Column (4). The regression results of 3-day CAR implies that only *leverage* is significantly negative, Vol and $EBITA/Sale$ have no impact on 3-day CAR.

We continue to explore the impact on 11-day CAR which wasn't regressed in Jorion and Zhang (2009). The results in Column (5)-Column (8) imply that although claim doesn't have impact on 3-day CAR, it did have significant negative impact on 11-day CAR. The coefficient of $Claim/MV$ is significantly negative, -0.575%, implying that claim increasing 1 percent of market value will result in 11-day CAR dropping 0.6% in average, fixing the other control variables as Jorion and Zhang (2009) and fixed effects I considered.

Table 5 shows that Jorion and Zhang (2009)'s model is partially efficient for 3-day CAR when considering fixed effects to control endogeneity. When it is used to explore 11-day CAR, only $Claim/MV$ is able to explain the market reaction, which is indexed as EXP, exposure ratio, in their model. An interesting finding is that the coefficients of $Immovable$ is significantly positive in Column (7). This implies that court enforcement on immovable assets has significantly positive impact on 11-day CAR, i.e., immovable assets do relieve the equity price decline of 11-day event window. But movable asset doesn't show the relief effect since neither the coefficient of $Claim/MV * Movable$ nor the coefficient of $Movable$ is significant in column 4 and column 8. [25]

[Insert Table 5 near here]

Fire sales can also lead to fragility of financial markets during crises (Shleifer and Vishny (2011)). This paper provides the evidence that fire sale leads to guarantor's equity price

[24] Since the movable fixed asset in Campello and Larrain (2016) refers to machinery and equipment, which is used as the frozen collaterals only in 3 suitcases.

[25] We also modified $Immovable$ and $Movable$ as variables compared to regular enforcement, i.e., it equals 0 when regular enforcement.

sharp decline. Ayotte and Bolton (2011)'s theoretical model documented that a property right is enforceable, not only against the parties to a contract, but also against third parties outside the contract. Our empirical results provide evidence to their theoretical model and shed light on the market reaction of the impact. Finally, we also find that immovable assets does relieve the downturn effect of market while movable assets doesn't matter, which broadens Campello and Larrain (2016)'s findings.

5.3 Renegotiation

If a lender does not expect her contract to be enforced, she will never extend arm's length credit. Instead, she will seek some degree of economic or political control to protect her investment (Zingales (2015)). Tracing the details of lawsuit in Table 2 shows that court enforces extra penalties in 176 cases, which is 3.74 times of the number of the cases in which the lending bank forgave the guarantors. These penalties are also related to the relationship between guarantor and the bank. In addition to considering the impact from the relationship to renegotiation of the lawsuits, this section tries to deal with two concerns in the former regressions. One is endogeneity, the other is few clustering (Cameron and Miller (2015)).

In this section we introduce systems of equations based on proxies to reflect the relationship and explore the renegotiation between guarantor and bank. One classic instrument variable to describe the relationship is *distance* to the filing banks, therefore I use distance between guarantor and filing bank as the first instrument variable, following Petersen and Rajan (2002). The second proxy we use is $CEOchange$ of the guarantor corporation since it may have influence on the relationship with the borrower company and with the filing banks as well. We also introduce the systems of equations with an exogenous variable, $CEOmale$, in the second equation. The exogenous variable, $CEOmale$, is a dummy, which equals 1 if the CEO is male.

The systems of equations are:

$$CAR_i = \alpha_p + \lambda_1 y_i + \lambda_2 CEOChange_i + \lambda Controls_i + e_{1i}, \tag{4a}$$

$$\begin{aligned} y_i = {} & \beta_S + \beta_c + \beta_p + \zeta_1 Claim/MV_i \times distance_i + \zeta_2 CAR_i \\ & + \zeta_3 Claim/MV_i \times CEOmale_i + \zeta_4 Age_i + \zeta_5 Size_i + e_{2i}. \end{aligned} \tag{4b}$$

where y_i is the variable $Claim/MV \times Penalty_i$. $Penalty$ equals 1 when the court enforcement asks for more penalties. Following Fisman et al. (2017), adding fixed effects to control endogeneity. In order to overcome the second concerns of few clustering, industry is not clustered in this section. The benefit of constructing systems of equations is not only reducing

endogeneity, but explaining the reverse causality as well.

Table 6 reveals several interesting patterns. First, the results of the systematric equations implies that neither of the models shows a converse impact, i.e., neither 3-day CAR nor 11-day CAR has significant impact on $Claim/MV * Penalty$. These results relax the first concern on endogeneity.

Second, the term of *male* allows us to identify the *gender effect* in the renegotiation because females are still working even after marriage and they are much more likely to be promoted than those in western countries. Both the regression on y_i indicate that court enforced more penalties on the enterprises with male CEO and long distance. This implies that filing bank is more likely to forgive the guarantor if its CEO is female although Chinese male CEOs are more talented in renegotiation capability and running social network. De-Mel et al. (2008) found that the returns are much higher in enterprises owned by males than in enterprises owned by females. My paper provides a strong evidence that enterprises owned by males were asked for more penalties by filing banks, which is consistent with Jiang et al. (2014). [26]

The regression on 11-day CAR shows a significantly negative coefficient, implying that 11-day CAR drops down in the group with penalties. The result shows a dual black side of guarantor's default, i.e., they will pay much not only for the repayment but also in their market reaction. But the coefficient is not significant for 3-day CAR, implying that feedback effect may not seize the information from penalty commitments in the court enforcement.

[Insert Table 6 near here]

Renegotiation occurs when the parties to a contract are unable to commit to the terms of their agreement. Bolton and Scharfstein (1990) shows that the presence of an enforceable investment covenant would lead to renegotiation because liquidation is inefficient. The asymmetric information models of DeMarzo and Sannikov (2006) and DeMarzo and Fishman (2007) produce long-term contracts that are susceptible to renegotiation because of the inefficiency of the punishment. Roberts (2015) using data from SEC filings show that the pricing, maturity, amount and covenants are significantly modified during renegotiation, whose timing is governed by the financial health of the contracting parties. My paper shows that Chinese banks do take on efficient punishment on guarantors through court enforcement when borrowers defaulted, and these extra penalties resulted in guarantor's 11-day

[26] Jiang et al. (2014) predicted a higher likelihood that borrower will obtain a loan when the borrower is female. My paper provides evidence in case of penalties, which shows a significant impact from gender effect. Jiang et al. (2016) examined the voting behavior of Chinese independent directors. Their research founds no significant impact from gender effect. But my paper provides evidence that female CEOs do have advantage in the renegotiation on loan contract when the firm was filed by banks.

CAR dropping down 1.16% further.

6 Further measurements of risk contagion

6.1 Financial distress

6.1.1 Matching estimations

In this section we are examining whether the lawsuit decreases the firm's subsequent bank loan or even results in financial distress. First, exploration is based on difference-in-difference approach. The "event" sample is affected by the lawsuits being filed as a guarantor. The matched sample is constructed using standard propensity score methodology-firms in the event sample are matched to firms with the closet propensity to the event firm which also guarantee other borrowers but without a lawsuit. This matched sample may let us know the impact from the lawsuit on guarantors. Since this paper is focusing on bank loan lawsuits, we use net worth as the matching estimator which is the key factor for loan policy. The tests reported in Table 7 show the success of our matching: the median size and age is virtually identical across firms in filed or non-filed guarantor companies after the matching is performed. We calculate the Altman's Z-score at the current event year and 1-year, 2-year, and 3-year sequently. All of the Z-score show significant negative difference between treated and control group. Table 7 identifies that the guarantor being filed has higher leverage, lower liquidity and much higher risk of financial distress.

[Insert Table 7 near here]

6.1.2 Credit loss

Jorion and Zhang (2009) summarized the fraction of creditors that are delisted or downgraded with 1 and 2 years. In this paper, we use panel data of the guarantor who faces corporate default to focus on the subsequent financial distress of guarantors [27]. We define a company in financial distress if its Z-score is below the cut-off of zero for two continuous years (Fan et al. (2013)),which means $Z_{it} < 0$ and $Z_{i,t+1} < 0$ where Z is calculated at the end of the year. [28] We model the effect on guarantor's propensity of financial distress from credit loss in

[27]The claim was calculated over fixed asset in this section since we focus on the propensity of financial distress based on panel data, instead of the observation of events in the prior sections focused on market reactions.

[28]We also use a second criteria to infer distress is it belongs to Special Treatment, labeled as ST because of business loss or no accounting profit.

this section. For this purpose, we construct a binary response variable $FD_{i,t} \in \{0, 1\}$ which captures whether, or not, firm i was in *financial distress* in year t and year $t + 1$, where $FD_{i,t} = 1$ if $Z_{it} < 0$ and $Z_{i,t+1} < 0$, otherwise it equals 0. In order to control operation and capital structure, the control variables $\mathbf{X}$ includes salegrowth, leverage, size and age. The logistic financial distress model for the binary responses is of the form,

$$\theta_{it} = \ln\left(\frac{p_{i,t}}{1 - p_{i,t}}\right) = \mathbf{1}'\boldsymbol{\alpha}_{it} + \beta_1 Claim/Asset_{it} + \beta_2 After_{it} + \boldsymbol{\gamma}'\mathbf{X}_{i,t-1} + \epsilon_{it} \tag{5}$$

Table 8 reveals several interesting patterns. First, it shows the time decay of the impact of claim on financial distress. The coefficient of $Claim/Asset$ is significant at 10% level for FD_{t+1}, insignificant for FD_{t+2} in Panel B while it is significant at 1% level for FD_t in Panel A. This implies that the impact from lawsuit is decreasing with time. Table 8 Panel A shows the impact on financial distress at the end of filing year. The empirical results indicate that implicit collateral have significant impact in the filing year. The coefficient of $Claim/Asset$ is 0.162 at 1% level, which means that the probability of financial distress at the end of current year will increase 16.2% if the guarantor is asked for 1% claim over its fixed asset, which is both economically and statistically significant.

Second, self-treatment is significant, especially for the cases with penalties. In Table 8, $After$ equals 1 after it was filed, and $After2$ equals 1 if the firm was court enforced with penalties. Column 5 in Panel A shows the coefficient of $After$ is significantly positive at 5% level which means the probability of financial distress increases at the end of the event year. Column 2' and Column 2' report significantly negative coefficients of $After$, implying that the probability drops down 1- and 2-year after the lawsuit. The interesting thing is the self treatment effect is so prompt. Column 3 and Column 6 in Panel A show negative coefficient of $After2$ which means those companies with penalties adjusted themselves and self treated at the end of the event year. Column 3 and Column 3' both report insignificant coefficients of $After2$ which means those firms with prior penalties do not go bad again.

The interesting finding of Table 8 demonstrates the efficiency of punishment. The more claim being asked, the more probability of financial distress. But this impact decays because Chinese firms recover soon. Wisdom comes by suffering. Lawsuits or even more penalties in court enforcement let them check themselves and never go bad again. This is the reason why seldom firms were filed frequently as shown in Panel B of Table 1.

[Insert Table 8 near here]

6.1.3 Risks clustering in regions

In this section we clustering the bankruptcy risk by regions in Chinese provincial level. Figure 9 shows the impact from lawsuits. The Altman's Z-scores of treated group are lower than those of control group, at the current year and the sequent years, in Fujian, Heilongjiang, Henan, Jiangsu, Ningxia, Shanghai, Shandong, Sichuan, and Zhejiang Province. Those regions are exactly the provinces emerging area booming guaranteed crisis. Our finding which Figure 9 demonstrates does consist with China's guaranteed loan crisis taking place in local regions.

Figure 9 also shows two ex post trends in the areas booming the crisis. It was recovering in the region of Shandong, Zhejiang and Fujian, while it still went worse in Ningxia and Jiangsu.

[Insert Figure 9 near here]

6.2 Loan capacity

6.2.1 Description of loan capacity

In this section we merge the sample with their ex ante and ex post bank loan information to address the following question: does lending bank reduce their bank loan to guarantors who were filed because of borrowers' default? If it is true, do this bank loan transferred to the other competitors in the same industry with guarantors being filed? Although the actual risk was in the industry of borrower, the lawsuit announcement reveals the guarantor's equity price decline which will also result in bank loan shrinkage of the other companies in the industry with guarantors being filed. Prior credit booms by guaranteed loan will shrink back if risk event like the case in this paper takes place. This also demonstrates that the bank loan market is also self treated.

Table 9 shows the mean of bank loan over asset for each by-year decile of ordering firms by fixed asset deciles, respectively. Both Panel A and Panel B shows the firms get more bank loan with low fixed assets. Loan/Asset is shrink in announce years which is lower in Panel A than in Panel B. We also saw a significant credit shrinkage of Δ_{3-}, Δ_{2-} and Δ_{1-} in most of the deciles in the announcement year than benchmark, which indicates that banks do reduce the guarantor's bank loan at the end of announcement year compared to prior years. For the bank loans after the announcement year which is indicated as Δ_{+}, we even see higher value on the left in Panel A than those in Panel B, which shows China bank is likely to expand bank loans to the firms even they have low fixed assets. These above identify that

although bank punished the default guarantor at the announcement year, they also forgive or even rescue the lowest three deciles with lowest fixed assets.

[Insert Table 9 near here]

6.2.2 Impact from lawsuits

Schularick and Taylor (2012) addressed that the change in bank credit is robust predictor of financial crisis based on 14 developed countries from 1870 to 2008. Baron and Xiong (forthcoming) found that bank credit expansion predicts increased bank equity crash risk one to three years later. What this paper wants to know is to address the following question: does firm's bank loan change after it is filed as a guarantor? Is it contagious to other companies in the same industry?

In this section, we offer ex post outcomes of the lawsuits.The logistic forgive or punish model for the binary responses is of the form,

$$ln\left(\frac{Forgive_{ist}}{1-Forgive_{ist}}\right) = \mathbf{1}'\boldsymbol{\alpha}_{it} + \beta_1 Claim/Asset_{it} + \beta_2 GDPgrowth_{st} + \boldsymbol{\gamma}'\mathbf{X}_{i,t-1} + \epsilon_{it} \quad (6)$$

where s indicate the province where the firm located. $GDPgrowth_{st}$ indicates the growth rate to control the economic development in this region. Following Brown and Petersen (2009), Equation (6) also includes stock and debt issues to control for possible omitted variable biases and to evaluate the changing role of external finance, which are both the ratios over asset. The regression results are robust with the control variables exclude stock and debt issues.

Table 10 shows the impact of being filed as guarantor on the firms sequent loan capacity. In Column 1, we find a significant negative impact of $Claim/asset$. Following Fisman et al. (2017), We use fixed effect of SOE-, industry-, location- and year of pre/post 2011, to control endogeneity. If the bank asks for 1% repayment, firm's bank loan will drop 7.3%, which is both economically and statistically significant. But we also find that the lawsuit may not influence the bank loan expansion of 1-year and 2-year later, as Column 2 and Column 3 shows. The empirical evidence shows that the impact on credit shrink only happens at the end of the announcement, the risk contagion of corporate default on guarantor shows an instant impact.

[Insert Table 10 near here]

6.2.3 Forgiveness or not

Figure 10 shows the forgiveness from the filing banks. Figure 10(a) shows that only three province, Beijing, Hainan and Heilongjiang still expanded their bank loans to defaulted guarantors. Other provinces reduces their bank loans if the bank files the defaulted guarantor. Figure 10(b) of Figure 10 shows more guarantors are forgiven ex post in which credit expansion is positive. There is or not negative externalities?

In section 6.1.3, we find two different trends. One is recovering, in Shandong, Zhejiang and Fujian. The credit expansion is highly positive in those three provinces both Figure 10(a) and in Figure 10(b), implying that forgiveness is applied. The other trend is shown in Ningxia and Jiangsu, where we found lower forgiveness both in Figure 10(a) and in Figure 10(b). This conclusion implies that financial distress resulted from credit contagion could be cured by debt forgiveness. If banks punish the guarantor and even reduce their sequent loan, they may getting more and more unhealthy. This is helpful to explain the ongoing China's credit boom.

[Insert Figure 10 near here]

7 Robustness check

7.1 Demand shrinkage

Jacobson and VonSchedvin (2015) shows that trade credit chains are an important mechanism through which corporate failures are propagated in the economy. They inferred that the trade credit failure propagation mechanism is driven by both credit losses and demand shrinkage. Table 8 has shown the impact of credit losses ($Claim/Asset$). Table 11 aims to focus on the channel of demand shrinkage ($Claim/Sale$).

Table 11 shows demand shrinkage is different from credit loss. Its impact also shows a trend of time decay as credit loss's. This impact is significant impact in the current year and the following year, but it disappears in the $t+2$ year. The coefficients of $Claim/sale$ are significantly positive in column 2 and column 4 imply that the impact is stronger to the firms with less total sale.

An interesting identification is the coefficient of $After$ is not significant to the current year, but significantly negative on the subsequent 2 years. This reveals the learning effect, as mentioned in section 3. As a critical announcement, being accused as guarantor to repay is helpful to improve corporate governance. It makes the firms to pay attention to their debt

management, including some implied debts, especially their guaranteed loans. This is likely to drop the possibility of swamping in financial distress.

We also check the characteristics of the firm property owned by state or not. The results are reported as Panel B of Table 11 shows. There is no difference between SOE and non-SOE by the demand shrinkage. *p-Value* of $After$ is significant, which implies that non-state owned guarantors are more possible to be swamped in financial distress after borrower defaults than state-owned guarantors.

[Insert Table 11 near here]

7.2 Exogenous shock

While banks pass their liquidity shocks on to firms, large firms-particularly those with strong business or political ties-completely compensate this loss by additional borrowing through the credit market (Khwaja and Mian (2008)). Small firms are unable to do so and face large drops in overall borrowing and increased financial distress.

Since there are double shocks from both liquidity and real estate price at the end of 2010, I also check the impact of this double shock. Dummy *shock* equals 1 if the year>2010, otherwise is 0. In order to check whether credit loss or demand shrinkage has impact on propensity of financial distress and the structure change, the model is as follows,

$$Y_{it} = \alpha_i + \alpha_t + \beta_1 CreditLoss_{it} \times shock + \beta_2 DemandShrink_{it} \times shock + \boldsymbol{\gamma}'\mathbf{X}_{it} + \epsilon_{it}. \quad (7)$$

Table 12 traces the impacts from liquidity and real estate price shocks. Column 1 to Column 3 show the impact of credit loss channel on financial distress. The coefficients of $Claim/asset$ are all significantly positive which implies that credit failure propagation is driven by credit loss and will last a long period. After the double shocks, impact from credit loss is getting much more positive since p-Value is significant. Column 4 to Column 6 show the impact of trade shrinkage channel. The coefficient is significantly positive only in Column 5, which implies that trade shrinkage channel is a temporary propagating channel of credit default failure, which only works before the shock. Table 12 doesn't report the regressions on FD_{t+2}, because introducing 2010 as double shock year let the sample of shock=1 has only one-year data. In order to considering time fixed effect, we only report the results on FD_t and FD_{t+1}. [29]

[29]Jacobson and VonSchedvin (2015) considered both the interaction term with $Claim/asset$ and $Claim/asset^2$. We also test the interactional term with $Claim/asset^2$, but it's not significant, therefore the former equations are all correct.

[Insert Table 12 near here]

8 Concluding remarks

In cascades of failures in a network of interdependent financial networks, Elliott et al. (2014) acknowledges that diversification connects the network initially, permitting cascades to travel; but as it increases further, organizations are better insured against one another's failures. We hope that this paper is a step forward and digging deeper in this direction focusing on the risk contagion to the guarantor who insures the borrower's bank loan when he was filed to repay the default borrower's bill.

First, we focused on the market reaction. Guarantor's equity price suffers a decline by the announcement, which is getting stronger as the event window broadens. We examined this effect from the guarantor's implicit collateral. By dividing assets into immovable and movable based on court enforcement, we find immovable assets relieve the decline while movable assets doesn't matter. This finding demonstrates that although banks want to be secured and isolate Wall Street from corporate default, this risk still propagates through guarantor's market reaction.

Second, the guarantor's financial health has significantly changed. The guarantor's propensity of financial distress increases significantly after they are filed by the lending banks or enforced extra penalties. This effect propagates through both credit loss and demand shrinkage. Our calculations on clustering the bankrupt risk by regions shows two ex post trends in the areas booming guaranteed loan crisis, recovering or getting worse.

Last but not least, this paper constructs left-side and right-side credit expansion indicators to examine the structural change of guarantor's loan capacity. This perspective explains the reason of the two trends. Financial distress resulted from credit contagion could be cured by debt forgiveness, while punishment could only worsen the contagion.

Our novel detailing data on court enforcement highlights the role lending bank plays during the renegotiation and ex post credit expansion, which is help to broaden the contract characteristics summarized in Roberts and Sufi (2009). Our analysis shows a complete risk contagion of corporate default in guaranteed loans, which is propagating from Main Street to Wall Street. Bank is the initiator of evil, and the protagonist deciding comedy or tragedy.

A Variable Names and Definitions

Table A1: **Variable Names and Definitions.**

Names	Definitions
$Claim/MV$	Amount of claim over total market value 1 business day before announcement (in %).
CAR	Cumulative abnormal returns based on CSI 300 daily returns (in %).
$Leverage$	Leverage rate at the beginning of the year.
$Salegrowth$	Sales growth rate at the beginning of the year (in %).
Vol	Equity return volatility of the guarantor for the year preceding the announcement (in %), based on logarithmic return on 52-week daily data.
Age	Number of years since registration.
$Age1$	Number of years since IPO.
$Size$	ln($totalasset$), $totalasset$ is in 10,000 RMB.
$Finslack$	Cash over fixed asset at the beginning of the year (in %).
SOE	Dummy variable, equals 1 if it is state-owned, otherwise is 0.
$Immovable$	Dummy variable, equals 1 if court enforcement is frozen real estate, or frozen both real estates and equities, otherwise is 0.
$Movable$	Dummy variable, equals 1 if court enforcement is frozen bank accounts/equities/equipments/both real estates and equities, otherwise is 0.
$UnREL$	Dummy variable, equals 1 if the guarantor is unrelated to the borrower, otherwise is 0.
$CoGuarantor$	Dummy variable, equals 1 if it is jointly guaranteed by several companies, or 0 if guaranteed by unique company.
$MultiBank$	Dummy variable, equals 1 if the loan was borrowed from more than 1 bank, otherwise is 0.
$Claim/asset$	amount of credit over fixed asset at the beginning of the year.
$Claim/sale$	amount of credit over total sale at the end of the year.
$Z-score$	Calculated according to Altman(2000), Fan et al. (2013) .
FD	Dummy variable, equals 1 if Z-score is below the cut-off of zero for two continuous years, otherwise is 0.
$After_{it}$	Dummy variable, equals zero before firm i was filed and one afterwards.
$After2$	Dummy variable, equals 1 if the firm was court enforced with penalty, otherwise is 0.
$shock$	Dummy variable, equals 1 if year>2010, equals 0 if year$\leq$2010.
$distance$	Distance between the address of the guarantor corporation to the filing bank branch, in $Mile$s.
$CEOmale$	Dummy variable, equals 1 if the CEO is female, otherwise is 0.
$CEOchange$	Dummy variable, equals 1 if CEO changed at the beginning of the year.
$Penalty$	Dummy variable, equals 1 when the court enforcement asks for more penalties, otherwise is 0.
$BadRel$	Dummy variable, equals 1 if $Penalty$=1, otherwise is 0.
$Macro$	Annual percentage nominal growth rate of GDP in local province.
$Region$	Zip code of the company.

B Tests of Endogeneity

Table B1: 2SLS Testing Relationship between Guarantor and Borrower. Reported in parentheses are t-statistics based on clustered standard errors, which are robust standard errors not clustering by industries.

A. 2SLS Testing *CorpRelation*

		(1)one IV			(2) one IVs			(3) two IVs	
	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}
claim	3.700***	0.001	0.006***	0.009	0.007	0.048**	0.632	0.001	0.007***
	(5.22)	(0.51)	(3.55)	(0.41)	(0.48)	(2.32)	(1.22)	(0.53)	(3.62)
claim*CEOmale									
claim*distance	-0.009***			0.763***			-0.009***		
	(-7.17)			(27.25)			(-12.75)		
claim*CEOchange							3.576***		
							(5.19)		
claim*CorpRelation		-0.001	0.0004		-0.001	-0.058**		-0.001	-0.001
		(-0.57)	(0.26)		(-0.47)	(-2.16)		(-0.61)	(-0.52)
leverage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
salegrowth	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SOE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-statistic	1093127			3.17E+07			2369950		
First-stage R^2	0.976			0.837			0.991		
No. of Obs.	322			322			322		
$\rho_{distance}$	0.642						0.642		
$\rho_{CEOchange}$				0.899			0.899		
p of endogeneity		0.461	0.739		0.656	0.055		0.029	0.465
Endogeneity		insignificant	insignificant		insignificant	significant		significant	insignificant

B. 2SLS Testing *CoGuarantor*

		(1)one IV			(2) one IVs			(3) two IVs	
	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}
claim	0.994***	-0.634	0.325	1.006***	-2.685	-9.680	0.996***	-0.776	-0.566
	(116.58)	(-0.64)	(0.21)	(76.05)	(-0.37)	(-0.36)	(73.59)	(-0.62)	(-0.47)
claim*CEOmale									
claim*distance	9.64E-06						0.00001		
	(0.78)						(0.70)		
claim*CEOchange				-0.005			-0.003		
				(-0.33)			(-0.18)		
claim*CoGuarantor		0.636	-0.320		2.678	-9.680		0.778	-0.574
		(0.64)	(-0.21)		(0.37)	(-0.36)		(0.62)	(-0.47)
leverage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
salegrowth	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SOE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-statistic	3.30E+07			3.67E+04			2.85E+07		
First-stage R^2	0.9996			0.998			0.9996		
No. of Obs.	323			326			323		
$\rho_{distance}$	0.888						0.888		
$\rho_{CEOchange}$				0.994			0.994		
p of endogeneity		0.609	0.780		0.387	0.042		0.578	0.721
Endogeneity		insignificant	insignificant		insignificant	significant		insignificant	insignificant

Table B2: 2SLS Testing Relationship between Guarantor and Filing Bank. Reported in parentheses are t-statistics based on clustered standard errors, which are robust standard errors not clustering by industries.

A. 2SLS Testing *BankRelation*

	(1)one IV			(2) one IVs			(3) two IVs		
	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}
Claim/MV	1.717***	-0.047	0.030	0.064	0.007	0.049**	0.072	0.008	0.049**
	(5.50)	(-0.71)	(0.29)	(1.01)	(0.50)	(2.35)	(1.06)	(0.53)	(2.38)
Claim/MV*CEOmale									
Claim/MV*distance	0.0002						-0.0001		
	(0.54)						(-1.45)		
Claim/MV*CEOchange				1.879***			1.918***		
				(28.56)			(21.38)		
Claim/MV*MultiBank		0.027	-0.013		-0.004	-0.024**		-0.004	-0.024**
		(0.70)	(-0.23)		(-0.49)	(-2.26)		(-0.52)	(-2.28)
leverage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
salegrowth	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SOE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-statistic	805232			4438691			5502263		
First-stage R^2	0.974			0.998			0.998		
No. of Obs.	323			323			323		
$\rho_{distance}$	0.879						0.879		
$\rho_{CEOchange}$				0.943			0.943		
p of endogeneity		0.556	0.970		0.969	0.492		0.975	0.629
Endogeneity		insignificant	insignificant		insignificant	insignificant		insignificant	insignificant

B. 2SLS Testing *BadRel*

	(1)one IV			(2) one IVs			(3) two IVs		
	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}	y_2	CAR^3	CAR^{11}
Claim/MV	0.852***	-0.026	0.020	0.053	0.007	0.050**	0.050	0.007	0.049**
	(5.68)	(-0.69)	(0.36)	(0.94)	(0.50)	(2.30)	(0.96)	(0.48)	(2.29)
Claim/MV*CEOmale									
Claim/MV*distance	0.0002						0.00004		
	(1.00)						(0.79)		
Claim/MV*CEOchange				0.946***			0.934***		
				(16.85)			(15.03)		
Claim/MV*BadkRel		0.029	-0.015		-0.007	-0.047**		-0.007	-0.047**
		(0.68)	(-0.25)		(-0.49)	(-2.18)		(-0.47)	(-2.18)
CAR^3									
CAR^{11}									
leverage	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
salegrowth	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SOE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage R^2	0.995			0.995			0.9996		
No. of Obs.	323			323			323		
$\rho_{distance}$	0.903			0.903			0.903		
$\rho_{CEOchange}$							0.9996		
p of endogeneity		0.546	0.693		0.398	0.228		0.424	0.243
Endogeneity		insignificant	insignificant		insignificant	insignificant		insignificant	insignificant

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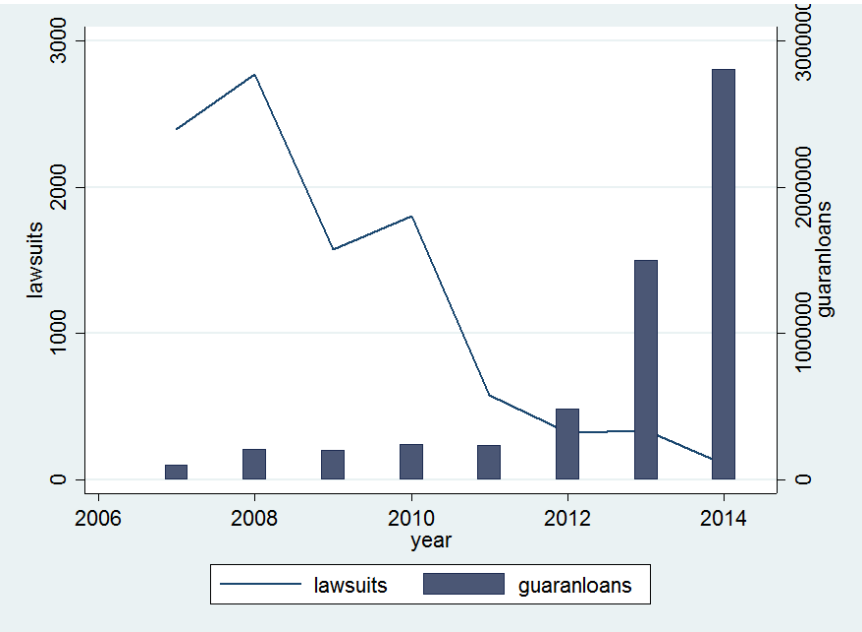
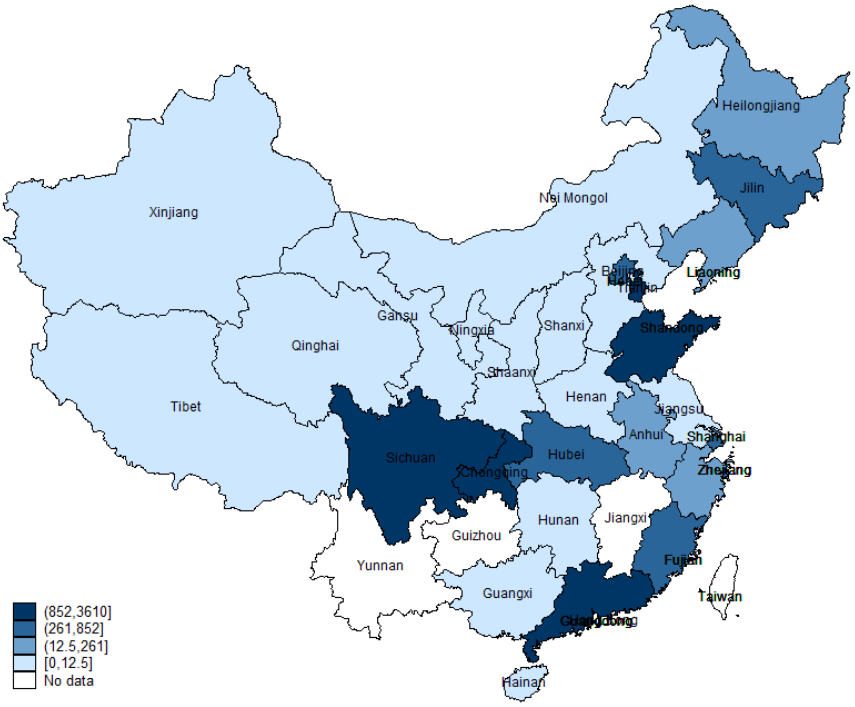


(a) Time distribution.



(b) Regional distribution.

Figure 1: **Guaranteed Loans and Lawsuits in China.** The dark bars show the time evolution of the amount of guaranteed loans all the listed companies obtained from 2007 to 2014, which has grown exponentially since 2007. The total amount of guaranteed loans was 100,451 million RMB in 2007 and rose to 2,805,185 million RMB in 2014. This navy line plots the amount of the principles the guarantor were filed to repay after the borrowing companies defaulted. It was 2396 million RMB in 2007 and dropped to 105 million RMB in 2014, which shows a very obvious decline since 2011. Both the amount of guaranteed loans and the lawsuits are in million RMB.

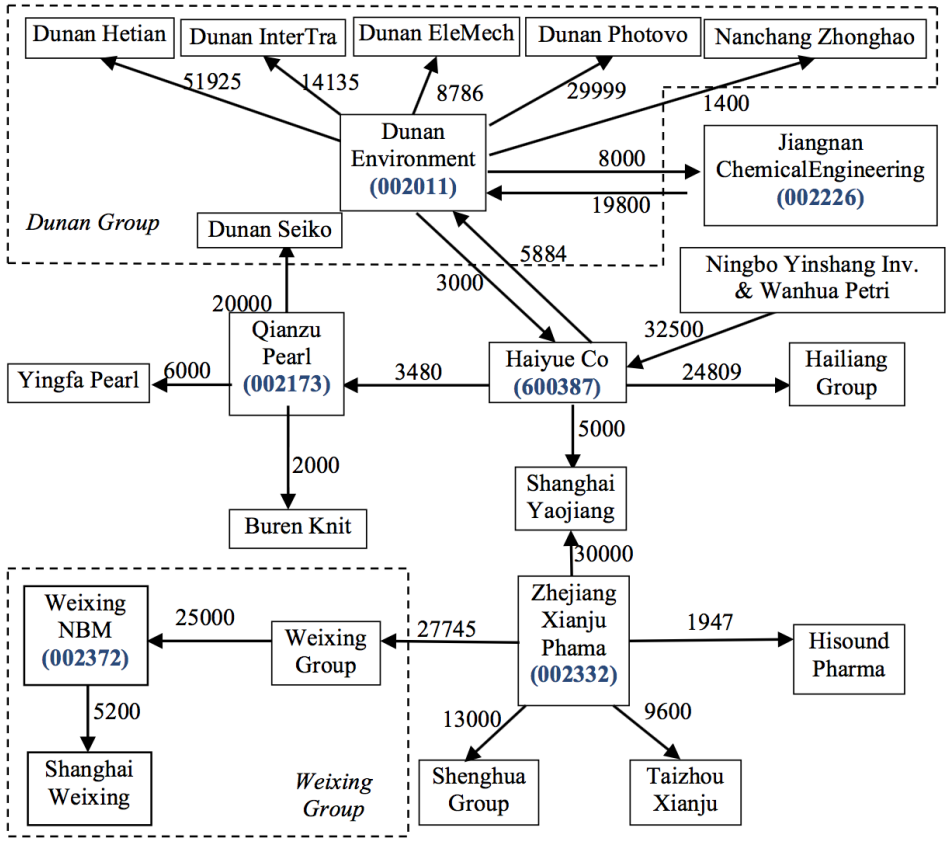
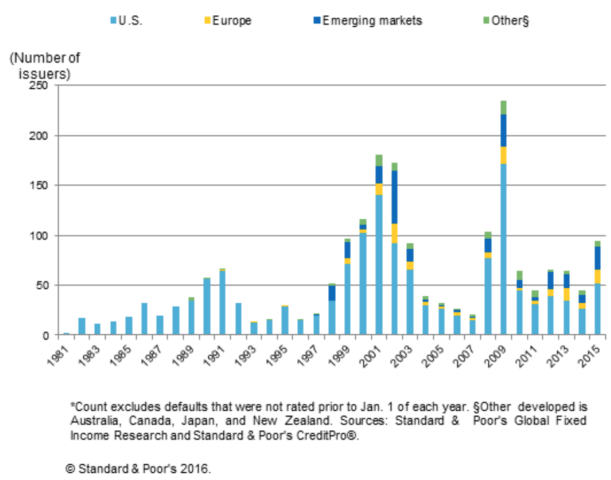
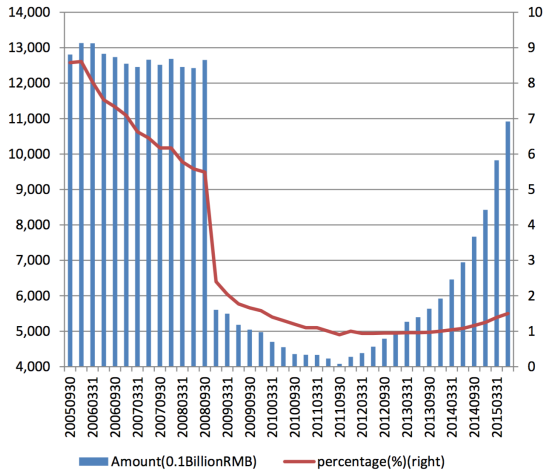


Figure 2: **Network of Chinese guarantee loan, Dunan case.** The arrow points to the guarantor. The numbers are the bank loan amount in million RMB. The navy numbers in brackets are the listing codes of the companies.



(a) Global Default Lines.



(b) Default Rates of Chinese Commercial Banks.

Figure 3: **Global and China Default Lines.** (1) Corporate defaults in emerging markets rose in 2015 to their highest level since 2011, and China which accounts for more than half of its debt, is the epicenter of fear jolting global financial markets, according to S&P Ratings reports in January 2016. Defaults in emerging markets are on the rise. While emerging-market corporate debt globally has risen fivefold over the past decade, totaling $23.7 trillion in early 2015, much of the increase has come the nonfinancial corporate debt to GDP ration has risen to 125%, up from 100% five years ago, according to WSJ, which results in emerging-market defaults rise. Figure 3(a) reports the annual corporate defaults by number of issuers, S&P 2015 Annual Global Corporate Default Study and Rating Transitions. (2) Default rates of Chinese commercial banks touched the historical lowest point before the end of 2011. Bank loan default rates of Chinese commercial banks touched the historical lowest point before the end of 2011, as Figure 3(b) shows. Both the volume and proportion of default loan have been increasing since 2011. Bank loan default piled up, highlighting one big challenge Chinese government faces as Chinese economy slows down.

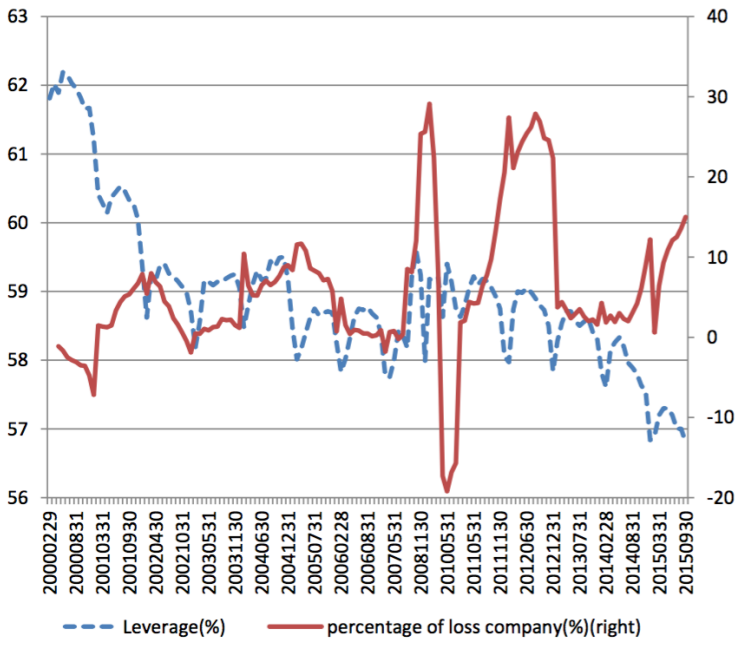
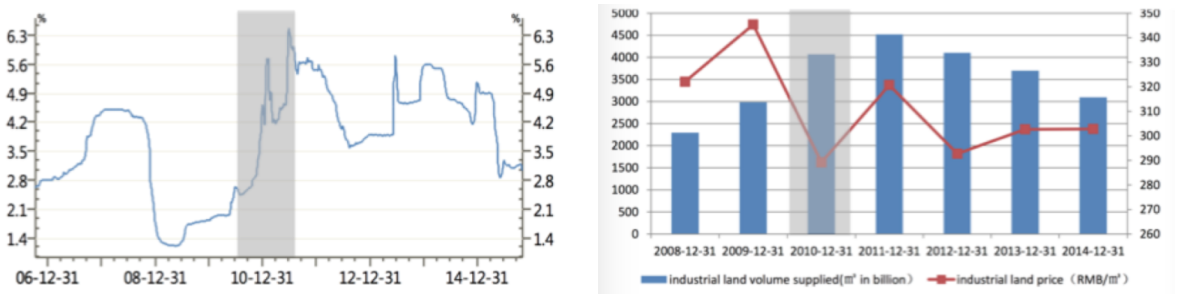


Figure 4: **Leverage and Loss of Chinese Industrial Firms.** (a) Aggregate claims in country level. The leverage of the Chinese companies touched the historical top before the end of 2011. Percentage of the loss firms has increased between February 2010 and February 2012.(b)Aggregate claims in provincial level.



(a) Liquidity shock.

(b) Land price shock.

Figure 5: **Double Exogenous Shocks.** The 3-month Shibor climbed up with a historical speed near the end of 2010. Chinese industrial land price collapsed in 2010. Data is from Chinese Annual Report of Land.

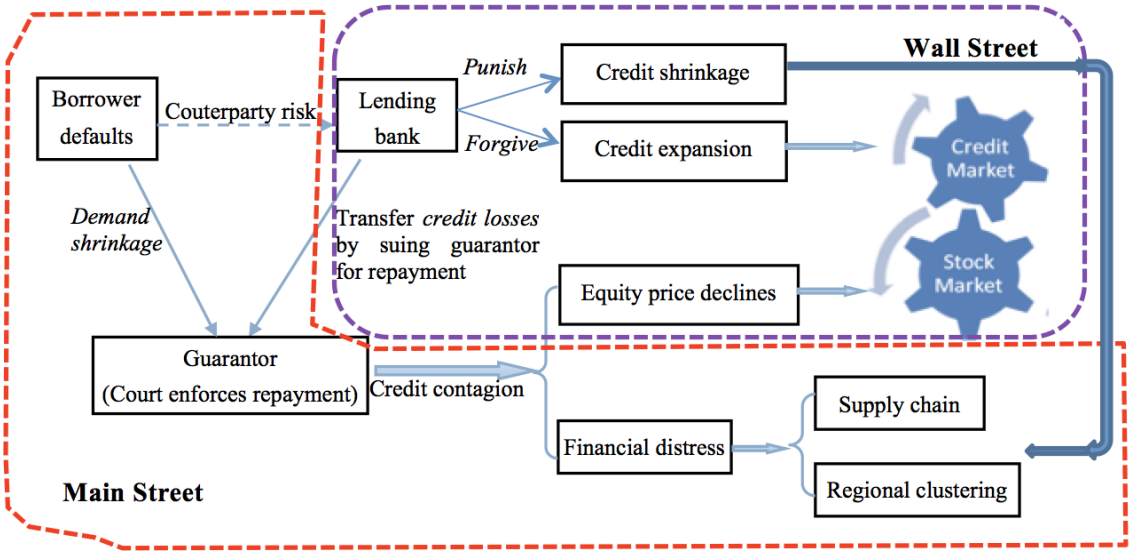
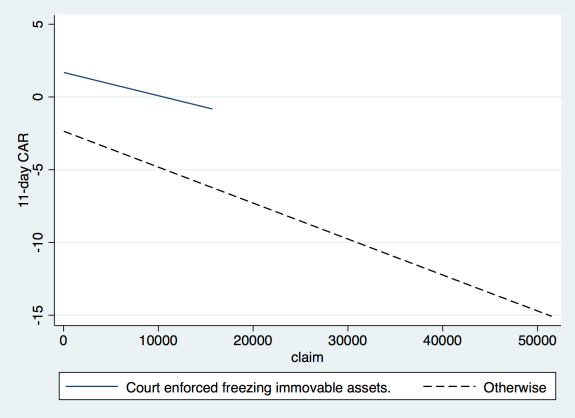
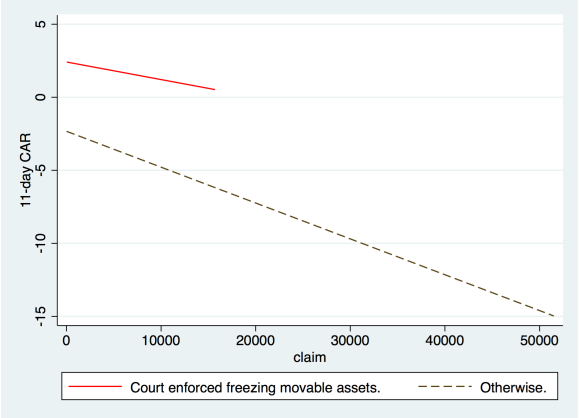


Figure 6: **Channels of Credit Contagion.** After the borrower defaults, lending bank will file a lawsuit against the guarantor for the promised repayment. The lawsuit announcement is likely going to decrease the guarantor's equity price, or even results in financial distress.



(a) Immovable assets.



(b) Movable assets.

Figure 7: **Impact of Court Enforcement.** implicit collateral relieves the equity decline. The navy solid line represents the court enforcement freezing guarantor's immovable assets. The red solid line represents the court enforcement freezing guarantor's movable assets.

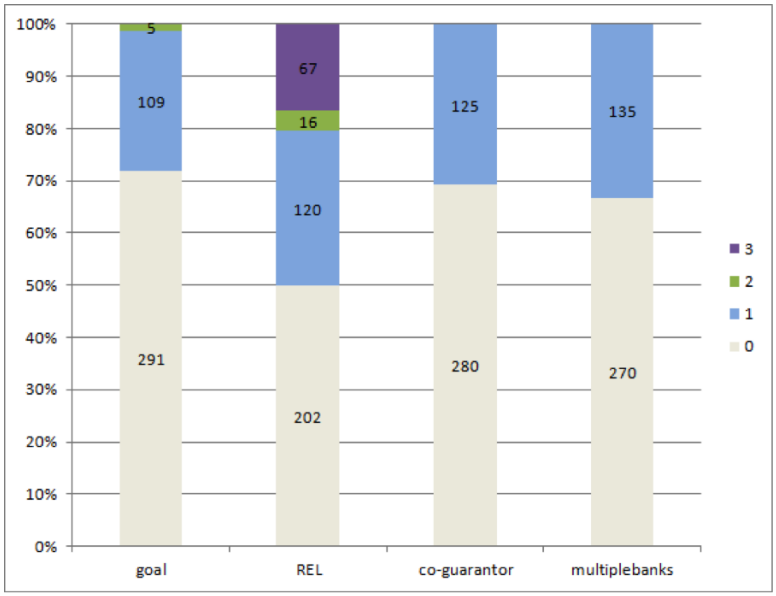
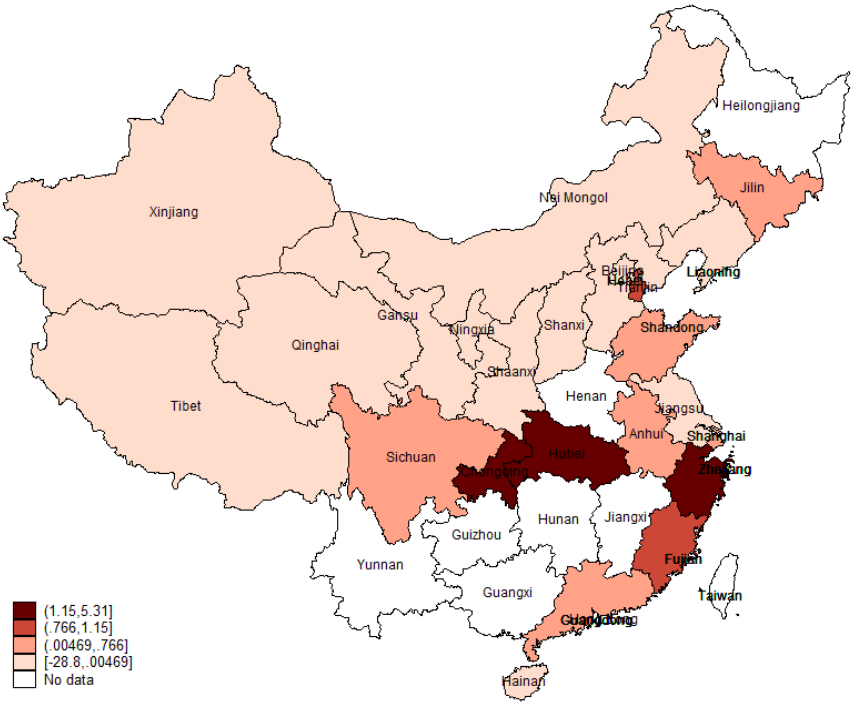
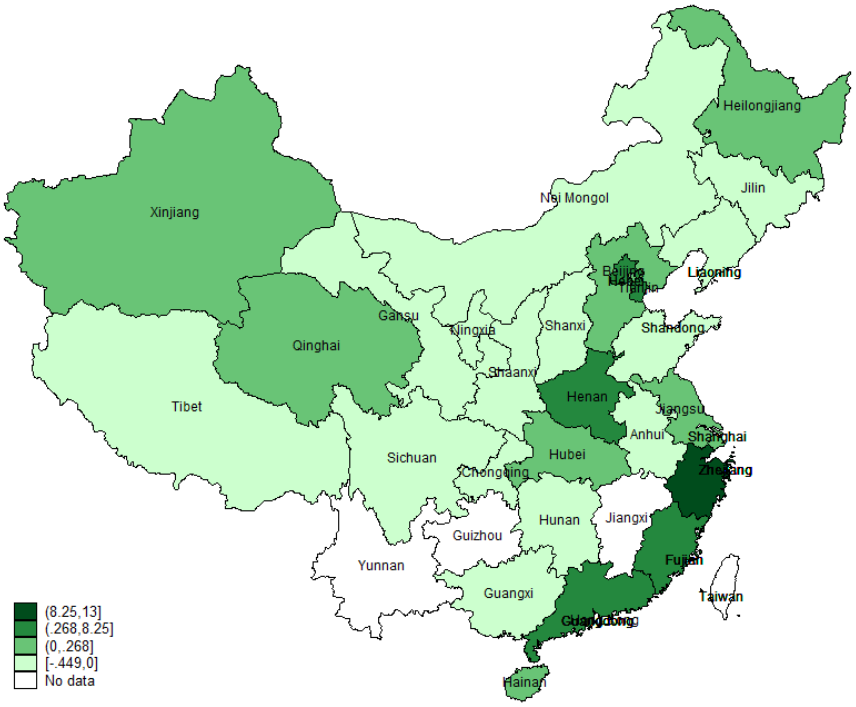


Figure 8: **Relationship in Guaranteed Loans.** The first bar, *goal*, shows that 109 corporations guarantee their subsidiaries or parents for financing, 5 guarantors made another guaranteed loan for insurance, 291 corporations made neither insurance nor real financing. The second bar, *REL*, shows that 120 events were parents and subsidiaries, 16 events were partners, 67 events were cross share-holding, 202 events can't find evident relationship. The third bar, *co-guarantor*, shows 125 events have co-guarantors while in 280 events there is unique guarantor. The last bar *multiplebanks*, shows that 135 events have more than 1 lending bank while 270 events has single lending bank.

Figure 9: **Risks Clustering.** The Altman's Z-scores of treated group, navy solid lines, are lower than those of control group, green dashed lines, in majority of the provinces. This figure also shows two ex post trends in the areas booming guaranteed loan crisis. It was recovering in Shandong, Zhejiang and Fujian, while it still went worse in Ningxia and Jiangsu.



(a) Forgiveness compared to 3 years before the announcement Δ_{3-}.



(b) Forgiveness after the announcement Δ_{1+}.

Figure 10: **Regional Contagion.**Figure (a) shows that only three province, Beijing, Hainan and Heilongjiang still expanded their bank loans to defaulted guarantors. Other provinces reduces their bank loans if the bank files the defaulted guarantor. Figure (b) shows more guarantors are forgiven ex post in which credit expansion is positive.

Table 1: **Distribution of Lawsuits in Sample.**

Panel A. Summary by Announcing Year

Year	# Lawsuits	% of the sample	Claim in million RMB	
			Mean	Median
2006	99	24.4	28.122	19.882
2007	47	11.6	50.973	30.000
2008	75	18.5	37.019	22.900
2009	62	15.3	25.380	12.750
2010	63	15.5	28.629	20.000
2011	24	5.9	24.084	16.117
2012	12	2.9	26.479	21.468
2013	14	3.5	23.769	18.976
2014	9	2.2	34.953	15.400
Total	405	100.0	31.794	20.000

Panel B. Frequency by Being Sued

Frequency	# Lawsuits	% of the sample	Claim in million RMB	
			Mean	Median
1	75	18.5	32.662	19.742
2	24	5.9	35.692	23.811
3	20	4.9	34.661	25.000
4	10	2.5	25.621	12.100
5	6	1.5	20.769	20.000
6	2	0.5	29.422	20.000
7	1	0.2	114.722	54.000
8	5	1.2	27.977	13.750
9	3	0.7	31.725	15.148
10	3	0.7	29.886	20.000
11	1	0.2	24.681	11.000
12	1	0.2	40.198	42.502
13	1	0.2	15.688	18.400

Panel C. Summary by Lending Banks

Bank category	# Lawsuits	% of the sample	Claim in million RMB	
			Mean	Median
Political banks	7	1.7	48.771	29.000
Dominated state-owned banks	213	57.5	34.017	20.000
Other national commercial banks	149	36.8	28.833	20.000
Local banks	36	8.8	27.592	11.000

Table 2: **Court Enforcement.**

	# Events	% of the sample	Claim	Net worth	Cash
dismiss lawsuit by banks	11	2.7	19.00	−43.60	28.46
partial repayment	36	8.8	16.93	−401.2	22.50
regular repayment	63	15.6	11.70	121.8	2.88
creditor changing	10	2.5	14.50	−107.6	40.3
frozen real estate or auction	45	11.1	20.86	12.33	0.58
frozen equities or auction	64	15.8	24.50	308.4	35.56
frozen both real estates and equities	22	5.4	25.50	682.0	38.3
frozen equipments	3	0.7	25.00	−236.1	5.67
frozen bank accounts or movable assets	42	10.3	19.91	492.1	30.49
try to say no impacts	10	2.5	18.30	153.2	19.66
pending	99	24.4	22.62	136.1	27.31

Median is reported.

Table 3: **Firm Characteristics.**

	All Firms					Before 2011		After 2011	
	Mean	Median	Std.	10th Perc.	90th Perc.	Mean	Median	Mean	Median
Leverage	3.890	0.860	18.490	0.410	2.630	4.450	0.880	0.760* (>)	0.780***
Salegrowth (in %)	0.720	0.020	4.050	−0.720	0.720	0.820	−0.010	0.110	0.060
Financial slack (in %)	2.280	0.270	8.470	0.020	3.290	2.490	0.230	1.060	0.610**
Employee	6.310	6.620	1.670	3.690	8.570	6.250	6.590	6.670** (<)	6.710*
Age	16.770	16.000	5.740	9.000	26.000	16.050	15.000	20.810***(<)	19.000***
Investment/fixed asset (in %)	0.270	0.020	1.590	−0.660	0.510	0.260	0.020	0.330	0.030
Cash/fixed asset (in %)	3.620	0.280	14.70	0.010	3.810	4.100	0.240	0.910* (>)	0.610***
z	20.38	1.260	180.500	−4.920	10.170	23.300	1.090	3.430	1.360**
Financial distress (1/0)	0.310	0	0.460	0.000	1.000	0.350	0.000	0.080***(>)	0.000***
Fixed asset/total asset	0.220	0.190	0.190	0.010	0.520	0.220	0.190	0.230	0.220
Total asset (in 1 million RMB)	1900.000	784.240	33.000	149.770	4900.000	1500.000	670.540	4300.000 ***(>)	1500.000 ***
Market Value (in 1 million RMB)	2200.000	1500.000	24.000	436.290	4200.000	1900.000	1300.000	3500.000 ***(>)	2500.000 ***
Claim/Market value (in %)	2.690	1.350	3.620	0.170	6.920	2.980	1.610	1.070***(>)	0.640***
Claim/fixed asset	5.300	0.140	28.19	0.010	2.300	5.640	0.150	3.480	0.060***
Claim/total asset	1.230	0.020	8.500	0.000	0.210	1.440	0.030	0.030	0.010***
Total sale (in 1 million RMB)	1100.000	339.370	19.000	13.400	2700.000	878.640	288.510	2200.000 ***(<)	771.760***
Claim/Sales	0.700	0.050	1.930	0.000	2.130	0.730	0.060	0.550	0.020**
No. of obs.	393					334		59	

The amount is in 1 million RMB while the units in Stata document are all in 10,000 RMB. * Statistical significance at 10 %. ** Statistical significance at 5 %. *** Statistical significance at 1%.

Table 4: **ARs and CARs of the Entire Sample and Industrial Firms.** This table reports the ARs and CARs for the entire sample. I calculate abnormal returns AR_{jt} for firm j at time t using the market model methodology following Jorion and Zhang (2009), with parameters estimated over a window ranging from one year before the event date to two months before the event date. Cumulative abnormal returns (CAR) are then computed from time t_1 to t_2. Finally means are tested by "mean< 0" from the portfolio time-series standard deviation to account for any possible event clustering, median are tested by "median=0". The "%(< 0)" entry indicates the percentage of observations with negative values.

	Full Sample						Industrial Companies					
Day	%(< 0)	Mean (%)	Median (%)	Std. (%)	10th Perc.	90th Perc.	%(< 0)	Mean (%)	Median (%)	Std. (%)	10th Perc.	90th Perc.
-5	57.14	−0.250**	−0.370**	2.700	−3.190	2.840	56.80	−0.230*	−0.370*	2.710	−3.240	2.840
-4	53.71	−0.240**	−0.210	2.570	−3.930	2.710	54.44	−0.250**	−0.230*	2.550	−3.930	2.850
-3	58.57	−0.300**	−0.490**	2.720	−3.270	3.450	57.40	−0.270**	−0.500**	2.750	−3.250	3.580
-2	43.43	0.210	0.470*	2.940	−3.320	3.880	42.31	0.220	0.600**	2.950	−3.360	3.870
-1	55.71	−0.150	−0.570**	2.630	−2.980	2.940	57.10	−0.200*	−0.620**	2.640	−2.980	2.940
0	65.71	−0.890***	−0.930***	3.060	−4.480	3.340	64.79	−0.820***	−0.840***	3.070	−4.440	3.390
1	56.86	−0.300**	−0.380***	2.780	−3.230	2.720	58.28	−0.350**	−0.460***	2.780	−3.400	2.700
2	50.57	0.450	−0.0900	9.180	−3.430	3.790	50.00	0.450	0.000	9.340	−3.720	3.840
3	56.29	−0.350**	−0.290**	2.990	−3.380	3.330	55.62	−0.390***	−0.250**	2.990	−3.630	3.120
4	53.14	−0.130	−0.240*	3.110	−3.970	3.760	57.69	−0.180	−0.330***	3.130	−3.970	3.710
5	60.57	0.060	−0.290	3.020	−3.330	3.650	54.14	0.000	−0.360	2.990	−3.370	3.650
[-1,1]	59.14	−1.340***	−1.300***	5.420	−6.950	4.750	60.36	−1.370***	−1.300***	5.480	−7.150	4.850
[-2,2]	60.00	−0.680	−1.430***	10.66	−8.700	7.660	58.88	−0.700	−1.090***	10.770	−8.930	7.590
[-3,3]	60.00	−1.330**	−1.880***	11.97	−9.230	8.680	59.76	−1.350**	−1.760***	12.090	−9.300	8.480
[-5,5]	60.00	−1.890***	−2.320***	14.59	−15.10	12.450	59.76	−2.010***	−2.120***	14.740	−15.100	12.300
[-5,35]	60.76	−6.870***	−6.380***	35.87	−35.26	24.79	62.28	−7.360***	−6.970***	36.270	−35.260	25.060
[-5,65]	61.05	−11.300 ***	−10.170 ***	57.33	−49.54	33.49	62.28	−12.140 ***	−10.760 ***	57.900	−49.540	33.640

* Statistical significance at 10 %. ** Statistical significance at 5 %. *** Statistical significance at 1%.

Table 5: **Implicit Collateral Channel.**CAR is defined as the cumulated abnormal stock returns for the guarantor for the [-1.1] and [-5,5] daily intervals around the announcing day. Robust standard errors are in parentheses. All non-binary variables are winsorized at the 1st and 99th percentiles except *age* following Lins et al. (2013) and Hadlock and Pierce (2010) where $z-score$, *leverage* and *vol* are winsorized by announcing year. Column (1) is the benchmark model adding fixed effects to Jorion and Zhang (2009).

	CAR^3				CAR^{11}			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Claim/MV	0.010	0.016	-0.043	-0.040	-0.573**	-0.583**	-0.663**	-0.778**
	(0.113)	(0.115)	(0.125)	(0.113)	(0.231)	(0.220)	(0.242)	(0.255)
Immovable			-0.290				2.986**	
			(0.655)				(1.168)	
Claim/MV*Immovable			0.366				0.494	
			(0.238)				(0.471)	
Movable				-0.311				3.403
				(0.721)				(2.134)
Claim/MV*Movable				0.243				0.752
				(0.137)				(0.560)
z-score	0.003*	0.004**	0.004**	0.002	0.004	0.004	0.005	-0.004
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.005)	(0.005)	(0.007)
Leverage	-0.002***	-0.002**	-0.002**	-0.002**	1.45e-05	-0.0003	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)
Vol	0.040	0.041	0.041	0.043	-0.086	-0.091	-0.091	-0.074
	(0.040)	(0.035)	(0.035)	(0.034)	(0.211)	(0.211)	(0.214)	(0.206)
EBITA/sale		0.001	0.001	0.001		-0.001	-0.001	-0.0005
		(0.001)	(0.001)	(0.001)		(0.002)	(0.002)	(0.002)
SOE FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creditor FE (0/1)	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE (pre/post 2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.014	0.022	0.031	0.025	0.020	0.022	0.039	0.047
Observations	336	336	336	336	336	336	336	336
p-value for F-statistics	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001

Table 6: **System of Equations Considering Penalties on Guarantors**

	(1)		(2)	
	CAR^3	Claim/MV*Penalty	CAR^{11}	Claim/MV*Penalty
Claim/MV*Penalty	0.107		-1.162**	
	(0.191)		(0.507)	
CEOchange	-0.860		-0.721	
	(0.662)		(1.760)	
Claim/MV*CEOmale		0.462***		0.462***
		(0.114)		(0.123)
Claim/MV*distance		0.001***		0.001***
		(0.000)		(0.000)
CAR^3		0.099		
		(0.173)		
CAR^11				0.066
				(0.199)
z-score	Yes	No	Yes	No
leverage	Yes	No	Yes	No
vol	Yes	No	Yes	No
EBITA/sale	Yes	No	Yes	No
age	No	Yes	No	Yes
size	No	Yes	No	Yes
SOE FE	No	Yes	No	Yes
Industry FE	No	No	No	No
Creditor FE (0/1) FE	No	Yes	No	Yes
Year FE (pre/post 2011)	Yes	Yes	Yes	Yes
No. of Obs.	320		320	

Table 7: **Median for Treated and Matched Control Group of Guarantors**

	Size	Age	Leverage	Cash/asset	z_t	z_{t+1}	z_{t+2}	z_{t+3}
Treated	6.793	15	76.88	6.160	1.343	2.067	2.010	2.272
Matched-control	6.703	15	65.45	11.04	2.081	3.168	3.155	3.257
Difference	0.09	0	11.43	-4.88	-0.738	-1.101	-1.145	-0.985
p-value	0.2226	0.0718	0.0003	0.0006	0.0014	0.0000	0.0002	0.0111

Table 8: **Propensity of Financial Distress**.

Panel A. Impact on Financial Distress at the End of Current Year (FD_t)						
	(1)	(2)	(3)	(4)	(5)	(6)
Claim/asset	0.162***			0.162***		
	(0.033)			(0.033)		
after		0.311			0.311**	
		(0.145)			(0.145)	
after2			-1.226**			-1.226*
			(0.728)			(0.728)
salegrowth	0.002	0.012	0.022	0.002	0.012	0.022
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
leverage	0.292***	0.302***	0.323***	0.292***	0.302***	0.323***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
size	-0.297*	-0.292*	-0.319**	–0.297**	-0.292***	-0.319**
	(0.148)	(0.146)	(0.142)	(0.148)	(0.146)	(0.142)
age1	-0.317***	-0.345***	-0.249***	-0.317*	-0.345***	-0.249**
	(0.174)	(0.183)	(0.122)	(0.174)	(0.183)	(0.122)
Industry	no	no	no	yes	yes	yes
Wald chi2	54.98***	51.21***	53.17***	54.98***	51.21***	53.17***
p value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	1315	1315	1315	1315	1315	1315
Panel B. Time Decay of the Impact on Financial Distress						
Independent variable	FD_{t+1}			FD_{t+2}		
	(1)	(2)	(3)	(1')	(2')	(3')
Claim/asset	0.143*			0.001		
	(0.080)			(0.003)		
after		-0.606**			-0.023**	
		(0.268)			(0.009)	
after2			-1.021			-0.013
			(1.024)			(0.016)
salegrowth	-0.085	-0.056	-0.048	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
leverage	0.116	0.145	0.154*	0.006*	0.006*	0.006*
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
size	-0.249*	-0.256*	-0.279**	-0.006**	-0.006**	-0.006***
	(0.148)	(0.154)	(0.134)	(0.003)	(0.003)	(0.002)
age1	-0.419	-0.376	-0.351	-0.003***	-0.001*	-0.002***
	(0.306)	(0.267)	(0.235)	(0.001)	(0.001)	(0.001)
Industry	yes	yes	yes	yes	yes	yes
Wald chi2	34.46***	33.19***	30.13***	147.74***	130.55***	81.27***
p value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	1315	1315	1315	1315	1315	1315

Notes: Average marginal effects are reported for the logistic models.

Table 9: **Credit Expansions of Guarantors**

Panel A. Data in Announcement Years											
decile	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Total
Loan/Asset	2.199	3.208	2.417	0.198	0.018	0.762	0.051	0.133	0.120	0.066	0.923
Δ_{3-}	-3.074	2.422	1.653	0.093	0.010	0.431	0.033	0.098	-0.036	0.030	0.092
Δ_{2-}	1.545	-6.954	0.820	0.144	0.001	0.166	0.020	0.085	0.072	0.023	-0.278
Δ_{1-}	2.513	0.249	2.760	0.130	-0.025	0.486	0.004	0.098	0.073	0.037	0.662
Δ_{1+}	15.300	4.800	1.545	0.654	0.541	0.171	0.118	-0.036	-0.059	0.031	2.401
Δ_{2+}	4.178	-0.207	4.629	0.583	0.026	0.436	0.029	0.051	0.059	0.024	1.084
Δ_{3+}	5.893	0.619	5.467	1.413	0.160	0.017	0.127	0.034	-0.016	0.014	1.513
Panel B. Panel Data of Each Year (as Benchmark)											
decile	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Total
Loan/Asset	12.100	7.261	3.410	1.837	0.682	0.341	0.304	0.239	0.205	0.128	2.683
Δ_{3-}	2.893	1.910	1.526	0.340	0.054	0.088	0.107	0.035	0.029	0.027	0.711
Δ_{2-}	3.231	0.452	0.746	0.572	0.122	-0.033	0.088	0.079	0.018	0.027	0.538
Δ_{1-}	3.648	2.239	-1.846	0.573	0.357	-0.494	0.182	0.101	-0.047	0.063	0.482
Δ_{1+}	-1.549	4.498	-0.108	0.673	0.328	0.129	0.092	0.197	0.065	0.071	0.437
Δ_{2+}	-2.916	4.694	1.502	0.520	0.143	0.158	0.054	0.157	0.042	0.049	0.437
Δ_{3+}	-0.400	4.040	1.614	0.747	0.485	0.356	0.046	0.038	0.052	0.054	0.704

Table 10: **The Impact of Being Filed as Guarantor on Credit Expansion**

	(1) Δ_{3-}	(2) Δ_{2-}	(3) Δ_{1-}	(4) Δ_{1+}	(5) Δ_{2+}	(6) Δ_{3+}
Claim/asset	-0.265***	-0.015	-0.006	0.710***	0.006	0.013
	(0.072)	(0.107)	(0.177)	(0.173)	(0.100)	(0.068)
Year FE (pre/post 2011)	-1.304	-0.872	-0.615	0.779	-0.147	-0.421
	(0.699)	(1.012)	(1.680)	(1.669	(1.021)	(0.862)
Provincial GDPgrowth	0.080	0.041	-0.063	-0.002	0.049	-0.044
	(0.057)	(0.082)	(0.135)	(0.139)	(0.083)	(0.064)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
SOE FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	875	1021	1166	1164	1015	867
R-squared	0.041	0.007	0.001	0.016	0.007	0.022

Table 11: **Propensity of Financial Distress by Demand Shrinkage**.

Panel A. Marginal Effects of Being Sued and Demand Shrinkage

Independent variable	FD_t (1)	FD_t (2)	FD_{t+1} (3)	FD_{t+1} (4)	FD_{t+2} (5)	FD_{t+2} (6)
After	0.192		-0.632*		-0.025***	
	(0.214)		(0.330)		(0.009)	
Claim/sale		0.281**		0.232*		0.007
		(0.119)		(0.133)		(0.005)
leverage	Yes	Yes	Yes	Yes	Yes	Yes
size	Yes	Yes	Yes	Yes	Yes	Yes
age1	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Wald chi2	51.35***	54.58***	37.17***	34.72***	186.77***	213.43***
p-Value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	1337	1337	1337	1337	1337	1337

Panel B. Marginal Effects by Different Controller

	Non State-owned		State-owned		p-Value
After	-0.046***	(0.015)	-0.021**	(0.011)	0.018
Claim/sale	0.008	(0.007)	0.004	(0.003)	0.310

Table 12: **Tracing Impacts from Liquidity and Real Estate Price Shocks**.

Independent variable	$d\theta/dx$	shock=0	shock=1	p-Value	$d\theta/dx$	shock=0	shock=1	p-Value
	(1)	(2)	(3)		(4)	(5)	(6)	
A.FD_t								
Claim/asset	0.226***							
	(0.030)							
		0.125***	0.351***	0.003***				
		(0.029)	(0.064)					
Claim/sale					0.253			
					(0.344)			
						0.276**	0.225	0.942
						(0.113)	(0.716)	
B.FD_{t+1}								
Claim/asset	0.260***							
	(0.590)							
		0.086	0.474***	0.0001***				
		(0.053)	(0.098)					
Claim/sale					0.304			
					(0.324)			
						0.168**	0.474	0.622
						(0.069)	(0.665)	
salegrowth	Yes	Yes	Yes	Yes	No	No	No	No
leverage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Industries	13	13	13	13	13	13	13	13
Observations	1315	1315	1315	1315	1337	1337	1337	1337