Rise of Bank Competition: Evidence from Banking Deregulation in China*

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Abstract

Using proprietary loan-level data and detailed bank branch data in China, this paper investigates the effects of the 2009 bank branch deregulation on competition dynamics between new and incumbent banks and on real economic activities. Tracing out each of the loans firms borrowed, we find that new entrant banks tend to target different firms than incumbent banks (e.g., more efficient firms). Increased interbank competition leads to more relationship bank lending than transaction lending. Loans from new banks have longer maturity, better internal ratings, more third party guarantees, and lower delinquency rates. When competition pressure is higher, incumbent banks provide better loan terms, lower loan-screening standards, and have higher delinquency rates. Overall, increased interbank competition leads to increases in firm investments, employments, sales, and efficiency, especially for private firms. Moreover, interbank competition leads to greater added value of bank loans for firms which depend mainly on transaction lending than for firms which mainly borrow relationship loans.

Keywords: Bank Competition; China; Relationship Lending; Growth; Efficiency

1. Introduction

Banks are the most important financial intermediaries and play an important role in economic growth, whereby banking sectors are often heavily regulated across the globe (e.g., Barth et al. (2013)). A central question in debate is whether bank competition help economic development or not. The market view argues that highly developed financial markets and higher bank competition could lower costs (of transaction lending), improve efficiency, and fuel future economic growth (e.g., King and Levin (1993 a, b); Smith (1998); La Porta et al. (2002)). In contrast, the relationship banking view argues that market power can help establish lending relationships to mitigate asymmetric information and add value for borrowers (e.g., Ramakrishnan and Thakor (1984); Peterson and Rajan (1995); Marquez (2002)). Banks usually engage in both transaction and relationship lending (Boot and Thakor (2000)). However, the empirical evidence on the economic consequences of increased bank competition is mixed and is unclear on the countervailing effects of bank competition on borrowers via transaction vs. relationship lending.[1] One major limitation is the lack of detailed data that have described exactly how banks compete with each other, measured concentration degree and relationship, and linked individual loans to microeconomic activities of firms.

Using comprehensive loan-level data from the China Banking Regulatory Commission (CBRC), this paper aims to document detailed competition dynamics between new entrant banks and incumbent banks and to separate these countervailing channels of bank competition by tracing out each transaction loans and relationship loans to firms. The CBRC data records detailed loan-level information for 17 largest commercial

[1] See, for example, the survey papers; Berger el al. (2003) and Allen et al. (2001).

banks in China between 2006 and 2013. The data cover approximately 80% of the total bank loan market in China. This paper makes three main findings: First, we find that, compared with incumbent banks, new banks lend to more efficient firms with relatively larger size but not the very large firms. Moreover, increased competition leads to more relationship lending. Second, loans from new banks have longer maturity, better internal ratings, more third party guarantees, and lower delinquency rates. For incumbent banks, when pressure from new banks increases, they provide loans with longer maturity, better internal ratings, and fewer guarantees. However, the delinquency rates of these loans increase. Third, higher bank competition make firms expand in assets, hire more workers, and become more efficient. These positive effects are more prominent for firms which borrow mainly transaction loans. The effects of interbank competition are negative for firms which borrow relationship loans. This paper, for the first time, distinguish the opposing effects of bank competition on firms between relationship and transaction lending. This sheds lights on the inconclusive results of previous studies, which use mainly aggregate market structure indicators to estimate overall net effects of increased bank competition.[2]

China has the biggest bank loan market across the globe, whereby the banking system is heavily regulated and has been dominated by the *big five* state-owned commercial banks.[3] In particular, joint equity banks in China formerly were allowed to apply for only

[2] Many previous studies use the Herfindahl-Hirschman Index (HHI) to measure competition level. See, for example, Berger and Hannan (1989); Hannan (1991); and Neumark and Sharpe (1992). The main criticism of these measurements is that they might not capture real competition levels (e.g., Claessens and Laeven (2004)).

[3] Total credit in China amounted to 104.2 trillion RMB in November 2016. Please see the statistics for details: http://www.pbc.gov.cn/diaochatongjisi/116219/116225/3211313 /index.html. In China, we can mainly categorize banks into three groups: the big five commercial banks, twelve joint equity banks, and 131 local municipal banks. See detailed discussion in Section 3.1.

one branch in each city, which severely suppressed competition between joint equity banks and the big five. In 2009, the CBRC partially lifted this restriction on the number of branches joint equity banks were allowed. This deregulation led to direct competition between the incumbent big five banks and joint equity banks in certain cities. In particular, after April 2009, joint equity banks could freely open branches in a city where they have already had branches in this city or in the province capital of this city.

In this paper, we mainly investigate this 2009 partial deregulation and use it as an exogenous shock to perform the Diff-in-Diff analysis. In particular, we compare the competition dynamics between banks in their deregulated cities (i.e., treatment group) and regulated ones (i.e., control group) before and after April 2009. This partial deregulation provides us exogenous and heterogeneous variation to establish the causal effects of bank expansion on firm activities. One potential concern is that the Chinese government might select particular banks to deregulate certain regions. However, there are twelve joint equity banks in total and each of them focuses on different regions across the country. It is hard for the government to target certain areas by this 2009 deregulation. Along with other recent banking reforms, this makes China an ideal place to study the effects of bank competition.

Our first analysis concerns how new banks compete with incumbent banks. We show that the 2009 deregulation led to an increase of 26.3% on number of new opened bank branches and an increase of 68.2% on the outstanding loan amounts of joint equity banks in deregulated cities. Moreover, at the firm level, the 2009 deregulation led to an increase of approximately 6% in new banks' share of firms' bank loan debt. Joint equity banks' share in total bank loan debt at firm level increased dramatically from 22% in 2007 to

40% in 2012. The 2009 deregulation hugely increase the market shares and competitiveness of joint equity banks in China. We further look into how new bank branches target borrowers. In particular, we find that, when new joint equity banks enter a city, approximately 35% of their loans go to new firms that have never borrowed from banks before. Furthermore, we explore the differences in characteristics of firms which borrow from incumbent banks vs. new banks. We find that, overall, new bank branches lend to firms with 20% higher ROA than incumbent branches. Moreover, if the new branches belong to big five banks, they usually target SOEs with lower efficiency. On the other hand, for joint equity banks, they usually target private firms with higher ROA. This suggests that the expansion from joint equity banks could improve the credit allocation while the expansion from big five banks seems to achieve the opposite. New bank branches also target firms with relatively large size but not very large ones. In sum, the new banks tend to target different firms than incumbent banks. This means the traditional market structure indicators for competition (e.g., HHI) are not good measurements. Furthermore, we separate the loans into transaction and relationship loans by looking at whether this firm has any outstanding loans from the bank within the past 12 month.[4] We find that, after 2009, both joint equity and big five banks issue significantly more relationship loans than transaction loans. This is consistent with the prediction of Boot and Thakor (2000).

Second, we look at the differences in loan contract terms and differences in loan performance between new and incumbent banks. First, we show that, compared with incumbent banks, loans from new banks have significantly larger loan amounts, longer

[4] We follow the method of Ioannidou and Ongena (2010) to distinguish relationship and transaction loans. We also tried other definitions in the literature and find similar patterns.

maturities, better internal ratings, more guarantees, and lower delinquency ratios. Moreover, the new banks intend to lend to bigger firms with lower leverage ratios. In particular, after the 2009 deregulation, loans from joint equity bank branches increased maturity, internal ratings, and guarantees and lowered the delinquency ratio significantly. On the other hand, we also look at how the incumbent big five banks reacted to these new competitors. We find that the 2009 deregulation led to increases in loan maturities with better internal ratings but fewer loan guarantees and worse performance for the big five commercial banks. This means the big five commercial banks tried to compete with the newly entered joint equity banks by providing better loan terms, giving them better credit rating, and requiring fewer guarantees. Subsequently, the performance of their loans deteriorated. The big five banks lowered the standard of the loan-screening process, which led to higher delinquency ratios. In the CBRC loan-level data, we do not have interest rate information.[5] However, the bank deposit and lending rates were highly regulated by the government in China before July 2013. In our sample period, the loan interest rates are not determined by the market and do not fully reflect the riskiness of the borrowers. In China, it is difficult for firms to get credit access from banks, especially for long-term loans. In sum, more competition leads to better loan contract terms for firms that borrow from both new and incumbent banks.

Moreover, we also explore the information asymmetry between new and incumbent banks by looking at the monthly change of the internal loan ratings. In particular, we find that big five commercial banks, on average, downgrade the ratings one month before the

[5] The literature shows mixed evidence on the effects of relationship duration on loan interest rates (e.g., Berger and Udell (1995), Peterson and Rajan (1994), Degryse and Van Cayseele (2000), Degryse and Ongena (2005), and Ioannidou and Ongena (2010)).

actual delinquency. Joint equity banks normally would not foresee the future loan delinquency and, on average, downgrade the ratings one month after the delinquency.

Third, we explore how firms have reacted to higher bank competition following the 2009 deregulation. We match the CBRC loan-level data into the CIC firm-level data. This allows us to trace each loan a firm took out and how firms reacted in terms of investments in assets, employment, sales, ROA, and total factor productivity (TFP). We find that on average the 2009 deregulation led to increases in firm assets, liabilities, and number of employees by 7.2%, 17.7 %, and 15.3%, respectively. Greater bank competition after 2009 also led to improvements in firms' efficiency, particularly ROA and TFP. We find that there are no significant changes of these firm activities and performance in deregulated cities in one and two years prior to 2009 deregulation (i.e., we pass the parallel trend's test). Moreover, we find that private firms can benefit from bank competition significantly more than SOEs can. In particular, after the 2009 deregulation, private firms increased their assets, sales, number of employees, ROA, and TFP significantly more than SOEs which mainly depend on relationship lending. Furthermore, consistent with private vs. SOE analysis, we also find that the positive effects of increased bank competition largely come from the transaction lending. If the firm only borrows relationship loans, deregulation leads to decreases in firms' assets and sales. This is in line with the prediction of Boot and Thakor (2000) which argues that interbank competition might lead to lower added value of relationship lending for borrowers which mainly rely on relationship lending prior to the increased interbank competition.

Our paper adds to the literature on financial market development and economic growth. Many studies have shown evidence of the positive effects of financial market

development on economic growth at macroeconomic level.[6] However, there are opposing views and contrary evidence in the literature.[7] Due mainly to data limitation, previous empirical findings are based on the measurement of bank competition at an aggregated level, and show mixed results. This approach has been heavily criticized in the literature since these market indexes of bank concentration (e.g., HHI) are endogenously determined by prices and firm performance (e.g., Bresnahan (1989)).[8] By using loan-level and firm-level data, this paper provides very detailed evidence on how banks compete with each other in terms of loan contracts and how incumbent banks react to pressure from new banks.[9] This captures the real competition dynamics among banks.

This paper also establishes the causal effects of bank expansion and competition on firm activities and performance in China. This provides the microeconomic foundation of the literature on the finance-growth nexus. Although many studies have documented the connections between bank competition and economic consequences at aggregate level, our understanding of microeconomic behavior of firms is limited. By tracing each of the loans borrowed by the firms, this paper provides these microeconomic evidence.

Moreover, we also explore the heterogeneous effects of increased interbank competition on firms between relationship lending and transaction lending. The literature has very different views on it. Harris and Holmstrom (1982) and Petersen and Rajan (1995) argue that competition reduces investment in building relationships. Boot

[6] See for example, King and Levine (1993); Demirguc-Kunt and Maksimovic (1998); Levine and Zervos (1998); Rajan and Zingales (1998); and Levine, Loayza, and Beck (2000), Barth et al. (2001 and 2004)
[7] See for example, Peterson and Rajan (1994) and Cetorelli (2001).
[8] Bank expansion decision is also endogenous. For example, it could depend on the ownership of a bank (e.g., Assunçao et al. (2012)) and on the potential cost and benefit of the region (e.g., Keniston et al. (2012)).
[9] Berger and Udell (1995) and Ioannidou and Ongena (2010) document the price and nonprice terms for relationship lending.

and Thakor (2000) argue that interbank competition has asymmetric effects on bank's profits and banks choose to switch to relationship lending. Our evidence support the later one. Moreover, in the literature, it is also debatable whether interbank competition would increase or decrease the welfare of the borrowers, depending on whether the borrowers rely on relationship or transaction lending (Boot and Thakor (2000)). We find supportive evidence on this by disentangling the countervailing effects of competition between relationship and transaction lending.

The results in this paper also have important policy implications, especially during the current slowing down of economic growth in China. Moreover, besides China, the consolidation of banks is a global phenomenon eliciting many public policy debates (See for example, Berger et al. (2004)). Banking sectors are highly regulated in many other countries as well. For policy makers, their decision on banking reforms rely heavily on the understanding of the real economic consequences of bank expansion, whether new banks crowd out or supplement incumbent banks, and how would incumbent banks react.

The rest of this paper is organized as follows. In Section 2, we review the literature. In the following section, we describe the institutional background of the banking system in China, and in Section 4 we present our data and summary statistics. Section 5 provides the empirical results regarding bank competition and its economic consequences, and Section 6 concludes.

2. Literature Review

A long debate exists in the literature on whether competition in the banking system helps or hurts economic growth. On the one side, the "market view" argues that deeper

financial markets would improve efficiency and fuel future economic growth. For example, King and Levin (1993 a, b) explore the relationship between financial development and growth. They find that lower development in financial markets is associated with lower growth of GDP, capital stock, investment, and lower efficiency. Rajan and Zingales (1998) find the fraction of domestic credit going to the private sector is strongly correlated with market capitalization to GDP.[10] The banking sector is one of the most important financial markets. Smith (1998) argues that increased competition in banking tends to increase the level of economic activity by reducing the severity of business cycles. Moreover, regulations designed to stabilize the banking system could impede competition, which leads to slower growth (Barth et al. (2001 and 2004)).

On the other side, many studies argue that bank competition may have negative effects on economic outcomes. Peterson and Rajan (1995) argue that firms can have better access to finance when they have relationships with banks, which lower asymmetric information. It is costly for the bank to establish relationship with firms to obtain soft information.[11] Bank competition would harm a particular relationship between a firm and a bank, which could lead to deteriorating asymmetric information problems. Marquez (2002) shows that in the presence of information asymmetries increasing the number of competing banks may push interest rates up, as it leads to less efficient screening by banks. Hakenes and Schnabel (2010) argue that a bank's ability to transfer risk depends on whether the bank grants loans based on public or private information. This informational

[10] Other earlier works also support the "market view." See, for example, Goldsmith (1969); Gurley and Shaw (1955); McKinnon (1973); Demirguc-Kunt and Maksimovic (1998); Levine and Zervos (1998); Levine, Loayza, and Beck (2000).

[11] The seminar paper Townsend (1979) argues that it is costly to monitor and verify the contingent event of a debt contract.

asymmetry leads to a moral hazard at the originating bank, and causes insurers to demand a lemons premium. Increasing bank competition with private information would increase access to finance only for bad borrowers.

Boot and Thakor (2000) studies the bank competition effects on both relationship lending and transaction lending. In particular, they argue that interbank competition would lower down the profits from transaction lending more than the profits from relationship lending. This causes banks to switch to relationship lending after increasing in interbank competition. Moreover, borrowers who are used to borrow transaction loans would be better off in higher interbank competition. This effect is ambiguous for borrower who mainly rely on relationship loans. Most of our evidence supports this view.

The empirical evidence on whether bank competition leads to better economic growth is also inconclusive. Jayaratne and Strahan (1996) find that after bank branch deregulation in the U.S. in the early 1970s, rates of real per capita growth in income and output increased significantly. Claessens et al. (2001) find that, in the long run, foreign bank entry can render national banking markets more competitive, thereby forcing domestic banks to operate more efficiently and leading to positive welfare implications for banking customers. Cetorelli (2003) finds that higher bank competition tends to promote job creation among industrial establishments at the start-up stage and to permit them to prosper in the immediate wake of their entry into the market. Concurrently, higher bank competition accelerates the exit of more mature establishments from the market. Cetorelli and Strahan (2006) find that high bank competition increases the proportion of establishments in the smallest size group, and increases the total number of establishments. However, changes in bank competition have no effect on the largest

establishments. Bertrand et al. (2007) show that, after the 1985 banking deregulation in France, banks improved their monitoring and screening technology. Moreover, this deregulation led to an overall improvement in firm-level ROA; such improvement was mostly concentrated among firms that were already good performers. Correspondingly, the poorer performing firms became more likely to exit after the banking reform.

Many empirical works show the negative impact of bank expansion on growth. Berger et al. (1998) find that although large holding company acquisitions in bank mergers tend to increase small business lending, smaller acquisitions decrease small business lending. Cetorelli and Gambera (2001) show evidence that bank concentration has a heterogeneous effect across industries. Sectors that are more dependent on external finance enjoy a beneficial effect from increased bank concentration. This positive effect may more than compensate the direct negative effect on quantities of credit. Bonaccorsi and Dell' Ariccia (2004) find a "bell-shaped" relationship between bank market power and firm creation. Moreover, bank market power is relatively more beneficial to highly opaque firms.

In this paper, the analysis on detailed loan-level data unveils micro evidence on the competition dynamics among banks. In particular, the lending strategy of newly entered banks vs. responses from incumbent banks provide us with a deeper understanding of this issue. Moreover, we use the 2009 deregulation on bank entry to establish the causal effects of these different forces from bank competitions on economic activities.

3. Background

3.1. Banking System in China

The banking sector in China started from a centralized system in 1949 when the People's Bank of China (PBOC) was in charge of all commercial bank businesses (e.g., deposits, lending, and foreign exchange) and central bank functions. Along with the economic opening by Deng Xiaoping in 1978, the banking system entered a period of reform. In 1983, the PBOC, as China's central bank, began to focus on national macroeconomic decision making, maintaining monetary stability and promoting economic development. At the same time, the big four commercial banks (i.e., ICBC, ABC, BOC and, CCB) started to take over commercial bank businesses and each of them were specialized in a certain area.[12] In 1987, the Bank of Communications (BoCom) was formally established and became the first national shareholding commercial bank. We classify ICBC, ABC, BOC, CCB, and BoCom as the big five commercial banks in China which are directly controlled by the state. The two main shareholders of these big five commercial banks are the Ministry of Finance and China Investment Corporation.[13]

The Bank of Communications' experience in reform and development has paved the way for the development of shareholding commercial banks in China and exemplifies banking reform in China. Between 1988 and 2005, twelve joint equity banks were established, mostly as SOEs or institutions transformed from local financial companies. Although joint equity banks are also banks on a national level, unlike the big five commercial banks, they usually focus their business locally and operate on a much smaller

[12] The Industrial and Commercial Bank of China (ICBC) was specialized in the credit business, the Agriculture Bank of China (ABC) specialized in supporting economic development in the rural areas, the Bank of China (BOC) specialized in the foreign exchange business, and the China Construction Bank (CCB) was responsible for the management and distribution of government funds allocated to construction and infrastructure projects.

[13] China Investment Corporation is a sovereign wealth fund which manages the foreign exchange reserves of China.

scale. One of the reasons is that these joint equity banks can't open branches freely in the cities other than their headquarters. Although, the joint equity banks are still smaller than the big five commercial banks, they are catching up very quickly. In particular, in 2006, the total assets of the big five banks amounted to 24.4 trillion RMB, and the total assets of joint equity banks amounted to 5.4 trillion RMB. In 2013, the total asset amount of the big five banks was 65.6 trillion RMB and the total asset amount of the joint equity banks was 27.0 trillion RMB.

3.2. CBRC Regulations on Bank Branches

As in many other countries, the banking sector in China is highly regulated. In March 2003, CBRC was founded to supervise and regulate the banking sector. The CBRC put strict restrictions on the twelve joint equity commercial banks, especially for the branch opening. For example, in 2006, CBRC announced that the twelve joint equity banks, along with local commercial banks, in each single application to the CBRC, could apply to establish only one branch in one city.[14] To be precise, banks can't submit another application until the current one was rejected or approved by the CBRC. The bank need to submit the application to CBRC's local province offices for the initial review. If the application passes this local review, the case would be transferred to the CBRC's headquarter for the final review. The application, on average, takes approximately a year to achieve the verdict. Some of these applications could take years, depending on the review time of the local CBRC offices. Moreover, the total number of branches allowed to be opened in each city were capped by the CBRC. In the end of 2005, big five bank

14 Please refer to CBRC Order [2006] No.2, titled "The implementation of administrative licensing items on Chinese commercial banks"

branches covered approximately 90% of the cities in China. For the twelve joint equity banks, they only covered approximately 7% of the cities. The bank entry regulation of CBRC in 2006 hugely limited the twelve joint equity banks to compete fairly with the big five commercial banks who had already established branches almost in all the cities and counties of China.

In April 2009, "Adjustment comment on the market access policy of setting up branches for small- and medium-sized commercial banks" was introduced by the CBRC as a significant and important deregulation of the Chinese banking system. [15] This adjustment aimed to free joint equity banks and city commercial banks to set up new branches in new cities. This deregulation removes any entry restrictions for new branches in a city if the joint equity commercial bank had already set up branches in this city or in their capital city. Specifically, for these deregulated cities, the joint equity banks can open branches freely without any restrictions on number of branches. Moreover, for each application, joint equity banks can apply for multiple branch openings and don't need to get approval from the central CBRC office. Instead, banks only need approval from a local CBRC office which makes the application process much easier and quicker, typically within four months. Besides, there was no specific requirement on capital amounts for the new branches. However, if the bank didn't have any branches in the city or in the provincial capital city, it was still strictly regulated by the old rules of the CBRC. Taken together, this bank entry deregulation enacted in April 2009 will reduce the cost and time of new branch entry applications dramatically. As one of the senior officers in the CBRC commented, this deregulation shock is one of the milestones in the development of

15 Please refer to CBRC Order [2009] No. 143;
http://www.cbrc.gov.cn/govView_E38927D9D67E4FA4904E7E580DDFFAFD.html

commercial banks and the growing level of competition in the whole banking sector.[16] On October 15, 2013, in CBRC Order [2013] No.1, an updated version of CBRC Order [2006] No.2, the CBRC fully relaxed the entry restrictions on commercial banks.

In this paper, we focus on this 2009 partial deregulation and use it as an exogenous shock to bank competition. This policy shock led to the significant growth of joint equity market share and increased competition pressure to incumbent commercial banks, and provides an ideal empirical setting to establish the causal effects of bank expansion. Specifically, the 2009 deregulation only applies to certain regions and banks, we can use this cross-sectional heterogeneity to perform the Diff-in-Diff regressions.[17] This allows us to establish the causal effects of bank competition on economic activities.

4. Data and Summary Statistics

We utilize three datasets for our empirical analyses, including two proprietary datasets on major Chinese bank loans and all Chinese bank branch information, and Chinese Industry Census (CIC) firm-level data.

4.1. CBRC Loan Level Data

The first dataset includes all major bank loans that the CBRC compiled for monitoring and regulatory use, which consists of over 7 million loan contracts granted by 19 largest Chinese banks to firms with unique organization codes. This monthly frequency dataset

[16] In response to this deregulation, China Merchants Bank, one of the twelve joint equity banks, decided to open another 20 new branches by the end of 2009. As reported in the Announcement of 39th Meetings of the Seventh Sections of The Board of Directors, the China Merchants Bank would expand in Jiangsu, Guangdong, Henan, Sichuan, Shandong, Zhejiang, Jiangxi, Liaoning, Fujian, Yunnan, Hunan, Hubei, Anhui, and Guangxi.

[17] Table A2 in Appendix shows the distribution of branch numbers of different banks across provinces before the 2009 deregulation.

covers all borrowers with an annual credit line over RMB 50 million (approximately US$8 million) and spans from October 2006 to June 2013, which accounts for over 80% of the total bank credit in China. The data cover over 160,000 borrowing firms located in all 31 provinces in China across all 20 different sectors in accordance with the Economic Industrial Classification Code in China. In addition to the comprehensive coverage, the data also contain detailed loan-level information, i.e., the unique firm identifier, firm-level fundamentals (e.g., size, leverage and location), banks' information (e.g., the names and location of branches), and loan-level characteristics (e.g., loan amount, loan maturity, credit guarantee providers, internal ratings, issuing date, maturity date on contracts, and loan delinquency status).[18]

4.2. CBRC Branch Data

The second dataset includes all bank branch information in China, which is also collected by the CBRC. This dataset contains over 200 thousands branches from around 2,800 banking financial institutions and spans from 1949 to 2016. The data record details of branch level information, such as full names, branch IDs, branch addresses, and the exact opening and closing dates. Based on this data, we can observe how many new branches that a specific bank set up during a given period in a specific region (provinces, cities, or counties). For our analyses, we restrict our bank branch sample to 17 commercial banks, i.e. big five banks and twelve joint equity banks.

To validate the quality of this bank branch data, we cross check it with the public branch information for Bank of China (BOC) in 2016. We chose BOC because we can find

[18] However, the data do not record loan interest rates. In China, the lending rate was fully liberalized after July 20, 2013. During our sample period, the bank lending rates were still highly regulated.

all its branches with name, address, branch level, and operating status on the bank's website. We constructed BOC's branch list in September 2016 from CRBC dataset and check each of these branches with BOC's website. In total, BOC's website records 10,714 operating branches. This number is close with the number of branches 10,686 disclosed in BOC 2015 annual report and is also similar with the CBRC dataset which includes 10,678 branches. Then, we compare the names of branches between CBRC and BOC website and there are 9,900 branches have the exact the same names in these two dataset. This means 92.71% of the branches from CRBC dataset are as the same as the ones listed on BOC website. For these 7.29% unmatched branches, we manually check their names at the city level. Approximately, we can match another 3.58% of the branches. In sum, 96.29% of BOC branches in CBRC dataset could be matched with the branches listed with BOC website. The quality of CBRC bank branch dataset is very good.

4.3. Chinese Industry Census Data

The other dataset we use in this paper is Chinese Industrial Census (CIC) from 1998 to 2013.[19] The Chinese Industry Census (CIC) was collected by The Chinese National Bureau of Statistics (NBS). It includes all the manufacturing firms in China with annual sales more than 5 million RMB (increases to 20 million RMB in 2011). The CIC appears to be the most detailed database on Chinese manufacturing firms, and the content and quality of the database are sufficient. CIC data has detailed firm level accounting information (e.g., balance sheet, income statement, and cash flow statement) as well as other firm characteristics (e.g., number of workers, location, industry, shareholder type,

[19] We obtained the CIC data between 1998 and 2013, except for 2010. The data quality of CIC in 2010 is very bad. To our knowledge, all the available data sources of CIC don't have good quality for 2010.

and registration type). Using firm registration type from CIC data, we classify firms as SOE and Non-SOEs. In total, there are 635,709 firms. To investigate the impact of bank credit access on firm activities, we merge the CBRC data with CIC from 2007 to 2013.

4.4. Summary Statistics

Figure 1 shows two heat maps of the number of outstanding joint equity bank branches in 2008 and 2013, respectively. In the heat map, the darker color means larger number of joint equity bank branches in the province. Over the last two decades, joint equity commercial banks grow very fast. As displayed in Panel A of Figure 1, there are still several provinces with less than 20 joint equity bank branches (they are Jilin, Inner Mongolia, Gansu, Qinghai, Ningxia, Guizhou, Guangxi, Hainan and Tibet). On average, by the end of 2008, there are over 1,600 branches for big five banks in each province while the number is only around 150 for joint equity banks. Since the 2009 deregulation, joint equity banks have been expanding rapidly. Panel B of Figure 1 shows that 13 out of 31 provinces have over 200 joint equity branches in the end of 2013. Particularly, there are five provinces that reached to over 500 joint equity branches, i.e., Guangdong, Zhejiang, Shandong, Shanghai, and Jiangsu.

[Place Figure 1 about here]

Besides the growth of number of branches, joint equity banks also grow rapidly in terms of their lending market shares. In particular, the market share of joint equity banks, which is measured by the percentage of total amount of assets of joint equity banks over assets of all banks in China, increased from 10.7% in 2003 to 18.6% in 2015. The average

of annual growth rate for the assets of joint equity banks is around 25% while the number is only 15% for big five banks.

The 2009 deregulation contributes a lot to this fast catching up of joint equity banks in China. In Figure 2, we illustrate the dynamics of growth rate of the outstanding loan amounts between cities where at least one joint equity bank can open branches freely (solid line) and cities where all joint equity banks are still under CBRC's regulation after April 2009 (dashed line). As shown in Figure 2, before April 2009, the growth rates of treatment cities (i.e., solid line) and control cities (i.e., dashed line) are very similar and move in parallel. After the shock in April 2009, the growth rate of outstanding loan amounts for treatment groups started to increase much faster than the growth rate for control cities. On average, the growth rate of outstanding loan amounts in treatment cities increased to 43.25% post April 2009. In contrast, the average of growth rate of outstanding loan amounts in control cities increased to 30.78%. The evidence in Figure 2 suggest that the faster growth rate of lending after April 2009 is mainly due to the deregulation. There are no significant changes of the growth rate differences between the treatment and control cities prior to 2009.

[Place Figure 2 about here]

Table 1 presents summary statistics of the data. As discussed above, we employ the 2009 bank entry deregulation as an exogenous shock on interbank competition which is mainly between joint equity banks and the big five. This policy provides an ideal setting of Diff-in-Diff regressions to exam the causal impact of bank expansions. Our main variable of interest is the Diff-in-Diff dummy *Treatment*Exposure*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before that.

Exposure equals one for treated bank-cities and zero for controlled bank-cities. Based on this 2009 deregulation, bank *k* free to open branches in city *j* is the bank that have existing branches in city *j* or in the capital city of the province of city *j*. The mean of *Exposure* is 0.385 which means that, on average, joint equity bank can open branches without restrictions in 38.5% of the cities. Moreover, among the pair of cities-joint equity banks with *Exposure*=1, 18.7% of them had joint equity bank branches before April 2009. In other words, for the remaining 82.3% of the cities, the unrestricted branch opening is due to the existing branches in the provincial capital cities instead of the city itself. This mitigates the concern that government endogenously targeted several specific cities to perform the deregulation in 2009.

Panel A of Table 1 reports the number of branches at bank-city-year level from 2006 to 2013. Overall, the big five banks dominate the market. In specific, the average number of branches for big five banks is 31.25 while it is 1.25 for joint equity banks. Panel B presents the summary of loan contract terms. The average amount of loan is around 15 million RMB with short-term maturity. Approximately one fifth of loans have third party guarantee, which provides a credit enhancement scheme for lenders. The default rate defined as over 90 days delinquency is 1.1% and it is comparable to the non-performing loan rate disclosed in banks' annual reports in China. Moreover, for each loan, we define it as a relationship loan if the firm has outstanding loans from the same bank over the past 12 months. The rest are transaction loans. On average, 85.9% of loans are classified as relationship loans. Panel C of Table 1 shows firm level characteristics. The median size of firms equals 20 million RMB while the standard deviations are large. And on average

the sample firms have a moderate leverage level. We describe all variables' definitions in Table A1 in Appendix.

[Place Table 1 about here]

5. Empirical Analysis and Results

5.1. Expansion of Joint Equity Bank Branches under 2009 Deregulation

We start by analyzing how joint equity banks expand into new cities and in terms of new branches and loan issuances after the 2009 deregulation. In other words, do joint equity banks actually expand and compete with incumbent big five banks in the lending market when the restriction on branch openings is lifted. As we described before, after the 2009 deregulation, joint equity banks can freely open branches in the cities where they already have branches or in all cities in the province where they have branches in the capital city of that province. After this partial deregulation, different joint equity banks have different access to different cities depending on their branch distributions before 2009. At the city-bank-year level, we study the joint equity bank expansion patterns in response to the 2009 deregulation using Diff-in-Diff regression on the number of branches and outstanding loan amounts for each bank in each city. Formally, the regression can be represented as follows:

$$\mathrm{Y}_{ijt} = \beta_1 Treatment_t * Exposure_{ij} + \beta_2 Treatment_t$$

$$+\beta_3 Exposure_{ij} + \phi X_{it} + \alpha_i + \delta_j + \eta_t, \qquad (1)$$

where Y is the logarithm of one plus the number of outstanding branches or the logarithm of one plus the total amounts of outstanding loans for city *i*, bank *j* at the end

of year *t*. We control for the observable city level characteristics, such as *Log(Local GDP)*, *Fixed Investment/Local GDP*, and *Fiscal Revenues/Expenditures*. We also control for city (α_i), bank (δ_j), and year (η_t) fixed effects. Standard errors are clustered at the city level.

Table 2 Panel A shows the regression results. Samples in Column (1) to (4) restrict to joint equity banks. Column (1) is for one-year before and after Diff-in-Diff by restricting the sample to 2008 to 2009. Column (2) is for two-year window, Column (3) is for three-year, and Column (4) is for the whole sample period. In Column (1) to (4), the coefficients β_1 of Treatment*Exposure are all positive and are statistically significant at the 1% level. For example, in Column (1), the coefficient is 0.040 with a *t*-statistic of 8.83. This means the number of joint equity bank branches increase by 4.0% more in the deregulated cities (i.e., Exposure=1) than in the still regulated cities (i.e., Exposure=0) after the 2009 deregulation shock. Additionally, the β coefficients increase monotonically from Column (1) to (4). This suggests that the long-term effect of the deregulation on joint equity banking sector expansions is larger since it takes time to open branches in a new city. This also mitigates the concern that for still regulated cities (i.e., Exposure=0), the joint equity banks can simply open one branch in order to qualify for the deregulation. We find that if a joint equity bank didn't have any branches in a city (nor in the provincial capital city) before April 2009, even this bank open a branch later on, it is not qualified in the deregulation. In Column (5), we include the big five bank branches in the regression and define Exposure=0 for all big five banks since the 2009 deregulation is only for the joint-equity banks. The result is very robust by adding the big five banks.

In Panel B of Table 2, the independent variable is the logarithm of one plus the outstanding loan amounts.[20] Consistent with Panel A, the deregulation led to a significant increase in lending from the joint equity banks in deregulated cities. For example, the coefficient estimated from one-year window is 0.211 (*t*-statistic=11.72) statistically significant at 1% level, which means the total amount of outstanding loans increases by more than half due to the deregulation. Furthermore, in the robustness test, the results are still there even after controlling for the city*year fixed effects and bank*year fixed effects. In sum, these results confirms that the effects of the 2009 deregulation are in-line with the purpose of it which aims to increase the interbank competition in the lending markets.

[Place Table 2 about here]

Next, we look into how firms choose between big five loans and joint equity bank loans. Table 3 presents the yearly level statistics on shares of joint equity bank loans at the firm level. Table 3 Column (1) shows the percentages of the new firms with no outstanding loan records in the prior year while having loan issuance from joint equity banks at year *t*. The percentage jumps a lot at the year of 2009, which confirms that the joint equity banks expands greatly on the extensive margin. The economic magnitude is large (i.e. increases from 25.9% to 39.9%, by around 55%). Besides, the column (2) shows that the borrowers can switch completely from big-five banks to joint equity banks and there is a jump before and after the deregulation shock in banking industry (i.e. increases from 0.54% to 0.86%, by around 60%). The magnitude of the complete switch is small which

[20] For big five bank loans, firms borrow approximately 90% of their loans from the branches in the same city. This ratio is approximately 83% for joint equity banks. Sometimes, firms borrow from bank branches in the neighbor cities or in the provincial branches.

means most of the loans from new banks are "add on". In terms of borrowing shares with respect to outstanding loans, as shown in column (3), the number increases from 24.2% to 29.1%, by 21% and continues to become larger as the time goes by. At the end of year 2012, the firm-year average of borrowing shares from joint equity banks reaches 40%, which is certain a part of the whole banking sector. Also, this pattern is confirmed based on another borrowing share definition using the amount of new loan issuances (as can be seen in column (4)). To reveal the growth along the intensive margin, we drop those firm-year observations of which the borrowing shares from joint equity banks in the first year are 100% and calculate the frequency of firm-year observations with expansions in borrowing shares from joint equity banks. As the column (5) shows, there are only 16.0% of firm-year observations with positive change in borrowing shares from joint equity banks in 2007 while 31.4% at year 2012. More importantly, comparing the numbers in year 2007 and 2008, we find that there is no significant pre-trends, which adds additional proof of this exogenous deregulation shock.

[Place Table 3 about here]

Besides the analyses on outstanding loans amount in Table 2, Table 4 presents the Diff-in-Diff regression estimates on the impact of deregulation shock on firm's borrowing shares among banks. As shown in equation (2), the dependent variable in the first five columns of Panel A (Panel B) is Borrowing Shares$_{kijt}$, calculated as the ratio of the amount of outstanding loans (new loans) issued by bank j at the end of year t (during the year t) to the total amount of loans issued by all banks. To examine the expansion effect at the intensive margin, the dependent variable in the equation (3) is the year-to-year change in borrowing shares and the regression estimates are reported in the last two columns of

each panel. We also add bank (α_j), firm (δ_k), and year (η_t) fixed effects. Standard errors are clustered at the city level.

$$\text{Borrowing Shares}_{kijt} = \beta Treatment_t * Exposure_{ij} + \alpha_j + \delta_k + \eta_t, \quad (2)$$

$$\Delta \text{ Borrowing Shares}_{kijt} = \beta Treatment_t * Exposure_{ij} + \alpha_j + \delta_k + \eta_t, \quad (3)$$

Similarly, the coefficients across all model specifications are positive and statistically significant at 1% level. Particularly, as shown in column (1) Panel A, the coefficient is 0.004 with a *t*-statistic of 10.15. This result implies that the firms' borrowing shares from joint equity banks will increase by around 0.4% for bank-cities with Exposure equals one after the deregulation shock, which accounts for 16.7% of the sample mean of borrowing share. Moreover, the coefficients still becomes larger as the window spans, which suggests that the accumulative effect of joint equity banking sector expansions tends to be stronger. Besides, to investigate how the joint equity banks expand at the intensive margin, regressions estimates shown in the last two columns confirm our expectations.

[Place Table 4 about here]

5.2. Competition between Incumbent Banks and New Banks

In a next step, we explore how new banks compete with incumbent banks in the region by offering different loan contract terms. We also explore how incumbent banks react to the new bank entries and what are the impacts of the competition on loan performance. We first compare the loan contract characteristics between new banks and incumbent banks. Our loan data contains the loan amount, maturity, internal rating, third-party guarantee requirement, and ex-post performance. For each loan contract

between firm *k* (e.g. located in city *i*) and bank *j* at month *t*, we introduce a dummy to indicate whether the bank *j* is the new entered one in city *i*. In particular, the dummy equals one if the opening date of the earliest branch of bank *j* in city *i* is less than 12 months prior to the month *t*.[21]

Table 5 reports the mean difference in loan contract characteristics. The *t*-statistics are provided to show the significance in the last column. Panel A is for all banks in the sample and Panel B is for joint equity banks. The patterns are very similar between Panel A and B. In particular, new-entry banks tend to target borrowers by providing the loan contracts with the following characteristics: larger size, longer maturity, better internal ratings, and higher level of guarantee protections. All these patterns are statistically significant at 1% level. For example, the average amount of loans granted by new entry joint equity banks is 24 million RMB while this number for incumbent joint equity banks is only 14 million RMB. Moreover, over one third of loans from new entry joint equity banks are required to provide the third party guarantee requirement. Incumbent banks require significantly lower guarantee. We also explore the ex-post loan performance. As in Table 5, the credit risk is lower (significant at 10% level) for loans issued by new-entry banks while this effect will become larger and more significant for overall samples. Besides the loan contract characteristics, we also look at the differences on borrowers' characteristics. For example, the mean of firm total assets for incumbent banks is 6.9 billion RMB and the median is 0.8 billion RMB. For new entrant banks, the mean is 4.4 billion RMB and median is 0.9 billion RMB. This means that, compared with incumbent banks, new entrant banks lend to relatively larger firms but avoid the very large firms. We

[21] Our results are quite robust to other definitions of new bank entries (e.g. 36 months) and are not reported for brevity.

also find that new entrant banks target firms with less financial constraint (i.e. smaller leverage).

[Place Table 5 about here]

Furthermore, we explore the internal loan rating downgrading patterns of the delinquent loans between the big five banks and twelve joint equity banks. Figure 3 shows the distribution of the time differences between the initial loan delinquent date and the initial downgrading of the internal rating of that loan. For example, zero means that the first delinquent date of the loan is in the same month as the first downgrading of this loan's internal rating. -1 means that the bank downgraded the rating of the loan 1 month before the actual delinquency. As shown in Figure 3, big five banks usually downgrade the internal ratings of delinquent loans earlier than joint equity banks. In particular, the distribution of early actions for delinquent loans granted by big five bank is left skewed. On average, the mean value of months between initial downgrade action day and real expired day for delinquent loans granted by big five banks is -1.56 and the median value equals -1.00. In contrast, the numbers are 0.86 and 1.00 for joint equity loans. This means that the loan officers in big five banks have better information than joint equity banks due to past repeated relationships and are more likely to downgrade the delinquent loans in advance.

[Place Figure 3 about here]

Next, we perform the Diff-in-Diff analysis to access the causal impact of joint equity banking sector deregulation shocks on the loan contract terms initiated by the joint equity banks. Formally, the regression is:

$$\text{Loan Terms}_{kijt} = \beta Treatment_t * Exposure_{ij} + \phi X_{kt} + \alpha_j + \delta_k + \eta_t, \qquad (4)$$

where Loan Terms_{kijt} are for the characteristics of a loan borrowed by firm k (located in city i) from bank j in year t. α_j, δ_k and η_t are vectors of bank, firm, and year dummy variables that account for bank-, firm-, and year-fixed effects. X_{kt} is a set of time-varying firm level variables, including the firm size and firm leverage. The coefficient of interest, β, estimates the impact of branch deregulation on loan contract characteristics. The standard errors are clustered at city level.

As shown in the Table 6, column (1) reports the deregulation effect on loan maturity, column (2) is for internal rating, column (3) is for guarantee requirement, and column (4) is for ex-post loan performance. In column (1), the coefficient is 0.038 and the t-statistic is 3.99, which suggests that the 2009 deregulation led to 3.8% increases in maturities for these new-enter bank branches. Column (3) shows that the coefficient is 0.002 with z-statistic of 2.31, which suggests that the deregulation push the new-enter joint equity banks to issue loans with more guarantee protections. Column (2) shows that loan officers tend to give more favorable ratings after the deregulation shock. This could be due to two reasons; these borrowers are with greater credit quality or banks inflate the borrowers by issuing good internal ratings. To further examine the underlying channels, we turn to the ex-post repayment performance. As shown in column (4), these loans from joint equity banks after the deregulation shock performs better (i.e. the coefficient equals -0.001 with

significance at 10% level). This supports the argument that increased competition from joint equity bank deregulation led to better ex-ante loan screening and better ex-post loan performance. Moreover, in column (5), we study whether joint equity banks issue more relationship loans or transaction loans in deregulated cities after the 2009 shock. The coefficient is 0.026 and the *z*-statistic is 2.00, which suggests that there are more relationship bank loans after the deregulation in 2009.

[Place Table 6 about here]

Due mainly to data limitation, the prior studies have shown limited evidence on the impact of bank deregulation on incumbent bank strategies. Regarding this, we restrict to the subsample of loans granted by big five banks and further investigate how these incumbent banks react to this deregulation shocks. Similarly, the equation (5) is estimated to evaluate the policy effect. The only difference between equation (4) and equation (5) is that $Exposure_i$ in equation (5) is defined as a dummy at city level which equals one when at least one joint equity bank can expand freely in city *i* based on the 2009 deregulation (i.e. the joint equity banks had already set up branches in this city *i* or in its capital city prior to the policy enactment).

$$\text{Loan Terms}_{kijt} = \beta Treatment_t * Exposure_i + \phi X_{kt} + \alpha_j + \delta_k + \eta_t, \qquad (5)$$

To control for bank-, firm-, and year-fixed effects, we include α_j, δ_k and η_t, three vectors of bank, firm, and year dummy variables in the diff-in-diff regression estimates. X_{kt} is also a set of time-varying firm level variables, including the firm size and firm leverage. Similar to Table 6, our dependent variables of interests are loan maturity, internal rating, guarantee requirement and ex-post loan performance. In Table 7, we find

that incumbent big five banks located in treated cities offer significantly different loan contracts after the deregulation shock. In particular, the loan maturity becomes significantly longer, the guarantee requirement becomes significantly lower, and the internal rating becomes significantly better. For example, the coefficient estimated from column (3) is -0.007 and significant at 5% level (with the *t*-statistic of 2.04), which means borrowers provide less credit enhancement through third-party guarantee to the big five incumbent banks after the shock. This suggests that incumbent banks feel the pressure of increasing competitions and offer better loan contracts. However, in Column (4), the default ratio increase significantly. Instead of improving the loan screening and monitoring, the incumbent banks choose to lower the hurdle and let more unqualified borrowers in the pool by inflating the credit rating and requiring lower guarantee, which leads to the higher credit risk. Moreover, column (5) shows, as joint equity banks, big five also increase their relationship lending due to the increased interbank competition in 2009.

[Place Table 7 about here]

Besides the loan characteristics, we also compare the differences of borrowers' characteristics between incumbent banks and new banks. Table 8 shows the detailed summary statistics. Again, new branch is the branch that has opened for less or equal than 12 month. Incumbent branches are the ones with more than 1 year history. Panel A compares characteristics of firms which borrows from new bank branches vs. incumbent bank branches. New branches, on average, lend to firms with higher ROA, higher TFP, bigger assets, and more employees. In other words, these new bank branches target bigger firms with better efficiency. For example, on average, ROA of firms that borrow from

incumbent banks is 6.3% and ROA of firms that borrow from new bank branches is 7.6%. Moreover, new bank branches tend to target firms at the political hierarchy lower than province level whereby the incumbent banks lend more to firms with political hierarchy at provincial or national level. Then, we break down the banks into big five vs. joint equity banks. Panel B shows the comparisons for big five banks. Interestingly, when there is a new branch of big five opened, it targets more SOEs than the incumbent big five branches. Consistently, the firms that borrow from new big five branches have slightly lower ROA and TFP. They also have higher political hierarchy. In Panel C, opposite to big five new branches, new branches of joint equity banks tend to lend more to firms with higher ROA, higher TFP, and lower political hierarchy. For example, the ROA of the firms that borrow from new joint equity bank branches is 7.9% on average while the ROA of the firms that borrow from incumbent branches is 6.0%. In Table A3 in Appendix, we use 36 month to define the new branch and find very robust results as Table 8.

New branches of big five banks mainly target SOEs, especially the big ones with higher political hierarchy. This is not surprising since big five banks have been lending mainly to SOEs for decades. When a big five bank plan to enter into a new city and compete with other big five banks, it could have already established some connections with big local SOEs. In other words, the relationship between a big five bank and local SOEs might be the reason for its entering decision. On the other hand, for joint equity banks, when they enter into a new market, they typically pick the firms with better efficiency and provide better loan terms to them. The expansion decision could be due to the profit maximization. In sum, joint equity banks and big five are very different reasons and strategy of expansion which could lead to different economic consequences.

[Place Table 8 about here]

5.3. Impacts of Bank Expansion on Firm Activities

Finally, we want to understand the impacts of the bank competition on firm activities, especially the heterogeneous effects on SOEs vs. private firms. It is well known that, in China, the state-owned commercial banks mainly grand credit to SOEs in industries. There has been a long term relationship between the big five commercial banks and SOEs. Private firms, on the other hand, have very limited access to bank credit and rely heavily on informal lending channels. The 2009 deregulation on bank entry, along with other reforms on banking system, aims to improve the credit allocation in China. By merging the CIC firm level data and CBRC loan data, we select the firms which have borrowed from banks in our sample period. Then, we perform the Diff-in-Diff regressions of firm activities (e.g., expansions on assets, sales, employments, and liabilities), as well as firm performance (e.g., ROA and TFP) on the 2009 deregulation shock. The regression is as follows:

$$Y_{kit} = \beta Treatment_t * Exposure_i + Pretrend + \delta_k + \eta_t, \qquad (6)$$

where Y_{kit} is a vector of firm level activities such as total assets, fixed assets, total liabilities, capital structure, total sales, employment, ROA and TFP. $Exposure_i$ in equation (6) is also defined as a dummy at city level which equals one when the city *i* is eligible for branching expansion according to the 2009 deregulation (i.e. the joint equity commercial banks had already set up branches in this city *i* or in its capital city prior to the policy enactment). We also control for the pre-trend dummy for a year and two years

before the 2009 deregulation. δ_k and η_t are included to account for firm- and year-fixed effects. Standard errors are clustered at firm level.

Table 9 shows the Diff-in-Diff regression results. In particular, the 2009 joint equity banking sector deregulation does exert significantly positive effect on firms' real economic activities. For example, after 2009 deregulation, firms in the deregulated areas expand in size and employment while relieves the financial distress in terms of lower leverage. Table 9, column (1), shows that total amount of assets, on average, increased by 7.2% after the 2009 joint equity bank deregulation. In column (2), the amount of fixed assets increases by 13.6% with the t-statistic of 1.79. Column (4) is for leverage, the coefficient estimated is negative (-0.031), which demonstrates that the leverage decreases by 3.1% after the joint equity bank expansion shock. In Column (5), the number of employment also increases significantly after the 2009 deregulation.

Moreover, we use TFP to measure firm-level productivity and use ROA to present firm's profitability. The coefficient estimated in Column (7) in Table 9 is 0.022 with the *t*-statistic of 4.02, showing that the ROA increases by 2.2% after the joint equity bank expansion shock. Similar even stronger patterns can be observed in Column (8), i.e. the TFP improves by 14.2%. Both columns on the analyses of firm efficiency consistently confirm that deregulation that expands firm's access to bank credit improves the firm's performance significantly. Moreover, based on the coefficients of two pre-trend dummies, we don't find significant differences in firm activities between deregulated areas and regulated areas (i.e., control group) before the 2009 shock. This eliminate the concern that the results of Diff-in-Diff dummy is driven by demand side of the economy (e.g., firms in deregulated cities have better investment opportunities). Moreover, instead of the

firms with bank loans, we expand our sample to all firms in the CIC data and repeat the regressions in equation (6). Table A4 shows the results. The effects of 2009 deregulation are consistent with the results of Table 9 but generally weaker. This is in-line with our expectation since the firms with bank loans should be affected more by this banking deregulation.

[Place Table 9 about here]

Furthermore, we trace the effect of bank expansions across SOEs and private firms by interacting the Diff-in-Diff dummy with the dummy for private firms. We exclude the firms which were privatized from SOEs since these firms might still keep the relationship with the big five commercial banks. Table 10 shows the results. Overall, private firms can benefit significantly more from the 2009 deregulation than SOEs do. In particular, compared with SOEs, after 2009, private firms in deregulated areas increase significantly more in assets, liabilities, sales, and employments. For example, the coefficient of *Treatment* * *Exposure* in column (1) is -0.064 with the *t*-statistic of -4.03. This suggests that SOEs decrease in assets when interbank competition increased after the 2009 deregulation. On the other hand, in column (1), the coefficient of *Treatment* * *Exposure* * *Private* is 0.178 with the *t*-statistic of 12.02. This shows that, opposing to SOEs, private firms would increase the assets significantly when the interbank competition increase. Other variables show the similar patterns (e.g., fixed assets, liabilities, sales, and employment). Moreover, for firm performance (i.e., ROA and TFP). The coefficients of the triple interaction terms are 0.006 and 0.275, respectively. Both of them are statistically significant at 1% level. These findings suggest that expansions of joint equity banks in China generate more positive effect on private firms since these firms are

relatively less likely to get access to the bank credit prior to the arrival of intensified competition. SOEs, on the other hand, might even suffer from the better interbank competition.

[Place Table 10 about here]

Finally, we separate the firms who reply more on transaction lending or on relationship lending prior to the 2009 deregulation. As discussed in Section 2, Boot and Thakor (2000) predicts that borrowers who borrow transaction loans prior to the increased interbank competition would be better off. This effect is ambiguous for borrower who mainly rely on relationship loans prior to the deregulation. In Table 11, we construct a new variable *TransactionShare* which is the percentage of transaction loan issuance amounts prior to 2009 (i.e., 2007 and 2008) over the total new issuance loan amounts of each firm. We interact the *Treatment * Exposure* with *TransactionShare*. In Table 11, we find that the coefficients of *Treatment * Exposure* are significantly negative for firm assets and sales. This means firms with zero transaction loans (100% relationship loans) prior to the deregulation suffer from the higher competition after 2009. On the other hand, the coefficients of *Treatment * Exposure* TransactionShare* are significantly positive for assets, liabilities, sales, employments, ROA, and TFP. For example, if the firm borrowed 100% from transaction loans before 2009, the deregulation led to increases in assets, liabilities, sales, and employment by 13.7%, 24.5%, 5.6%, and 34.1% respectively. These results suggest that firms who mainly borrow transaction loans could benefit from increased competition.

[Place Table 11 about here]

The results in Table 10 and 11 are consistent with the prediction of Boot and Thakor (2000) which shows that relationship lending would have lower added value for borrowers when interbank completion becomes greater. The loans from new entered joint equity banks to private firms are largely transaction loans which would help private firms grow and become more efficient.

6. Conclusion

This paper exams how new entrant banks compete with incumbent banks and the economic consequences of increased interbank competition. Using unique loan-level data and firm-level survey in China, we trace each loan issued by big five commercial banks and twelve joint equity banks and find that while new banks tend to target different firms than incumbent banks. Increased competition leads to more relationship loans than transaction loans. Moreover, new banks usually require more guarantees and have better loan performance. Firms can benefit from the competitions among banks by expanding on assets and employments as well as improving efficiency. These effects are mainly from transaction lending.

Whether bank competition is good or bad for economic growth is the central question worldwide. This paper provides the detailed analysis and establishes causal links between bank competition and growth in the context of China. China has been experiencing unprecedented high growth in economy during last decades and is now the second largest economy worldwide. During this economic growth, China has also developed the world largest debt market. For policy makers, it is important to understand the heterogeneous effects of banking deregulation on transaction lending and relationship lending. In China, informal lending channel is a key to the development and private firms usually have

limited access to formal lending channels such as bank loans (Allen et al. (2005)). On the other hand, several recent papers argue that private sector firms with bank financing in China grow faster than those without (Ayyagari et al. (2010)). There are several ways these findings might be reconciled. First, the banking sector in China has improved over time which might have allowed more firms access to the bank credit. Second, bank competition and expansion might have allowed firms in China to take different financing strategies, e.g. switching from informal to formal lending channels.

In the future research, it is important to understand how this rapid changes in China's banking sector affect the global economy. What are the benefits and risks associated with the reform on banking systems in China? What are the relationships between the banking system and shadow banking system in China? Answering these questions will further help us understanding the world largest bank debt market as well as its role in the global economy.

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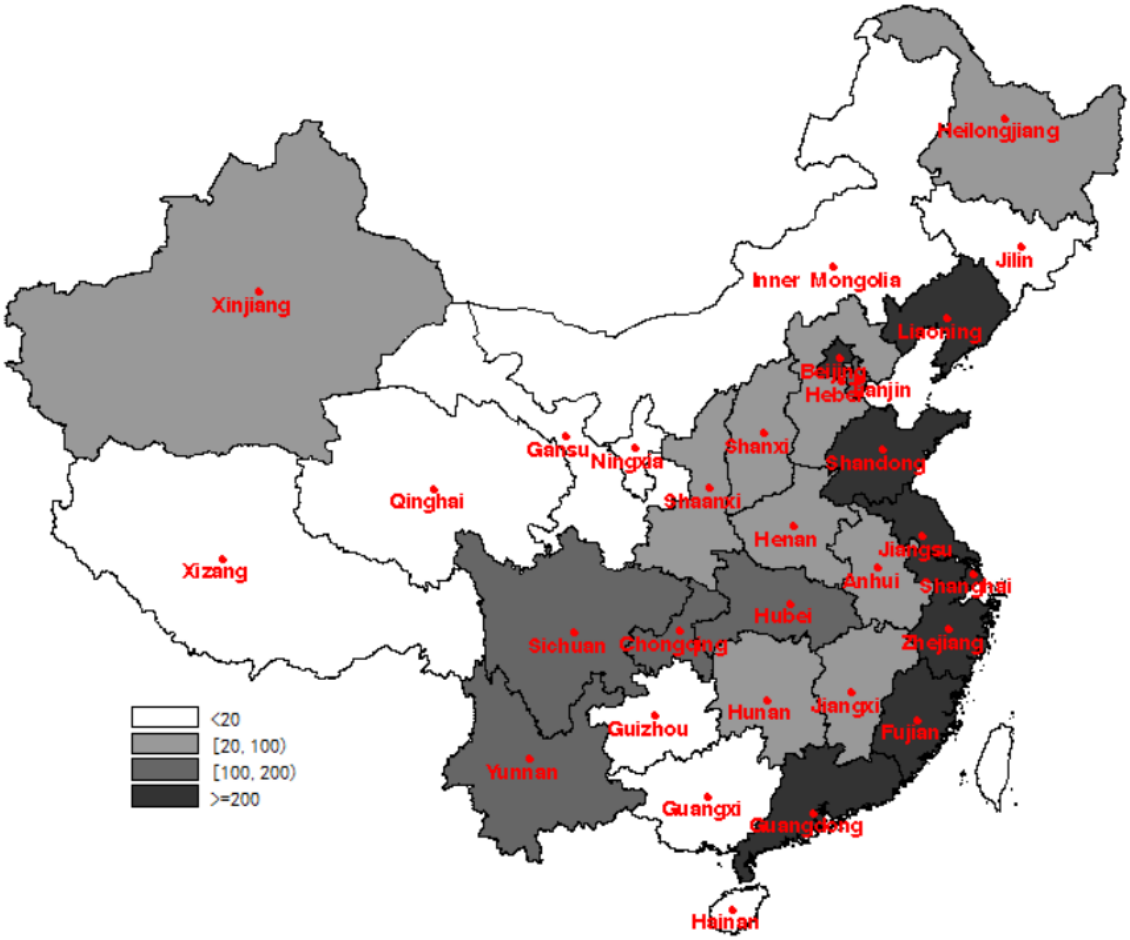
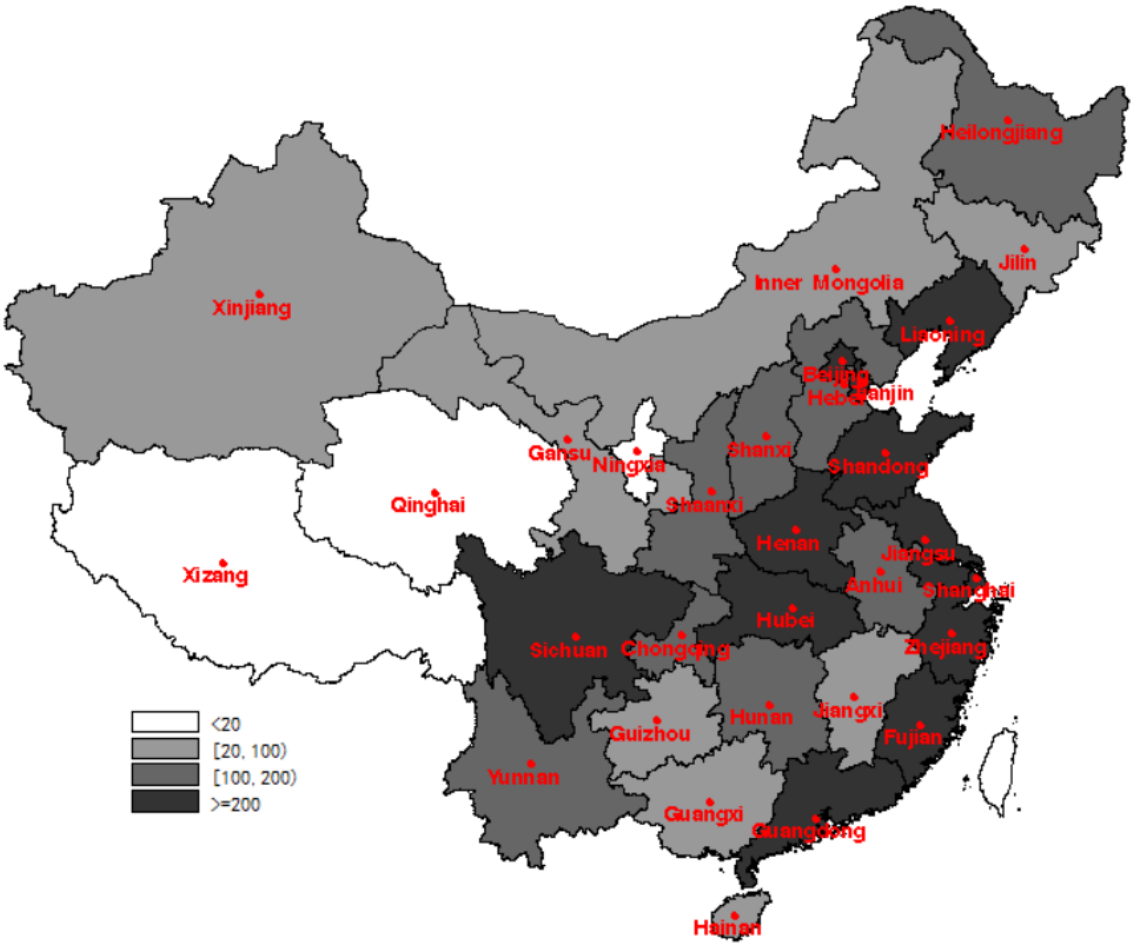


Panel A: By Year 2008



Panel B: By Year 2013

Figure 1: Heat Map of the Number of Joint-equity Branches across Provinces, 2008 versus 2013. This figure illustrates the outstanding number of all twelve joint-equity branches for all provinces in China at the end of 2008 (Panel A) and 2013 (Panel B). It covers 31 provinces including four centrally administrated cities (i.e., Shanghai, Beijing, Tianjin and Chongqing).

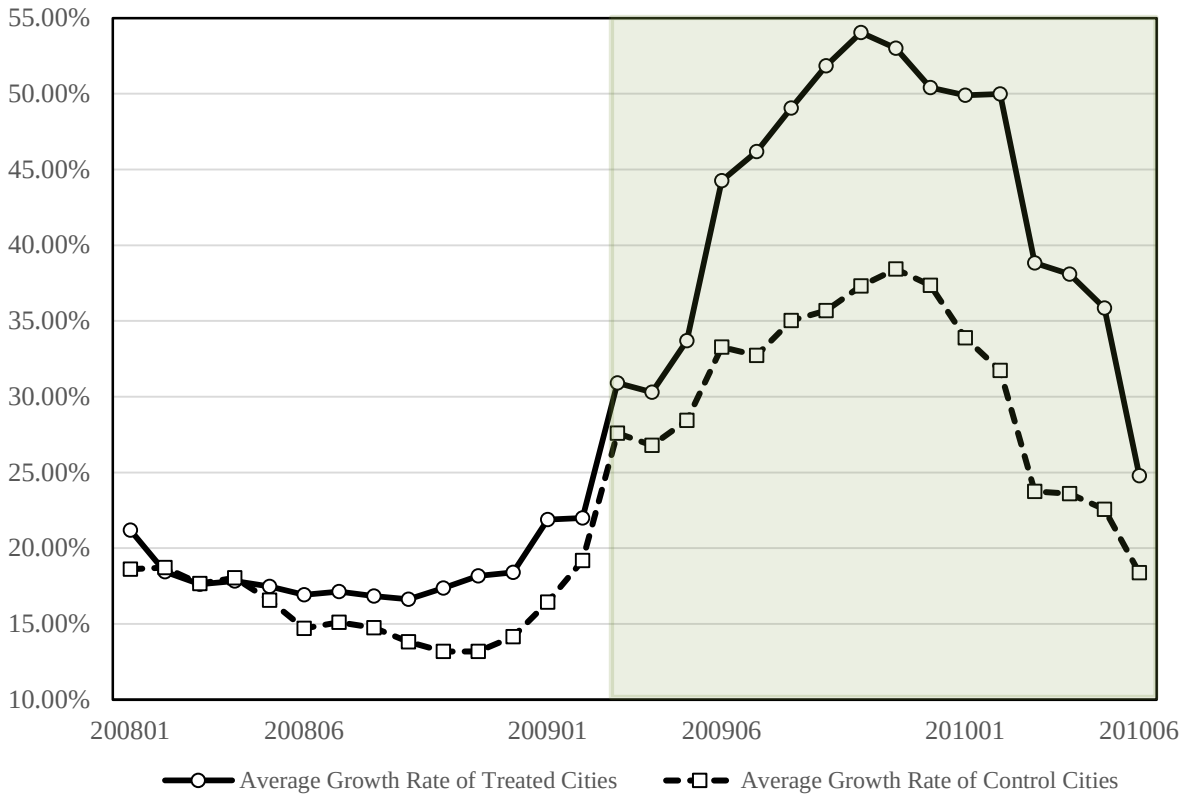


Figure 2: The Evolution of Growth Rate of Outstanding Loans: Across Cities. This figure plots the growth rate of the outstanding loan amounts before and after the banking sector entry deregulations of April 2009. The solid line with circles presents the dynamics of treated cities while the dashed line with squares exhibits that of control cities. The treated city requires that at least one eligible joint-equity bank has outstanding branches in this city or in its capital city of the province prior to the bank expansion policy shock.

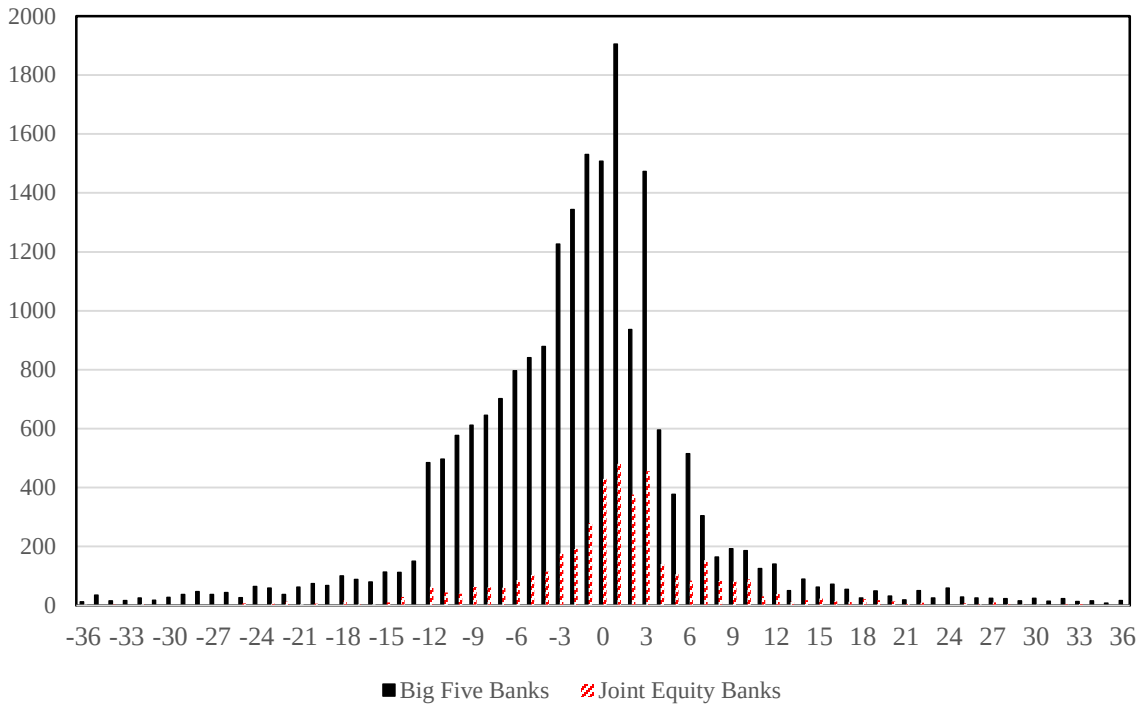


Figure 3: The Distribution of the Initial Downgrade of Delinquent Loans: Big Five Banks versus Joint Equity Banks. This figure plots the distribution of the differences between the month of the first delinquent loan payment and the month of the first downgrade of internal ratings of loans. The black bar is for the big five banks while the red bar is for the joint equity banks. The vertical line reports the frequency and the horizontal line reports the number of months between initial downgrade action date and real loan delinquent day. The data is restricted to all delinquent loans in CBRC sample.

Table 1: Summary Statistics

This table describes the characteristics of different samples. Panel A reports the summary statistics of the number of branch entries at city-bank-year level from 2006 to 2013, where the sample is from CBRC branch data set. Panel B reports the summary statistics of loan contract characteristics at loan level from Jan 2007 to June 2013, where the sample is from CBRC loan data set. Panel C reports the summary statistics of firm level characteristics at firm-year level from 2006 to 2012, where the sample is from the Chinese Industry Census. All other variables are defined in the appendix Table A1.

Variables	N	Mean	Median	S.D.	P25	P75
Panel A: The Number of Branches						
Outstanding Branches	46,512	10.073	0.000	28.379	0.000	9.000
—Big Five commercial banks	13,680	31.250	20.000	45.075	7.000	37.000
—Joint-equity commercial banks	32,832	1.249	0.000	5.445	0.000	0.000
Treatment	46,512	0.625	1.000	0.484	0.000	1.000
Exposure	46,512	0.385	0.000	0.487	0.000	1.000
New Branches overall sample	46,512	0.293	0.000	1.541	0.000	0.000
—Big Five commercial banks	13,680	0.672	0.000	2.659	0.000	0.000
—Joint-equity commercial banks	32,832	0.135	0.000	0.578	0.000	0.000
New Branches sub-sample	5687	2.394	1.000	3.795	1.000	2.000
—Big Five commercial banks	2847	3.229	1.000	5.073	1.000	3.000
—Joint-equity commercial banks	2840	1.557	1.000	1.284	1.000	2.000
Panel B: The Loan Contract Characteristics						
Loan Amount (Million RMB)	6,089,830	15.036	4.009	31.012	0.620	13.654
Maturity (in Months)	6,089,830	11.998	6.000	22.249	4.000	12.000
Internal Rating	6,089,830	1.026	1.000	0.181	1.000	1.000
Guarantee Requirement	6,089,830	0.218	0.000	0.413	0.000	0.000
Relationship	6,089,830	0.859	1.000	0.349	1.000	1.000
Default	4,955,168	0.011	0.000	0.106	0.000	0.000
Panel C: The Firm Characteristics						
Assets (Million RMB)	2,086,333	86.317	20.767	231.757	8.572	57.564
Fixed Assets (Million RMB)	2,078,597	30.131	6.051	87.737	2.051	18.889
Liabilities (Million RMB)	2,084,805	48.364	9.500	138.277	3.320	29.424
Leverage	2,079,898	0.534	0.543	0.283	0.312	0.752
Sales (Million RMB)	2,086,212	111.584	36.898	242.808	15.431	94.920
Employee	2,055,139	216.265	120.000	321.487	55.000	240.000
ROA	2,079,673	0.133	0.054	0.218	0.010	0.166
SOE	2,086,333	0.059	0.000	0.236	0.000	0.000

Table 2: National Policy Shock in Joint-equity Bank Expansions

This table presents the regression estimates of difference-in-difference analysis on the impact of national policy shock in bank expansion. The overall sample includes 46,512 city-bank-year observations and the dependent variables are *Log(1+No. Branches)* for Panel A and *Log(1+Outstanding Loans)* for Panel B, respectively. The main independent variable is the interaction, *Treatment*Exposure*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated bank-cities and zero for controlled bank-cities. According to the policy, an eligible bank *k* in city *j* free of regulation on new-branch entry is a bank that have outstanding branches in this city or in the capital city of the province that the city *j* is located in prior to the bank expansion policy shock. For each panel, the column (1) reports the regression estimates for subsample during 2008 to 2009 (one-year event window), the column (2) reports the regression estimates for subsample during 2007 to 2010 (two-year event window), the column (3) reports the regression estimates for subsample during 2006 to 2011 (three-year event window), the column (4) reports the regression estimates for subsample from joint-equity banks, and the column (5) is for the overall sample estimates. All other variables are defined in the appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. Standard errors are clustered at the city level and the robust *t*-statistics are reported in parentheses across all these model specifications.*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Log(1+No. Branches)

	DV: Log (1 + No. Branches)				
	(1)	(2)	(3)	(4)	(5)
Variables	[2008, 2009]	[2007, 2010]	[2006, 2011]	Joint-equity	Overall
Treatment*Exposure	0.040***	0.088***	0.124***	0.166***	0.128***
	(8.83)	(11.50)	(12.25)	(12.74)	(13.77)
Exposure	0.217***	0.193***	0.175***	0.150***	-0.040
	(5.48)	(5.11)	(4.78)	(4.10)	(-0.81)
Log(Local GDP)	0.244	0.062	0.016	-0.035	-0.032
	(1.16)	(0.41)	(0.20)	(-0.42)	(-0.51)
Fixed Investment/Local	-0.034	-0.088**	-0.103***	-0.127***	-0.114***
	(-0.75)	(-2.52)	(-3.18)	(-3.40)	(-3.83)
Fiscal	-0.005***	-0.003	-0.001	0.004*	0.002
	(-2.85)	(-1.49)	(-0.34)	(1.87)	(1.15)
Constant	0.510	2.190	2.607***	3.147***	3.420***
	(0.26)	(1.60)	(3.74)	(4.30)	(6.24)
City FE	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	8,208	16,416	24,624	32,832	46,512
Adjusted R-squared	0.612	0.610	0.607	0.621	0.846

Panel B: Log(1+Outstanding Loans)

	DV: Log (1 + Outstanding Loans)				
	(1)	(2)	(3)	(4)	(5)
Variables	[2008, 2009]	[2007, 2010]	[2006, 2011]	Joint-equity	Overall
Treatment*Exposure	0.211***	0.318***	0.385***	0.434***	0.448***
	(11.72)	(15.14)	(16.60)	(16.88)	(21.60)
Exposure	0.574***	0.487***	0.436***	0.382***	0.140**
	(10.60)	(9.58)	(8.94)	(7.93)	(2.59)
Log(Local GDP)	0.405*	0.241	0.197**	0.122	0.166**
	(1.85)	(1.31)	(2.16)	(1.47)	(2.35)
Fixed Investment/Local GDP	-0.142	-0.233***	-0.267***	-0.218***	-0.159***
	(-1.23)	(-2.79)	(-3.63)	(-3.14)	(-2.78)
Fiscal Expenditure/Revenues	-0.023***	-0.016***	-0.012**	-0.004	-0.006
	(-4.86)	(-3.05)	(-2.16)	(-1.01)	(-1.63)
Constant	1.147	2.659	3.057***	3.824***	3.786***
	(0.57)	(1.59)	(3.78)	(5.23)	(6.13)
City FE	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	8,208	16,416	24,624	32,832	46,512
Adjusted R-squared	0.706	0.699	0.695	0.708	0.798

Table 3: The Firm Borrowing Share of Joint-Equity Bank Loans

This table presents the calendar year distributions of borrowing patterns from Joint-equity banks. The column (1) reports, for each year *t*, the number of firms having new loan issuance from Joint-equity banks and among them, the percentages of the firms with no records of outstanding loan in last calendar year *t-1*. The column (2) reports the percentage of borrowers that switch completely from Big-five banks to Joint-equity banks. The column (3) reports the average value of borrowing shares from Joint-equity banks at firm-year level with respect to outstanding loan amount and the column (4) reports with respect to new loan issuance. Column (5) presents the frequency of firm-year observations with expansions in borrowing shares from joint equity banks.

	(1)		(2)		(3)		(4)		(5)	
	% borrowers without outstanding loans		% borrowers with complete switch		% outstanding loans from Joint-equity banks		% new loans from Joint-equity banks		Intensive margin growth for Joint-equity banks (%)	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2007	3,754	26.27	40,037	0.53	51,658	22.42	12,865	24.00	47,504	16.01
2008	5,178	25.88	41,828	0.54	54,915	24.19	16,229	25.78	50,623	18.16
2009	7,076	39.92	50,876	0.86	71,361	29.13	19,470	30.65	61,997	18.70
2010	7,633	33.55	55,797	0.87	80,029	33.59	20,443	31.75	70,024	24.28
2011	10,937	34.00	61,365	0.77	90,737	37.11	26,028	36.09	79,198	27.98
2012	12,414	30.42	68,068	0.83	103,994	39.95	28,516	37.46	90,968	31.35

Table 4: The Impact of Bank Expansion on Firms' Borrowing Decisions

This table presents the regression estimates of difference-in-difference analysis on the impact of national policy shock in bank expansion on firms' borrowing decisions. The overall sample includes 19,465,816 firm-bank-year observations. Panel A reports the regression results based on outstanding loans. The dependent variable in the first five columns of Panel A is Borrowing Shares_{kijt}, calculated as the ratio of the amount of loans issued by bank *j* at the end of year *t* to the total amount of loans issued by all banks. The dependent variable in the last two columns of Panel A is the year-to-year change in borrowing shares. Panel B presents the coefficients estimates based on new loan issuances. The dependent variable in the first five columns of Panel B is Borrowing Shares_{kijt}, calculated as the ratio of the amount of loans granted by bank *j* during the year *t* to the total amount of loans granted by all banks in year *t*. The dependent variable in the last two columns of Panel B is the year-to-year change in borrowing shares. All regressions include the Bank-, Firm-, and Year-fixed effects. In each panel, the column (1) reports the regression estimates for subsample during 2008 to 2009 (one-year event window), the column (2) reports the regression estimates for subsample during 2007 to 2010 (two-year event window), the column (3) reports the regression estimates for subsample during 2006 to 2011 (three-year event window), the columns (4) and (6) report the regression estimates for subsample from joint-equity banks, and the columns (5) and (7) are for the overall sample estimates. All other variables are defined in the appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. Standard errors are clustered at the city level and the robust *t*-statistics are reported in parentheses across all these model specifications.*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Borrowing shares based on outstanding loans

	Dependent Variable: Outstanding Shares, OLS						
	Extensive and Intensive Margin					Intensive Margin	
Variables	(1) [2008,2009]	(2) [2007,2010]	(3) [2006,2011]	(4) All Joint-equity banks	(5) All banks	(6) All Joint-equity banks	(7) All banks
Treatment*Exposure	0.004***	0.006***	0.008***	0.010***	0.014***	0.001**	0.002***
	(10.15)	(12.13)	(14.23)	(16.23)	(18.17)	(2.22)	(4.35)
Exposure	0.004***	0.003***	0.003***	0.003***	0.001	0.002***	0.001**
	(5.40)	(4.49)	(3.75)	(3.08)	(1.52)	(5.42)	(2.26)
Firm FE	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Observations	3,435,144	6,870,288	10,305,432	13,740,576	19,465,816	7,832,328	11,095,798
Adjusted R-squared	0.006	0.006	0.008	0.011	0.031	0.002	0.002

Panel B: Borrowing shares based on loan issuances

	Dependent Variable: New Issuance Shares, OLS						
	Extensive and Intensive Margin					Intensive Margin	
Variables	(1) [2008,2009]	(2) [2007,2010]	(3) [2006,2011]	(4) All Joint-equity banks	(5) All banks	(6) All Joint-equity banks	(7) All banks
Treatment*Exposure	0.004***	0.006***	0.007***	0.009***	0.009***	0.002***	0.010***
	(11.17)	(10.63)	(11.78)	(13.28)	(11.97)	(3.92)	(14.51)
Exposure	0.004***	0.004***	0.003***	0.003**	0.003**	-0.000	-0.008***
	(4.66)	(4.03)	(3.07)	(2.52)	(2.45)	(-0.78)	(-12.72)
Firm FE	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Observations	3,787,440	7,574,880	9,468,600	13,256,040	18,779,390	8,350,980	11,830,555
Adjusted R-squared	0.006	0.007	0.009	0.011	0.023	0.002	0.003

Table 5: Incumbent banks versus New-entry banks

This table provides the differences in loan- and firm-level characteristics between incumbent banks and new-entry banks. The new-entry banks in a city are defined as those of which their earliest branches in this city are opened up less than 12 months prior to the loan issuing month. *Loan Amount* is loan balance in unit of 100 Million RMB, *Maturity* is in unit of months, *Internal Rating* measures the five-category loan classification, *Guarantee Requirement* is a dummy indicating whether the loan is guaranteed by third-parties, *Delinquent* is a dummy indicating whether the loan is repaid after due date, and *Default* is a dummy indicating whether the loan is repaid three months after due date. *Assets* measures the size of borrowers in unit of 100 Million RMB while *Leverage* for financial conditions. We winsorize each of the above variables at the top and bottom 1% to reduce the effects of outliers. *T*-tests are also performed to show the statistical significance of the mean differences and *t*-statistics are reported in the last column. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Incumbent Banks			New-entry Banks				
	N	Mean	Median	N	Mean	Median	Diff	*t*-statistics
	Overall Sample							
Loan Amount (100 Million RMB)	6,063,386	15.000	4.000	26,444	23.294	10.000	-8.294***	-43.40
Maturity	6,063,386	11.996	6.000	26,444	12.669	7.000	-0.673***	-5.77
Internal Rating	6,063,386	1.027	1.000	26,444	1.007	1.000	0.020***	32.40
Guarantee Requirement	6,063,386	0.218	0.000	26,444	0.325	0.000	-0.107***	-42.03
Delinquent	6,063,386	0.014	0.000	26,444	0.007	0.000	0.006***	12.04
Default	4,933,421	0.011	0.000	21,747	0.006	0.000	0.006***	11.30
Assets (100 Million RMB)	6,017,234	69.313	8.120	26,358	44.414	9.141	24.899***	12.06
Leverage	6,017,234	0.605	0.604	26,358	0.587	0.587	0.019***	3.19
	Joint-equity Bank subsample							
Loan Amount (100 Million RMB)	1,547,757	14.436	3.353	23,032	24.141	10.000	-9.705***	-48.07
Maturity	1,547,757	8.984	6.000	23,032	12.321	7.000	-3.337***	-33.07
Internal Rating	1,547,757	1.009	1.000	23,032	1.004	1.000	0.005***	10.57
Guarantee Requirement	1,547,757	0.248	0.000	23,032	0.338	0.000	-0.090***	-31.27
Delinquent	1,547,757	0.007	0.000	23,032	0.007	0.000	0.001	1.07
Default	1,265,172	0.006	0.000	19,056	0.005	0.000	0.001*	1.68
Assets (100 Million RMB)	1,540,610	76.793	8.545	22,957	43.877	9.575	32.916***	9.42
Leverage	1,540,610	0.631	0.634	22,957	0.586	0.585	0.045***	41.39

Table 6: The Impact of Bank Expansion on Joint-equity Loan Characteristics

This table reports the difference-in-difference regression estimates of the bank expansion effect on Joint-equity loan contract characteristics. The sample covers 1,570,789 loans granted by Joint-equity banks. The dependent variables are non-pricing terms of loan contracts, including the loan maturity, internal ratings, third-party guarantee requirement, the ex-post loan performance (i.e. over 90 days delinquent) and relationship borrowing dummy (i.e. a dummy indicating whether the borrower has a lending relationship with the borrowing bank during the prior 12 months). The main independent variable is the interaction, *Treatment*Exposure*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated bank-cities and zero for controlled bank-cities. According to the policy, an eligible bank *k* in city *j* free of regulation on new-branch entry is a bank that have outstanding branches in this city or in the capital city of the province that the city *j* is located in prior to the bank expansion policy shock. All other variables are defined in the appendix Table A1. Firm-, Bank-, and Year-fixed effects are included across all models. Standard errors are clustered at the city level. The robust *t*-statistics for OLS regressions and robust *z*-statistics for Logit regressions are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	DID Regressions				
	Log(Maturity)	Rating	Guaranteed	Default	Relationship
Variables	(1)	(2)	(3)	(4)	(5)
Treatment*Exposure	0.038***	-0.006***	0.002**	-0.001*	0.026**
	(3.99)	(-2.64)	(2.31)	(-1.95)	(2.00)
Exposure	-0.057	0.008**	0.011	0.004	0.014
	(-1.52)	(2.16)	(0.24)	(1.06)	(1.15)
Log(Assets)	0.010*	-0.004**	-0.004	-0.000	0.042***
	(1.85)	(-2.32)	(-0.75)	(-0.84)	(3.19)
Leverage	-0.073***	0.008	-0.015	0.001	0.108***
	(-2.67)	(1.56)	(-0.59)	(0.14)	(3.38)
Firm FE	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	1,570,789	1,570,789	1,570,789	1,570,789	1,570,789
Number of firms	70,788	70,788	70,788	56,175	70,788
Adjusted R-squared	0.015	0.002	0.025	0.002	0.032

Table 7: Reactions of Incumbent Banks to Competitions

This table reports the difference-in-difference regression estimates on how big five banks react to the bank expansion caused by new-entries of Joint-equity commercial banks. The sample covers 4,519,041 loans granted by Big-five banks. The dependent variables are non-pricing terms of loan contracts, including the loan maturity, internal ratings, third-party guarantee requirement, the ex-post loan performance (i.e. over 90 days delinquent) and relationship borrowing dummy (i.e. a dummy indicating whether the borrower has a lending relationship with the borrowing bank during the prior 12 months). Our main independent variable is *Treatment*Exposure*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated cities and zero for controlled cities. According to the policy, an eligible city *j* free of regulation on new-branch entry is the city that have outstanding Joint-equity branches prior to the bank expansion policy shock. All other variables are defined in the appendix Table A1. Firm-, Bank-, and Year-fixed effects are included across all models. Standard errors are clustered at the city level. The robust *t*-statistics for OLS regressions and robust *z*-statistics for Logit regressions are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	DID Regressions				
	Log(Maturity)	Rating	Guaranteed	Default	Relationship
Variables	(1)	(2)	(3)	(4)	(5)
Treatment*Exposur	0.014***	-0.004***	-0.007**	0.001**	0.052***
	(13.12)	(-11.66)	(-2.04)	(2.28)	(5.53)
Log(Assets)	0.021***	-0.013***	-0.009***	-0.002***	0.050***
	(24.92)	(-48.40)	(-16.42)	(-7.77)	(8.94)
Leverage	-0.062***	0.048***	0.010***	0.005***	0.110***
	(-17.89)	(44.09)	(4.56)	(6.40)	(9.48)
Firm FE	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	4,519,041	4,519,041	4,519,041	4,519,041	4,519,041
Number of firms	105,461	105,461	105,461	84,053	105,461
Adjusted R-squared	0.004	0.004	0.010	0.006	0.025

Table 8: Comparisons in Firm Characteristics: Incumbent versus New Entry Banks

This table explores more firm characteristics after merging with CIC dataset and reports the comparisons between borrowers in incumbent banks and borrowers in new-entry banks. The new-entry banks in a city are defined as those of which their earliest branches in this city are opened up less than 12 months prior to the loan issuing month. *SOE Dummy* is coded on firm registration type, *ROA* is return on assets, *TFP* is total factor productivity of the firm, *Assets* and *Fixed Assets* are in unit of 100 million RMB, *# Employees* is the number of employees, Leverage is liability-asset ratio, *Age* is unit of years, *Lower Hierarchy* is a dummy indicating whether the firm is affiliated with city-or-below governments. We winsorize each of the above continuous variables at the top and bottom 1% to reduce the effects of outliers. *T*-tests are also performed to show the statistical significance of the mean differences and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		SOE Dummy	ROA	TFP	Assets	Fixed Assets	# Employees	Leverage	Age	Lower Hierarchy
Panel A: Overall Sample										
New Entry	N	2,376	2,369	2,343	2,376	2,373	2,343	2,371	2,374	2,376
	Mean	0.098	0.076	2.646	36.139	14.549	2146.079	0.647	14.214	0.856
	Median	0.000	0.041	1.849	11.282	3.238	700.000	0.662	10.000	1.000
Incumbent	N	164,626	164,274	163,257	164,626	164,414	163,284	164,352	164,598	164,626
	Mean	0.103	0.063	2.333	26.369	10.831	1731.397	0.637	14.105	0.836
	Median	0.000	0.036	1.659	6.952	1.835	588.000	0.649	11.000	1.000
	Mean Diff	-0.004	0.014***	0.312***	9.770***	3.717***	414.682***	0.010**	0.109	0.020***
	T-statistics	(-0.68)	(6.41)	(4.52)	(7.24)	(5.81)	(5.05)	(2.39)	(0.42)	(2.62)
Panel B: Big Five Bank subsample										
New Entry	N	361	361	357	361	361	357	361	361	361
	Mean	0.141	0.059	2.246	41.331	18.956	2366.221	0.669	12.116	0.729
	Median	0.000	0.031	1.510	13.166	4.654	590.000	0.680	9.000	1.000
Incumbent	N	121,423	121,150	120,443	121,423	121,263	120,469	121,204	121,400	121,423
	Mean	0.107	0.064	2.309	25.635	11.001	1749.708	0.632	14.051	0.829
	Median	0.000	0.037	1.646	6.797	1.948	598.000	0.644	10.000	1.000
	Mean Diff	0.034**	-0.004	-0.063	15.696***	7.955***	616.513***	0.037***	-1.934***	-0.100***
	T-statistics	(2.08)	(-0.77)	(-0.34)	(4.67)	(4.89)	(2.92)	(3.47)	(-2.89)	(-5.05)
Panel C: Joint-equity Bank subsample										
New Entry	N	2,015	2,008	1,986	2,015	2,012	1,986	2,010	2,013	2,015
	Mean	0.091	0.079	2.717	35.209	13.758	2106.507	0.643	14.590	0.879
	Median	0.000	0.044	1.911	11.035	3.060	719.500	0.659	11.000	1.000
Incumbent	N	43,203	43,124	42,814	43,203	43,151	42,815	43,148	43,198	43,203
	Mean	0.090	0.060	2.403	28.429	10.354	1679.877	0.652	14.257	0.857
	Median	0.000	0.033	1.700	7.478	1.536	560.000	0.667	11.000	1.000
	Mean Diff	0.001	0.020***	0.315***	6.779***	3.404***	426.630***	-0.009*	0.333	0.022***
	T-statistics	(0.18)	(8.34)	(4.74)	(4.29)	(4.79)	(4.78)	(-1.92)	(1.18)	(2.78)

Table 9: Bank Expansions Effect on Firms

This table reports the difference-in-difference regression estimates on the effect of 2009 bank entry deregulation on firm activities and performance. We merge the Chinese Industry Census firm level data with the CBRC loan data and restrict our sample to the firms which have had outstanding bank loans between 2006 and 2012. The dependent variable in column 1 is the logarithm of total assets of the firm. Column 2 is the logarithm of fixed assets of the firm. Column 3 is the logarithm of total liabilities. Column 4 is the leverage of the firm. Column 5 is the logarithm of total sales. Column 6 is the logarithm of total number of workers in the firm. Column 7 is the ROA (Return on Assets) of the firm. Column 8 is the TFP (Total Factor Productivity) of the firm. Our main independent variable is *Treatment*Exposure*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated cities (at least one joint equity bank can open branches freely in that city after the deregulation, i.e., the city that have outstanding Joint-equity branches prior to the bank expansion policy shock) and zero for controlled cities. Pre-Trend$_{t-1}$ and Pre-Trend$_{t-2}$ are for parallel pre-trends, where Pre-Trend$_{t-1}$ equals year dummy for 2008 times dummy *Exposure* and Pre-Trend$_{t-2}$ equals year dummy for 2007 times dummy *Exposure*. All regressions are controlled for firm fixed effect and year fixed effect. Standard errors are clustered at firm level and the robust *t*-statistics are reported in parentheses across all these model specifications. .*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log(Assets)	Log(Fixed Assets)	Log(Liabilities)	Leverage	Log(Sales)	Log(Employee)	ROA	TFP
Treatment*Exposure	0.072*	0.136*	0.177**	-0.031***	-0.089	0.153**	0.022***	0.142**
	(1.70)	(1.79)	(2.32)	(-2.87)	(-1.40)	(2.49)	(4.02)	(2.04)
Pre-Trend$_{t-1}$	-0.088	-0.007	-0.127*	-0.014	-0.116*	0.080	0.004	0.074
	(-1.48)	(-0.10)	(-1.74)	(-1.24)	(-1.94)	(1.60)	(0.62)	(0.50)
Pre-Trend$_{t-2}$	-0.046	-0.033	-0.083	-0.009	0.007	0.033	0.000	0.182
	(-0.88)	(-0.52)	(-1.33)	(-1.01)	(0.13)	(0.67)	(0.03)	(1.54)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226,533	226,172	226,504	226,141	226,503	224,728	226,039	224,698
Number of firms	50,182	50,157	50,181	50,120	50,173	49,839	50,102	49,830
Adjusted R-squared	0.236	0.081	0.162	0.002	0.200	0.031	0.006	0.002

Table 10: State Ownership and Bank Expansions Effect on Firms

This table exploits the impact of state ownership on Joint-equity bank expansions using the triple difference regression estimates. We merge the Chinese Industry Census firm level data with the CBRC loan data and restrict our sample to the firms which have had outstanding bank loans between 2006 and 2012. The dependent variable in column 1 is the logarithm of total assets of the firm. Column 2 is the logarithm of fixed asset of the firm. Column 3 is the logarithm of total liabilities. Column 4 is the leverage of the firm. Column 5 is the logarithm of total sales. Column 6 is the logarithm of total number of workers in the firm. Column 7 is the ROA (Return on Assets) of the firm. Column 8 is the TFP (Total Factor Productivity) of the firm. Our main independent variable is *Treatment*Exposure*Private*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated cities (at least one joint equity bank can open branches freely in that city after the deregulation, i.e., the city that have outstanding Joint-equity branches prior to the bank expansion policy shock) and zero for controlled cities. Pre-Trend$_{t-1}$ and Pre-Trend$_{t-2}$ are for parallel pre-trends, where Pre-Trend$_{t-1}$ equals year dummy for 2008 times dummy *Exposure* and Pre-Trend$_{t-2}$ equals year dummy for 2007 times dummy *Exposure*. Dummy *Private* is for whether the firm is privately owned or not based on its registration type, excluding firms that were privatized from SOEs. All regressions are controlled for firm fixed effect and year fixed effect. Standard errors are clustered at firm level and the robust *t*-statistics are reported in parentheses across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log(Assets)	Log(Fixed Assets)	Log(Liabilities)	Leverage	Log(Sales)	Log(Employee)	ROA	TFP
Treatment*Exposure*Private	0.178***	0.116***	0.157***	-0.009***	0.123***	0.288***	0.006***	0.275***
	(12.02)	(6.37)	(8.69)	(-2.77)	(8.12)	(14.34)	(3.02)	(2.67)
Treatment*Exposure	-0.064***	0.101***	0.119***	-0.023**	-0.201***	-0.109*	0.016***	-0.108
	(-4.03)	(3.09)	(4.09)	(-2.04)	(-3.07)	(-1.70)	(2.89)	(-0.26)
Pre-Trend$_{t-1}$	-0.087	-0.006	-0.126*	-0.014	-0.115*	0.082	0.004	0.076
	(-1.45)	(-0.09)	(-1.72)	(-1.24)	(-1.92)	(1.64)	(0.63)	(0.51)
Pre-Trend$_{t-2}$	-0.045	-0.032	-0.082	-0.009	0.008	0.035	0.000	0.183
	(-0.85)	(-0.50)	(-1.31)	(-1.01)	(0.15)	(0.71)	(0.04)	(1.15)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226,533	226,172	226,504	226,141	226,503	224,728	226,039	224,698
Number of firms	50,182	50,157	50,181	50,120	50,173	49,839	50,102	49,830
Adjusted R-squared	0.237	0.082	0.163	0.002	0.200	0.035	0.006	0.002

Table 11: Borrowing Relationship and Bank Expansions Effect on Firms

This table exploits the impact of borrowing relationship on Joint-equity bank expansions using the triple difference regression estimates. We merge the Chinese Industry Census firm level data with the CBRC loan data and restrict our sample to the firms which have had outstanding bank loans between 2006 and 2012. The dependent variable in column 1 is the logarithm of total assets of the firm. Column 2 is the logarithm of fixed asset of the firm. Column 3 is the logarithm of total liabilities. Column 4 is the leverage of the firm. Column 5 is the logarithm of total sales. Column 6 is the logarithm of total number of workers in the firm. Column 7 is the ROA (Return on Assets) of the firm. Column 8 is the TFP (Total Factor Productivity) of the firm. Our main independent variable is *Treatment*Exposure*Transaction Share*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated cities (at least one joint equity bank can open branches freely in that city after the deregulation, i.e., the city that have outstanding Joint-equity branches prior to the bank expansion policy shock) and zero for controlled cities. Pre-Trend$_{t-1}$ and Pre-Trend$_{t-2}$ are for parallel pre-trends, where Pre-Trend$_{t-1}$ equals year dummy for 2008 times dummy *Exposure* and Pre-Trend$_{t-2}$ equals year dummy for 2007 times dummy *Exposure*. *Transaction Share* is the percentage of transaction loan issuance amounts prior to 2009 (i.e., 2007 and 2008) over the total new issuance loan amounts of each firm. All regressions are controlled for firm fixed effect and year fixed effect. Standard errors are clustered at firm level and the robust *t*-statistics are reported in parentheses across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log(Assets)	Log(Fixed Assets)	Log(Liabilities)	Leverage	Log(Sales)	Log(Employee)	ROA	TFP
Treatment*Exposure*Transaction Share	0.450***	0.109***	0.104***	0.030***	0.442***	0.341***	0.006***	0.124***
	(53.50)	(42.41)	(51.45)	(14.69)	(46.86)	(31.72)	(4.89)	(2.79)
Treatment*Exposure	-0.313***	0.152***	0.141***	-0.050***	-0.386***	-0.078	0.016***	0.076
	(-6.55)	(5.97)	(7.24)	(-4.64)	(-6.20)	(-1.26)	(3.04)	(0.55)
Pre-Trend$_{t-1}$	-0.083	0.002	-0.117*	-0.013	-0.113*	0.085*	0.003	0.006
	(-1.45)	(0.03)	(-1.69)	(-1.19)	(-1.95)	(1.70)	(0.47)	(0.05)
Pre-Trend$_{t-2}$	-0.034	-0.032	-0.063	-0.009	-0.003	0.031	-0.000	0.090
	(-0.68)	(-0.50)	(-1.04)	(-0.99)	(-0.05)	(0.63)	(-0.09)	(0.94)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226,533	226,172	226,504	226,141	226,503	224,728	226,039	224,698
Number of firms	50,182	50,157	50,181	50,120	50,173	49,839	50,102	49,830
Adjusted R-squared	0.284	0.110	0.205	0.004	0.234	0.044	0.006	0.005

Appendix

Table A1: Variables' Definition and Construction

Variables	Definitions
Treatment	A dummy variable that equals one if it is after the deregulation shock and zero otherwise.
Exposure	A dummy variable at city-bank level takes value of one if the joint-equity bank has outstanding branches in this city or in its capital city of the province prior to the bank expansion policy shock and zero otherwise.
Loan Size (Million RMB)	The balance of each loan contract. The unit is in million RMB.
Maturity	The term of each loan contract. The unit is months.
Internal Rating	The credit score placed by the loan officers in the bank. The larger the number, the worse the credit quality of the obligor.
Guarantee Requirement	A dummy variable that equals one if the bank requires third-party guarantee protections and zero otherwise.
Relationship	A dummy variable that equals one if the bank had a lending relationship with the firm during the prior 12 months and zero otherwise.
Delinquent	A loan performance measure that equals one if the loan is not repaid on time and zero otherwise.
Default	A loan performance measure that equals one if the loan is not repaid over three months after due date and zero otherwise.
Assets (Million RMB)	The total assets of firms. The unit is in million RMB.
Fixed Assets (Million RMB)	The amount of fixed assets. The unit is million RMB.
Liabilities (Million RMB)	The total liabilities of firms. The unit is in million RMB.
Leverage	Book leverage, measured as the ratio of total liabilities over total assets.
Sales (Million RMB)	The total amount of sales. The unit is in million RMB.
Employee	The amount of employment.
ROA	It is calculated by dividing a firm's annual earnings by its total asset in the same year.
TFP	A measure of firm level efficiency, i.e. total factor productivity.
Local GDP	It is the city level GDP.
Fixed Investment/Local GDP	The fixed assets investment divided by local gross domestic production.
Fiscal Expenditure/Revenues	The fiscal condition measured as the ratio of government expenditures over government revenues.

Table A2: Provincial Distributions of Joint-equity Banks

This table shows the snapshot distribution of joint-equity banks on April 2009 (right before the deregulation). The table has 31 rows for 31 provinces respectively. For each province, there are four columns: (1) total number of branches of all 12 joint-equity banks, (2) total number of unique joint equity banks, (3) total number of unique joint equity banks which have branches in its capital city and (4) the number of cities.

	(1)	(2)	(3)	(4)
Province	No. Joint-equity Branches	No. Joint-equity Banks	No. Joint-equity Banks in Capital City	No. Cities
Beijing	332	10	10	1
Tianjin	128	10	10	1
Hebei	49	6	5	11
Shanxi	53	8	8	11
Inner Mongolia	14	4	4	9
Liaoning	206	9	7	14
Jilin	13	4	4	8
Heilongjiang	55	6	5	13
Shanghai	379	10	10	1
Jiangsu	311	11	11	13
Zhejiang	396	12	12	11
Anhui	50	6	6	18
Fujian	237	8	8	9
Jiangxi	29	4	4	11
Shandong	291	10	10	17
Henan	94	7	7	17
Hubei	127	8	8	14
Hunan	72	6	6	14
Guangdong	926	9	9	21
Guangxi	20	6	6	14
Hainan	14	2	2	3
Chongqing	119	8	8	1
Sichuan	117	11	11	21
Guizhou	0	0	0	9
Yunnan	104	9	9	16
Xizang	0	0	0	7
Shannxi	89	8	8	10
Gansu	17	2	2	14
Qinghai	0	0	0	8
Ningxia	0	0	0	5
Xinjiang	26	4	4	15

Table A3: Comparisons in Firm Characteristics: Incumbent versus New Entry Banks

This table reports the robustness checks on Table 8. The new-entry banks in a city are defined as those of which their earliest branches in this city are opened up less than 36 months prior to the loan issuing month. *SOE Dummy* is coded on firm registration type, *ROA* is return on assets, *TFP* is total factor productivity of the firm, *Assets* and *Fixed Assets* are in unit of 100 million RMB, *# Employees* is the number of employees, Leverage is liability-asset ratio, *Age* is unit of years, *Lower Hierarchy* is a dummy indicating whether the firm is affiliated with city-or-below governments. We winsorize each of the above continuous variables at the top and bottom 1% to reduce the effects of outliers. *T*-tests are also performed to show the statistical significance of the mean differences and *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		SOE Dummy	ROA	TFP	Assets	Fixed Assets	# Employees	Leverage	Age	Lower Hierarchy
Panel A: Overall Sample										
New Entry	N	18,677	18,609	18,486	18,677	18,632	18,496	18,623	18,669	18,677
	Mean	0.100	0.074	2.734	36.535	15.253	2379.078	0.647	14.380	0.850
	Median	0.000	0.042	1.810	11.265	3.166	739.000	0.660	10.000	1.000
Incumbent	N	157,517	157,180	156,238	157,517	157,329	156,265	157,251	157,493	157,517
	Mean	0.104	0.062	2.317	26.087	10.753	1727.579	0.637	14.120	0.835
	Median	0.000	0.036	1.651	6.869	1.818	588.000	0.649	11.000	1.000
	Mean Diff	-0.003	0.012***	0.417***	10.448***	4.500***	651.499***	0.010***	0.260***	0.015***
	T-statistics	(-1.32)	(15.56)	(6.57)	(20.39)	(18.49)	(20.65)	(6.49)	(2.64)	(5.34)
Panel B: Big Five Bank subsample										
New Entry	N	2,275	2,268	2,256	2,275	2,272	2,256	2,270	2,273	2,275
	Mean	0.131	0.063	2.163	40.963	18.892	2682.274	0.655	13.164	0.713
	Median	0.000	0.034	1.540	12.798	4.488	700.000	0.666	9.000	1.000
Incumbent	N	120,621	120,349	119,647	120,621	120,462	119,673	120,402	120,600	120,621
	Mean	0.107	0.063	2.307	25.563	10.974	1747.919	0.632	14.062	0.829
	Median	0.000	0.037	1.646	6.781	1.942	598.000	0.644	10.000	1.000
	Mean Diff	0.023***	0.000	-0.143**	15.400***	7.918***	934.355***	0.023***	-0.898***	-0.116***
	T-statistics	(3.53)	(-0.03)	(-1.96)	(11.37)	(12.06)	(10.97)	(5.41)	(-3.34)	(-14.49)
Panel C: Joint-equity Bank subsample										
New Entry	N	16,402	16,341	16,230	16,402	16,360	16,240	16,353	16,396	16,402
	Mean	0.096	0.076	2.813	35.920	14.748	2336.959	0.646	14.548	0.869
	Median	0.000	0.043	1.851	11.097	3.010	743.000	0.659	11.000	1.000
Incumbent	N	36,896	36,831	36,591	36,896	36,867	36,592	36,849	36,893	36,896
	Mean	0.091	0.057	2.349	27.800	10.033	1661.056	0.653	14.310	0.853
	Median	0.000	0.031	1.668	7.231	1.444	554.000	0.667	11.000	1.000
	Mean Diff	0.005	0.019***	0.464***	8.120***	4.715***	675.903***	-0.007***	0.238**	0.016***
	T-statistics	(1.57)	(19.77)	(3.54)	(12.19)	(15.52)	(17.20)	(-3.56)	(2.01)	(4.79)

Table A4: Bank Expansions Effect on All Firms

This table reports the difference-in-difference regression estimates on the effect of Joint-equity bank expansions on firms. The sample is restricted to all manufacturing firms in Chinese Industry Census data from 2006 to 2012. The dependent variable in column 1 is the logarithm of total assets of the firm. Column 2 is the logarithm of fixed asset of the firm. Column 3 is the logarithm of total liabilities. Column 4 is the leverage of the firm. Column 5 is the logarithm of total sales. Column 6 is the logarithm of total number of workers in the firm. Column 7 is the ROA (Return on Assets) of the firm. Column 8 is the TFP (Total Factor Productivity) of the firm. Our main independent variable is *Treatment*Exposure*, where *Treatment* equals one for observations after the policy shock in April 16, 2009 and zero before and *Exposure* equals one for treated cities and zero for controlled cities. According to the policy, an eligible city *j* free of regulation on new-branch entry is the city that have outstanding Joint-equity branches prior to the bank expansion policy shock. Column 1 to 8 are controlled by firm fixed effect and year fixed effect. Standard errors are clustered at firm level and the robust *t*-statistics are reported in parentheses across all these model specifications. .*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log(Assets)	Log(Fixed Assets)	Log(Liabilities)	Leverage	Log(Sales)	Log(Employee)	ROA	TFP
Treatment*Exposure	0.067***	0.093***	0.017	-0.018***	0.110***	0.126***	0.010***	0.638***
	(6.54)	(7.06)	(1.22)	(-6.67)	(10.78)	(12.18)	(6.00)	(7.23)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,086,333	2,078,597	2,084,805	2,079,898	2,086,212	2,055,139	2,079,673	2,055,018
Number of firms	596,278	595,369	595,967	594,434	596,243	588,070	594,400	588,035
Adjusted R-squared	0.223	0.078	0.105	0.006	0.278	0.149	0.023	0.013