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

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Abstract

Using proprietary individual level loan data and population bank branch data, this paper documents the economic consequences of the 2009 bank entry deregulation in China. We find that the deregulation leads to higher screening standards, lower interest rates, and lower delinquency rates of the loans from the new entrant banks. The incumbent state-owned banks do not respond much to the deregulation. Consequently, for the firms with bank credit access, the deregulation leads to increases in asset investment, employment, net income, and ROA in deregulated cities. These positive effects on loan terms and firm activities are more pronounced for private firms than state-owned enterprises (SOEs). In contrast, the deregulation amplifies bank credit from productive private firms to inefficient SOEs due mainly to SOEs' soft budget constraint. This unintended adverse effect accounts for 0.31% annual GDP loss.

Keywords: Banking Deregulation; Credit Allocation; Growth; China

JEL Classification: G21, G28, L50, O40

1. Introduction

Banks are the most important financial intermediaries in many countries and play an essential role in economic growth while banking sectors are often heavily regulated across the globe (e.g., Barth, Caprio, and Levine (2013)). A closely related central question in debate is whether bank competition is desirable or not. The existing empirical evidence is mixed. For example, increased bank competition could be beneficial to borrowers by lowering borrowing costs but it could also lead to negative consequences such as risk-taking and decreased efforts from banks in information collection.[1] Due mainly to data limitations, most previous studies have estimated the overall net effects of increased competition in the banking sector without disentangling its benefits and costs.

This paper uses individual loan level data to separate the various effects of increased bank competition in China, the biggest bank loan market worldwide.[2] We find that bank entry deregulation and consequently increased competition leads to better loan contract terms which benefit borrowers and result in higher growth and profitability. Moreover, internal loan ratings as indicators of quality increase and subsequent loan defaults decrease. Thus, the potential negative effect of competition is not in the data (e.g., risk-seeking). However, there remains a distortion in China's economy which is made worse; the deregulation amplifies bank credit from productive private firms to inefficient state-owned enterprises (SOEs). This is a novel trade-off in banking deregulation as we clarify and contribute to the on-going debate.

More specifically, we study the impacts of the 2009 partial bank entry deregulation on bank competition dynamics and consequent economic activities. The big five state-owned commercial banks have dominated China's banking system with 51,557 branches covering 85% of the country while the twelve joint equity banks were suppressed severely in competition with only 4,161 branches covering 9% of the country in 2008.[3] The joint equity banks were restricted to expand and were allowed to apply for only one branch in

[1] See, for example, the survey papers; Berger et al. (2004) and Allen et al. (2001).
[2] The total amount of bank loans in China reached USD19.6 trillion in Feb 2018, which ranks number one across the globe. The U.S. ranks the second, with USD9.1 trillion (https://www.ceicdata.com/en).
[3] In China, we can mainly categorize banks into three groups: the big five commercial banks in the top hierarchy, twelve joint equity banks in the middle, and 131 local municipal banks at the bottom. See Section 2 for a detailed discussion.

one city after 2006. In April 2009, the China Banking Regulatory Commission (CBRC) partially lifted this entry barrier and allowed joint equity banks to open branches freely in a city where they have already established branches. The joint equity banks were also allowed to freely enter all the cities in a province if they have branches in the provincial capital city. For joint equity banks, 38.5% of the city-bank pairs were deregulated while others are still under the 2006 entry barrier regulation.

The 2009 deregulation provides a Difference-in-Differences (DID) empirical setting. In particular, the joint equity banks that are still in regulated cities and the big five banks that are in cities where no equity banks were allowed to expand are mostly immune to the deregulation shock and serve as the control group. Different banks have different exposures to the shock even within the same city, and this depends on banks' pre-determined branch distributions. The exogenous variation of the deregulation is across banks and cities, and we take care not to confound this with common economic time trends at the national level or in individual cities.[4] We control for the year-, bank-, and firm-fixed effects to mitigate this concern. Moreover, bank lending activities and firm activities move in parallel between deregulated and regulated areas before the shock. In sum, the 2009 deregulation allows us to identify how joint equity banks compete, how big five banks respond, and how firms react across cities with different ex-ante competition levels and quantify these impacts.

Our primary data are from the CBRC which records detailed loan-level information for the seventeen largest commercial banks in China between 2006 and 2013. The loan level data cover all borrowers with an annual credit line over RMB 50 million (approximately US$8 million), which represent about 80% of the total bank loan market in China. Moreover, for each loan, the data record the detailed contract terms such as borrower and lender IDs, loan size, maturity, internal rating, and delinquency. We also match the loan data to the Chinese Industry Census (CIC) firm-level data by firm IDs.

[4] For example, Chinese government initiated the RMB 4 trillion stimulus program in Nov 2008. We find that the growth rates of loans outstanding before the 4 trillion program (i.e., Nov 2008) and before the deregulation (i.e., April 2009) are similar between control and treatment groups.

This allows us to trace out each loan a firm borrowed and study how firms react to the deregulation regarding their investments, employment, performance, and profitability.

We first document how joint equity banks expand and compete with big five banks. Joint equity banks have been growing substantially since the 2009 deregulation. For example, their market share increased from 24.5% in 2008 to 33.5% in 2010. The percentage of cities covered by joint equity banks significantly increased from 9.5% in 2008 to 15.7% (by 65.3%) in 2010 while the big five barely increased their coverage (by only 2%) over the same period. The regressions of the lending amount on the shock show results that are consistent with these unconditional patterns. Furthermore, when joint equity banks enter, the expansion is limited on the extensive margin. Approximately 88% of the loans go to the firms that have been borrowing from local incumbent banks.

Second, we study how deregulation affects the loan contract terms and loan performance. The DID regressions show that the 2009 deregulation leads to significantly lower interest rates, better internal loan ratings, more third-party guarantees, and lower default rates for joint equity bank loans in their deregulated cities. These effects are mainly from private firms rather than SOEs. In particular, the 2009 deregulation leads to a 6.6% decrease in the interest rates for private firms but no significant effects on SOEs' borrowing costs. The deregulation also leads to a 0.5% increase in the internal loan ratings for private firms but not for SOEs. Moreover, the percentage of loans to private firms that need guarantees increases by 9.1% while the increase is only 5.8% for SOE loans. Consequently, with the higher screening standard of the new entrant joint equity banks, the deregulation leads to a 77.7% decrease in the default rates of private firm loans while the default rates of SOEs do not change significantly. The higher lending standard is not employed for SOEs in China since they have soft budget constraints (i.e., implicit government guarantees).

Third, we explore the effects of the 2009 deregulation on firm activities. We restrict our sample to the firms that have ever borrowed from banks, as those firms should be affected directly by the loan contract term changes caused by the deregulation. The DID regressions show that the 2009 deregulation leads to increases in growth rates of fixed assets and number of employees by 21.3% and 8.1%, respectively. Besides the higher

growth in size, the deregulation also leads to increases in firms' net income growth and ROA by 44.0% and 1.8%, respectively. Moreover, the pre-trend dummies have insignificant coefficients which further supports the parallel trend assumption. We also find that the positive effects of the deregulations on borrowers are more pronounced in the cities with higher Herfindahl-Hirschman Index (HHI) ex-ante or in the cities where new entrant joint equity banks have larger total assets. Thus, the deregulation is more effective in previously less competitive areas or when entrant banks are more powerful.

We then perform a back-of-the-envelope calculation. In particular, as noted, the deregulation leads to a 21.3% increase in fixed assets, which equals an RMB 45 million annual increase. The average loans outstanding per firm is RMB 350 million. Thus, by the ratio, the deregulation leads to an RMB 0.13 increase in fixed assets for every RMB 1 loan outstanding. As the total loans outstanding of private firms in CIC was RMB 3 trillion in 2008, the deregulation led to a total of RMB 390 billion increase in fixed assets. This equals approximately 1.11% of China's GDP in 2008. The economic consequences of the 2009 deregulation are statistically and economically significant.

Next, we explore the negative consequences of the deregulation. The SOEs in China, as in many other countries, are much less efficient (e.g., lower ROA and TFP) than private firms and distort the credit allocation. For example, we find that SOEs take 22% of bank loans but contribute to only 9% of the output in China. Surprisingly, this distortion is more severe for the joint equity banks (23.7% of loans to SOEs) relative to the big five banks (18.5% of loans to SOEs).[5] After the 2009 deregulation, joint equity banks lend even more to SOEs. On average, within one year after the 2009 deregulation, joint equity banks' SOE loans outstanding and shares of SOE loans increased by 35.4% and 13.9%, respectively, in deregulated cities. Among SOEs, the joint equity banks in deregulated cities lend yet significantly more to less efficient ones (i.e., SOEs with lower TFP) which further distort the credit allocation. These less efficient SOEs, on average, have larger assets and rank higher on the political hierarchy (e.g., central government SOEs) that leads to softer budget constraints (i.e., stronger implicit government guarantees).

[5] The big five banks in China have been criticized for their inefficient lending towards SOEs which results in a large amount of nonperforming loans (e.g., Allen, Qian, and Qian (2005)).

Joint equity banks usually do not have much information on local firms when they newly enter into a city so that they prefer to lend to the "safer assets" (i.e., SOEs). In contrast, incumbent big five banks do not change their lending to SOEs significantly after the deregulation so that, overall, more credit flows to SOEs after the deregulation. Furthermore, we find that private firms can benefit from the deregulation significantly more than SOEs can regarding the growth and profitability which means that credit should have been granted to more productive private firms. These results serve to emphasize the potential unintended consequences of banking deregulation in China.

In sum, the deregulation leads to two seemingly opposing effects on the economy. On the bright side, for individual private firms with bank credit access, the deregulation leads to increases in firms' growth and profitability, especially in previously less competitive banking areas. On the dark side, across all firms, the deregulation leads to more credit allocated to inefficient SOEs. This worsening of credit allocation across firms undermined the positive effects of the 2009 deregulation. Another back of the envelope calculation makes the point: the total decrease in fixed assets from the distorted credit allocation caused by the deregulation equals 0.31% GDP loss.[6]

This paper contributes to the literature in three folds. First, our findings add to the literature on the nexus of financial market development and economic growth, especially in the banking sector. Using comprehensive loan-level data, this paper documents the loan-to-loan competition dynamics and disentangles the costs and benefits of the deregulation. This sheds light on mixed evidence of previous empirical studies, which usually do not have the granular data on individual loans and borrowers, and use only aggregate market indicators such as HHI to estimate net effects of bank competition (e.g., Berger and Hannan (1989); Hannan (1991); and Neumark and Sharpe (1992)).[7]

[6] We perform the back-of-the-envelope calculation to estimate the losses from increased SOE lending which should have been granted to private firms. See details in Section 4.5.

[7] Besides banking reform, many studies have shown the positive relationship between financial market development and economic growth. See for example, Gurley and Shaw (1955); Goldsmith (1969); McKinnon (1973); King and Levine (1993a, b); Demirguc-Kunt and Maksimovic (1998); Rajan and Zingales (1998); Levine and Zervos (1998); Levine, Loayza, and Beck (2000); Cetorelli (2003); Cetorelli and Strahan (2006); Bertrand, Schoar, and Thesmar (2007). There are also opposing views and contrary evidence on the harmful effects of financial reform, especially for bank expansion. See, for example, Peterson and Rajan (1994); Berger et al. (1998); Cetorelli (2001); Cetorelli and Gambera (2001); Prasad et al. (2003); Hakenes

Our findings of positive effects of deregulation on individual borrowers reconcile the conventional wisdom that increased bank competition could lower borrowing costs and improve lending efficiency to fuel economic growth (e.g., Jayaratne and Strahan (1996); Smith (1998); Claessens, Demirguc-Kunt, and Huizinga (2001); Barth, Caprio, and Levine (2001, 2004)). In contrast, competition could lead to negative consequences such as increased risks in the banking system (e.g., Keeley (1990); Allen and Gale (2000); Hellman, Murdoch, and Stiglitz (2000); Jiang, Levine, and Lin (2016)) and decreased efforts from banks in loan screening and monitoring (e.g., Peterson and Rajan (1995); Boot and Thakor (2000); Marquez (2002)). [8] We find opposing evidence that deregulation leads to higher screening standards and lower default rates for new entrant joint equity banks. The traditional trade-off in the literature is not present in China (i.e., lower interest rate vs. lower screening efforts and higher risks). We document a new consideration that deregulation leads to lending towards inefficient SOEs. This worse credit allocation is primarily due to SOE's soft budget constraint and serves as a novel and essential cost of banking deregulation in China.

The second contribution of this paper is to estimate the effects of banking deregulation on lending strategies of new entrant banks vs. incumbent banks. The deregulation of bank entry barrier is widely used in empirical studies to explore the economic consequences of increased bank competition (e.g., Jayaratne and Strahan (1996, 1998); Black and Strahan (2002); Dick and Lehnert (2010); Jiang, Levin, and Lin (2016)). We take a step forward to show both sides of the competition: how new entrant banks target borrowers and change loan contract terms and how incumbent banks respond. This supplements the previous studies by providing the micro evidence on both sides of the competition at the individual loan level, which unveil the underlying mechanisms of the economic consequences of bank entry deregulation documented in the literature.

Third, besides China, our findings have policy implications in many other countries. The consolidation of banks is a global phenomenon eliciting many public debates (e.g.,

and Schnabel (2010). Cetorelli and Peretto (2012) argue that the effects of bank competition depend on the market conditions.

[8] Gormley (2010, 2014) show that new entrant banks (e.g., foreign banks) target a specific group of borrowers while the credit access of other firms could be reduced. Consequently, increased competition from new entrant banks could lead to overall adverse effects on growth.

Berger, Demsetz, and Strahan (1999)). China is the second largest economy worldwide whereby its credit allocation is distorted mainly by SOEs and is far from being efficient (e.g., Hsieh and Klenow (2009); Hsieh and Song (2015); Song and Wu (2015)). The primary reason is the soft budget constraint of SOEs that have implicit or explicit government guarantees (e.g., Qian and Roland (1998); Song and Xiong (2017)). This leads to the adverse effects of banking deregulation on credit allocation in China (i.e., new entrant equity banks prefer SOEs). Our results suggest that policymakers should consider the interactions among different frictions in the reform policy. Fixing one distortion (e.g., bank entry restriction) might introduce unintended adverse effects arising from other distortions (e.g., the soft budget constraint of SOEs). This echoes the recent studies arguing that reforms in China could have unintended adverse consequences (e.g., Hachem and Song (2016, 2017); Chen, Petukhov, and Wang (2017); Liu, Wang, and Xu (2017); Wang et al. (2017)).[9] Furthermore, studies have shown that sequencing of financial liberalization matters in many countries, especially in emerging markets (e.g., Chinn and Ito (2006), Kaminsky and Schmukler (2008)). Governments should optimally sequence reforms to minimize the risks and maximize the benefits (e.g., Calvo (1998); Fischer (1998); Prasad et al. (2003)). Policymakers' decisions on banking reforms rely heavily on fully understanding the economic consequences from all dimensions, especially the potential adverse effects as what we find in China.

The rest of this paper is organized as follows. Section 2 describes the institutional background of the banking system in China. Section 3 presents the data and summary statistics. Section 4 provides the empirical results regarding bank competition and its economic consequences. Section 5 concludes.

2. Background

2.1. Banking System in China

The banking sector in China started from a centralized system in 1949 when the People's Bank of China (PBOC), as China's central bank, was in charge of both commercial

[9] Liu, Wang, and Xu (2017) raise a similar point as this paper and argue that interest-rate liberalization in China improves capital allocations within each sector but could exacerbate misallocations across sectors which is due to SOEs' distorted incentives.

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 began to focus on national macroeconomic policy, monetary stability, and 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 was specialized in a specific area.[10] 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.[11] The two principal shareholders of these big five commercial banks are the Ministry of Finance and the China Investment Corporation.[12]

The Bank of Communications' experience in reform and development has paved the way for the development of shareholding commercial banks in China and exemplified 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 national banks, unlike the big five commercial banks, they usually focus on local business and operate on a much smaller scale. One of the reasons is that these joint equity banks cannot open branches freely in the cities other than their headquarters. Compared to the big five, the joint equity banks are much smaller in the banking market. For example, in 2006, the total assets of the big five banks amounted to 24.4 trillion RMB while the total assets of joint equity banks amounted to 5.4 trillion RMB.

2.2. CBRC Regulations on Bank Branches

As in many other countries, the banking sector in China is heavily regulated. In March 2003, the CBRC was founded to supervise and monitor the banking sector. The CBRC

[10] 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) is responsible for the management and distribution of government funds allocated to construction and infrastructure projects.

[11] We exclude the BoCom in the sample and find that all the main results in this paper are robust.

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

placed strict restrictions on the twelve joint equity banks, especially for their branch opening. For example, in 2006, the CBRC announced that the twelve joint equity banks, along with local commercial banks, in each application, can only apply for opening one branch in one city at a time.[13] To be precise, banks cannot submit another request of branch opening until the current one was rejected or approved by the CBRC. The bank needs to send the application to CBRC's provincial offices for the initial review. If the application passes this local review, the case then would be transferred to CBRC's headquarter for the final evaluation. The turnaround time for each application is approximately a year, with some of them taking even longer, depending on the review time of the local CBRC offices.

Moreover, the CBRC capped the total numbers of branches that could be opened in each city. At the end of 2005, big five bank branches, on average, covered approximately 90% of the cities in China. For the twelve joint equity banks, they covered only about 7% of the cities. The bank entry regulation of CBRC in 2006 greatly limited the twelve joint equity banks to compete fairly with the big five banks who had already established branches in almost all the cities and counties across 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 vital deregulation of the Chinese banking system.[14] This adjustment aimed to free joint equity banks by allowing them to build new branches in new cities. This deregulation removes any entry restrictions for opening new branches in a city if the joint equity bank had already set up branches in this city. The joint equity banks can also enter all the cities of a province freely if they had branches in the capital city of that province. Explicitly, for these deregulated cities, the joint equity banks can open branches freely without any restrictions on the number of branches. Moreover, for each application, joint equity banks can apply for multiple branch openings and do not need to get approval from the central CBRC office. Instead, banks only need the approval of the local CBRC

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

[14] Please refer to CBRC Order [2009] No. 143, titled "Adjustment comment on the market access policy of setting up branches for small- and medium-sized commercial banks"

office which makes the application process much easier and quicker, with typically four months turnaround time.

Moreover, there was no specific requirement on capital amounts for the new branches. However, if the bank did not have any branches in the city or the provincial capital city, it was still strictly regulated under 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 for joint equity banks. As one of the senior officers in the CBRC commented, this deregulation shock is one of the milestones in the development of commercial banks and the growing level of competition in the whole banking sector.[15] On October 15, 2013, in CBRC Order [2013] No.1, an updated version of CBRC Order [2006] No.2, the CBRC completely lifted the entry restrictions on all commercial banks.

In this paper, we use the 2009 partial deregulation as an exogenous shock to perform the Difference-in-Differences (DID). Specifically, the 2009 deregulation does not apply to big five banks which have already covered most cities in China. The big five banks in cities where no equity banks were allowed to expand and the joint equity banks in still regulated cities are not directly affected by the deregulation, which serve as the control group. This allows us to use DID regressions to identify the deregulation's impacts on how new entrant joint equity banks compete ("intruders"), how big five banks respond ("defenders"), and how firms react to it. Since this deregulation only applies to specific regions and banks, we can exploit the heterogeneity within a city and across banks.[16]

3. Data and Summary Statistics

We use three datasets for our empirical analyses, including two proprietary datasets on Chinese bank loans and bank branches, and Chinese Industry Census (CIC) firm-level data.

[15] 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.

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

3.1. CBRC Loan Level Data

The first dataset includes all major bank loans that the CBRC compiled for monitoring and administrative use, which consists of over 7 million loan contracts granted by the 19 largest Chinese banks to firms with unique organization codes. This monthly frequency dataset 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 by 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).[17]

3.2. CBRC Branch Data

The second dataset includes all bank branch information in China, which is also collected by the CBRC. This dataset contains over 200,000 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 particular region (provinces, cities, or counties). For our analyses, we restrict our bank branch sample to the 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 choose BOC because we can find all its branches with their corresponding names, addresses, branch levels, and operating status on the bank's website. We construct BOC's branch list in September 2016

[17] 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.

from CBRC 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 to 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. Next, we also compare the names of branches between CBRC and BOC website, and 9,900 branches have the exact the same names in these two datasets. This means 92.71% of the branches from CBRC dataset are as the same as the ones listed on BOC website. For the remaining 7.29% unmatched branches, we manually check their names at the city level, and 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 on the BOC's website. The quality of the CBRC bank branch dataset is outstanding.

3.3. Chinese Industry Census Data

The other dataset we use in this paper is the CIC from 1998 to 2013.[18] The CIC was collected by The Chinese National Bureau of Statistics (NBS). It includes all the manufacturing firms in China with annual sales of more than 5 million RMB (increase 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. The CIC 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, and registration type). Although we do not have loan-level interest rate information from CBRC data, we have the annual amount of interest payment for each firm in CIC data that can be used to calculate the interest rate. Using firm registration type from CIC data, we classify firms as SOE and Non-SOEs. In total, there are 689,407 firms from 2004 to 2013. To investigate the impact of bank credit access on firm activities, we merge the CBRC data with CIC from 2007 to 2013.

Moreover, we also obtain the population census data on all firms in China in 2008. This cross-sectional dataset records firm ID, total assets, ownership, number of workers,

[18] We obtained the CIC data between 1998 and 2013, except for 2010 which has bad quality. For 2010, we use the Orbis data from the Bureau van Dijk to fill in the firm variables in CIC. We are able to recover approximately 80% of the data in 2010.

and operating income of 9,212,411 firms in total. Approximately 75% of the firms in the CBRC dataset can be matched to the 2008 census data (i.e., twelve thousand out of sixteen thousand). [19] Based on this, we can stratify the CBRC borrowers by ownership (i.e., SOEs vs. private firms) and performance (e.g., high vs. low efficiency).

3.4. Summary Statistics

Figure 1 shows two heat maps of the number of outstanding joint equity bank branches in 2008 and 2013, respectively. The darker color corresponds to a larger number of joint equity bank branches in the province. Over the last two decades, joint equity banks have been growing very fast. As displayed in Panel A of Figure 1, in 2008, 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 Xizang). Overall, in 2008, the big five banks dominated China's banking system with 51,557 branches covering 84.9% of the cities in China while the twelve joint equity banks were suppressed severely in competition with only 4,161 branches covering 9.5% of the cities. After the deregulation in 2009, joint equity bank branches increased dramatically from 4,161 in 2008 to 5,272 covering 15.7% of the cities in 2010 while the big five barely increase their coverages (by only 2%) over the same period. Moreover, Panel B of Figure 1 shows that 12 out of 31 provinces have over 200 joint equity bank branches at the end of 2013. Notably, five provinces reached over 500 joint equity bank branches, i.e., Guangdong, Zhejiang, Shandong, Shanghai, and Jiangsu. In Figure A1 in the Appendix, we plot the number of branches in 2008 and 2013 for the big five banks. Again, the numbers did not change very much during these five years.

[Place Figure 1 about here]

Besides the increase in the number of branches, joint equity banks also grow rapidly regarding their lending market shares. In particular, in Figure 2, the solid line represents the percentages of joint equity banks' loans outstanding to total loans outstanding (i.e., joint equity banks plus big five). The number has been increasing over time. For example,

[19] We cross checked the variables between CIC and 2008 census data. More than 95% of them are consistent. In CBRC data, we compared the differences of firm characteristics (e.g., total assets) between firms that are matched to the census and unmatched firms. The t-tests show insignificant differences.

in 2007, 21.7% of outstanding loans were issued by joint equity banks. This number increased to 24.5% in 2008 and sharply jumped a lot after the deregulation, which reached 33.5% in 2010. This confirms that the joint equity banks expand substantially after the deregulation. The share of joint equity banks continues to become larger as the time goes by (i.e., increases from 21.7% in 2007 to 40.1% in 2013, by around 85%). Moreover, the dotted line represents the shares of joint equity banks for new loan issuances that shows similar patterns as the solid line.

[Place Figure 2 about here]

To further illustrate the contribution of the 2009 deregulation to the fast catching up of joint equity banks, in Figure 3, we plot the unconditional pattern of loans outstanding for treatment group (i.e., joint equity banks in their deregulated cities) and control groups (i.e., banks in cities that were not affected by the shock). The solid line represents the treatment group, and the dotted line represents the control group. Before April 2009, the loans outstanding of treatment group moved in parallel with the loans outstanding of control groups. After the shock in April 2009, the gap has been increasing over time since banks can freely open new branches in treatment groups. The pattern in Figure 3 suggests that the increased lending after April 2009 is mainly due to the deregulation. There are no significant changes in differences between the treatment and control cities before April 2009. This is evidence for the parallel trend assumption underlying the DID analysis.

[Place Figure 3 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. Our main variable of interest is the DID dummy *After2009.4×Exposure*, where *After2009.4* equals one for observations after the policy shock in April 2009 and zero before it. *Exposure* equals one for bank-cities affected by the shock and zero for unaffected bank-cities. Particularly, for the joint equity bank, *Exposure* equals one in city *j* where the bank has existing branches or the capital city of the province of this city since according to the 2009 deregulation this joint bank is free to open branches in city *j*. *Exposure* equals zero for banks in the cities that are not affected by the deregulation, i.e., joint equity banks in still regulated cities and big

five banks in cities where no joint equity banks were allowed to enter freely after April 2009. We exclude the headquarter cities of joint equity banks in the sample since all twelve joint equity banks have built a significant number of branches in their headquarters and did not need to expand more after the deregulation.[20]

Panel A reports the city-bank-month descriptive statistics with 332,904 observations. The mean of *Exposure* is 0.533 which means that, on average, 53.3% of the city-bank pairs are affected by the deregulation while the other 46.7% are not directly affected. Moreover, among the city-bank pairs with *Exposure*=1, 18.7% of the cities had joint equity bank branches before April 2009. In other words, for the remaining 81.3% 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 also reports the number of branches and loans outstanding at the bank-city-month level from 2007 to 2013. On average, each bank has 1.4 branches per city. It is a small number due mainly to the fact that joint equity banks have no branch in many cities, especially in earlier years.

Panel B presents the summary of loan contract terms. The average amount of loan is around 14.8 million RMB with short-term maturity. 99.1% of the loans have the best ratings at the point of issuance. Approximately 24.1% of loans have third-party guarantees, which provides a credit enhancement scheme for lenders. The default rate defined as over 90 days delinquency is 0.9%, and this is comparable to the non-performing loan rate disclosed in banks' annual reports in China. For each loan, we also know the borrower characteristics such as total assets, leverage, ownership, and efficiency. Moreover, we measure the firm efficiency by dividing operating income over the total assets and use the median level in the census data to classify efficient and inefficient firms. Panel C of Table 1 shows firm-level characteristics after merging CBRC borrowers with CIC data. For example, the median firm size is RMB 198.6 million. Moreover, we back out the firm level interest rate by dividing the total amount of interest payments by the total amount of

[20] Our empirical results remain qualitatively and quantitatively robust even if we keep the observations from bank headquarter cities.

outstanding loans at the end of the prior year. The median interest rate is 9.1%. We describe all variables' definitions in Table A1 in the Appendix.

[Place Table 1 about here]

Furthermore, we categorize bank branches into incumbent bank branches and new entrant branches. In particular, we define the new entrant branches as those that open less than or equal to 12 months in the city. On average, for new entrant branches of joint equity banks, the percentages of loans to the new firms which have never borrowed from CBRC sample banks are approximately 12%. This means that, when joint equity banks enter into a new city, instead of developing new clients, their loans mainly go to the old firms which have been borrowing from incumbent banks (88%). Moreover, we find that borrowers can make a complete switch from big five banks to joint equity banks while the magnitude of the complete switch is approximately 1%. This means most of the loans from new entrant banks are "add-on" (99%).

We then compare the loan contract terms between new entrant banks and incumbent banks. [21] Table A4 in Appendix reports the mean difference in loan contract characteristics. 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, loans from new-entry bank branches have higher amounts, better internal ratings, more third-party guarantees, and lower default rates.

4. Empirical Analysis and Results

4.1. Expansion of Joint Equity Banks under 2009 Deregulation

We start by analyzing how joint equity banks expand regarding new branches and loan issuances after the 2009 deregulation. In other words, we examine if joint equity banks expand and compete with incumbent big five banks in the lending market when the restriction on branch openings is removed. 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. At the

[21] Our results are quite robust to other definitions of new bank entries (e.g. 36 months).

city-bank-month level, we regress the number of branches and outstanding loan amounts on the 2009 deregulation shock. Formally, the regression can be represented as follows:

$$\mathrm{Y}_{ijt} = \beta_1 \times After2009.4_t \times Exposure_{ij} + \beta_2 \times After2009.4_t$$

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

where Y_{ijt} 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 month t. $Exposure_{ij}$ equals one for joint equity banks in deregulated cities and zero otherwise. We control for city (α_i), bank (δ_j), and year (η_t) fixed effects. We also control for the city GDP every year. Moreover, we exclude the headquarter cities of joint equity banks in the sample since all twelve joint equity banks have built a substantial number of branches in their headquarters and do not need to expand more after the deregulation.

Table 2 shows the regression results. The dependent variable in Panel A is the logarithm of one plus the number of outstanding branches. Column (1) is for three months before and after the shock (i.e., from January 2009 to June 2009). Column (2), (3), and (4) are for six months, twelve months, and twenty-four months before and after the shock, respectively. In column (1) to (4), the coefficients β_1 of *After2009.4×Exposure* are all positive and statistically significant. For example, in column (1), the coefficient is 0.007 with a *t*-statistic of 4.94. This means that the deregulation leads to a 0.7% increase in the number of joint equity bank branches in the deregulated cities after three months of the shock. Additionally, the coefficients of *After2009.4×Exposure* increase monotonically from column (1) to (4). For example, in column (4), the coefficient is 0.086 with a *t*-statistic of 17.13. This means the number of joint equity bank branches increase by 8.6% in their deregulated cities after two years of the deregulation. The long-term effect of the deregulation on joint equity bank branch expansion is larger since it takes time to open branches in a new city. This also mitigates the concern that for still regulated cities, the joint equity banks can simply open one branch in order to qualify for the deregulation. Furthermore, we find that if a joint equity bank did not have any branches in a city (nor in the provincial capital city) before April 2009, the bank will not qualify for the deregulation even if this bank opens a branch subsequently.

In Panel B of Table 2, the dependent variable is the logarithm of one plus the outstanding loan amounts. Consistent with Panel A, the deregulation leads to a significant increase in lending from the joint equity banks in deregulated cities. For example, the coefficient estimated in column (4) is 0.312 (*t*-statistic=17.63) statistically significant at 1% level, which means that the total amount of outstanding loans increases by 31.2% due to the deregulation. The effects are economically significant. Furthermore, in the robustness test, the results are still present after controlling for the city×year fixed effects and bank×year fixed effects.

[Place Table 2 about here]

Next, we study how the incumbent big five banks respond to the deregulation shock. In Appendix Table A5, we repeat the regressions on the loans outstanding and the number of branches of big five banks. The control group contains the big five banks in still regulated cities after April 2009. In particular, *Exposure* equals zero for big five banks in still regulated cities and equals one for big five banks in deregulated cities. The coefficients of *After2009.4×Exposure* are all statistically insignificant. In sum, after the deregulation, the incumbent big five banks barely change their lending in deregulated cities while joint equity banks expand massively. These results are consistent with the unconditional patterns in Figure 1, 2, and A1. In short, the 2009 deregulation leads to a significant growth of joint equity market share and increased competitive pressure to incumbent big five commercial banks, which are in-line with the goal of the deregulation.

One concern about our deregulation shock is that it could be confounded with the RMB4 trillion stimulus package initiated in November 2008. For example, the 4-trillion program could have granted more credit to deregulated cities than regulated ones. To mitigate this concern, in Table A3, we calculate the growth rate of loans outstanding from November 2008 to March 2009 (i.e., after the 4-trillion but before the 2009 bank entry deregulation) for joint equity banks in deregulated cities, big five banks in deregulated cities, and big five banks in still regulated cities, respectively. Table A3 shows that the average growth rates of outstanding loans are around 30% for all three groups. We perform the *t*-tests for each pair of these three groups, and document the insignificant differences within each pair. Moreover, in column (1) of Table 2, we restrict our sample

from January 2009 to June 2009 (within the 4-trillion period), and we continue to find that the deregulation in April 2009 helped joint equity banks expand in deregulated cities. These results suggest that the increases in lending between the treatment and control groups in our DID analysis do not confound with the 4-trillion program and move in parallel before the deregulation in April 2009. Besides the analyses on deregulation's effects on lending activities in Table 2, we also study how these new entrant branches affect the deposit in the local area. The economic consequences can also come from the depositor side. In Table A6, we perform the DID regressions by using local deposit amount as the dependent variable. The coefficients of *After2009.4×Exposure* are mostly insignificant. The 2009 deregulation has enormous impacts on lending activities but not so much on the deposits. Our analysis on deregulation's economic consequences in section 4.3 is primarily from the bank lending.

4.2. Banking Deregulation and Loan Contract Terms

Next, we study the changes in lending activities for joint equity bank loans after the deregulation. In particular, we perform the DID analysis to assess the causal effects of the 2009 deregulation shock on the loan contract terms for joint equity bank loans in deregulated cities. Formally, the regression is:

$$Loan\ Terms_{kijt} = \beta_1 \times After2009.4_t \times Exposure_{ij} + \beta_2 \times After2009.4_t$$

$$+\beta_3 \times Exposure_{ij} + Pretrend + \phi X_{kt} + \alpha_j + \delta_k + \eta_t, \qquad (2)$$

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 ratio. We aggregate the loan-level sample at the firm-bank-month level. We control for the pre-trend dummies for the shock. The coefficient of interest, β_1, estimates the impact of branch deregulation on loan contract terms. The standard errors are clustered at the firm level.

Table 3 Panel A shows the results. Column (1) to (4) is for all firms in our sample. Column (1) reports the deregulation effect on loan default rates and the coefficient of

After2009.4×Exposure is -0.007 with significance at 5% level. On average, the default rate is approximately 0.9% and -0.007 is equivalent to a 77.7% decrease in default. Column (5) is for the SOE loan default rates, and the coefficient is insignificant. In contrast, column (9) is for the private firms and the coefficient is significantly negative. This suggests that after deregulation, the loan performance improves for private firms but not for SOEs in deregulated cities. Moreover, in column (2), for internal loan ratings, the coefficient of *After2009.4×Exposure* is 0.005 with significance at 1% level. This suggests that the loans with the best rating increase by 0.5% after the deregulation shock. There could be two reasons for the rating improvements; borrowers have higher credit quality or banks inflate the ratings. The low default ratio we find in column (1) supports the first hypothesis that banks raise the screening bar and lend to borrowers with a better credit quality. This effect on ratings is also mainly from private firms. Specifically, column (6) shows no significant changes in loan ratings for SOEs and column (10) shows that, for private firms, the ratings are significantly better after the shock.

Next, for the third-party loan guarantee, in column (3), the coefficient of *After2009.4×Exposure* is 0.021 with significance at 1% level. The average third-party guarantee ratio is 24.1% which means that the deregulation leads to an increase in third-party guarantee by 8.7%. Moreover, for SOEs in column (7), the coefficient of *After2009.4×Exposure* is 0.014 with significance at 5% level which is smaller than the coefficient in column (11) for private firms which is 0.022 with significance at 1% level. This means that the deregulation leads to an increase in third-party guarantee, which is more pronounced for private firms than SOEs. Moreover, the maturity of these loans also increases significantly after the deregulation. In Panel B, we repeat the DID regressions by using the loan-level sample. The results are robust and similar as in Panel A.

[Place Table 3 about here]

Although we do not have loan-level information on interest rate, we can back it out from the interest payment amount documented in CIC data and the outstanding loan amount in CBRC data. In Table A7 Panel A in the Appendix, we find that the deregulation significantly reduces the interest rates of borrowers. In Panel B, we interact the DID dummy with the private firm dummy. We find that the interest rates drop significantly

more for private firms than SOEs. In particular, column (2) of Panel B shows that the coefficient of *After2009.4×Exposure* is -0.610 which is statistically insignificant. The coefficient of Private*× After2009.4×Exposure* is -0.603 with 1% significant level. The median interest rate is 9.1% in CIC data. These suggest that the interest rates on average decrease by 6.6% for private firms after the 2009 deregulation. There is no significant effect on SOEs' borrowing costs. One caveat is that our interest rate extrapolation might not be accurate since the interest payments in CIC could include interests for types of debt other than bank loans or exclude the interest payment for fixed assets. To mitigate this concern, we collect a subsample of loans with interest rate information for listed firms from the China Stock Market & Accounting Research (CSMAR) database. Panel C shows that the deregulation leads to a significant decrease in interest rates of loans based on the smaller sample in CSMAR.

In sum, the results of decreased default rates and increased internal loan ratings and third-party guarantees are consistent with the unconditional patterns in Table A4. Overall, the 2009 bank entry deregulation leads to lower interest costs, higher ex-ante loan screening standard, and better ex-post loan performance. These effects are mainly from private firms since the higher lending standard is not necessary for SOEs in China due primarily to their soft budget constraints (i.e., implicit government guarantees).

4.3. Banking Deregulation and Firm Activities

This section explores the economic consequences of the 2009 bank entry deregulation regarding the firm activities. The 2009 deregulation on bank entry, along with other reforms of the financial system, aims to improve the lending efficiency and the economic growth in China. In Section 4.2, we show that the 2009 deregulation leads to better loan contract terms. Next, we want to understand, subsequently, how firms respond to the 2009 deregulation regarding the better loan contract terms. By merging the CIC firm-level data and CBRC loan data, we select the firms that have ever borrowed from banks in our sample period. These firms are directly affected by the 2009 entry deregulation. We then perform the DID regressions of firm activities (e.g., expansions on assets and employment), as well as firm performance (e.g., net income and ROA) on the 2009 deregulation shock. The regression is as follows:

$$Y_{kit} = \beta \times After2009.4_t \times Exposure_i + Pretrend + \delta_k + \eta_t, \qquad (3)$$

where Y_{kit} is a vector of firm level activities such as the growth of fixed assets and employment, leverage ratio, ROA, and growth of net incomes. $Exposure_i$ in equation (3) is defined as a dummy at city level which equals one when the city i is eligible for branch expansion for any joint equity banks according to the 2009 deregulation (i.e., the joint equity banks had already set up branches in this city *i* or in its capital city before the shock). We also control for the pre-trend dummy for one and two years before the 2009 deregulation. δ_k and η_t are included to account for the firm- and year-fixed effects. Standard errors are clustered at firm level.

Table 4 shows the DID regression results. Overall, the 2009 joint equity banking sector deregulation does exert significantly positive effects on firms' real economic activities. For example, after the 2009 deregulation, firms in the deregulated areas expand in fixed assets and employment significantly. In particular, column (1) shows that, from 2006 to 2011 (i.e., three years before and after the shock), the growth rate of fixed assets, on average, increased by 34.1% with the *t*-statistic of 6.42 after the 2009 deregulation. In column (2), we expand our sample period from 2004 to 2013 (i.e., five years before and after the shock), the growth rate of fixed assets increased by 21.3% with the *t*-statistic of 5.65. Column (3) and (4) are for the growth rates of employment. The 2009 bank deregulation leads to a 14.8% increase in firms' employment growth. Moreover, the parallel trend interaction dummy $Pretrend_{t-1}$and $Pretrend_{t-2}$ are all statistically insignificant. There are no significant differences in firm activities between deregulated areas and regulated areas before the 2009 shock. This is another piece of supportive evidence for the parallel trend assumption, which further mitigates the concern that the results of the DID dummy is driven by the demand side of the economy (e.g., firms in deregulated cities have better investment opportunities).

From column (5) to (8), we use net income growth and ROA to measure firm-level profitability and efficiency. The coefficient of *After2009.4×Exposure* estimated in column (5) is 0.872 with the *t*-statistic of 4.27, showing that the net income growth rate increases by 87.2% after the 2009 joint equity bank expansion shock. In column (7), for ROA, the coefficient is 0.019 with the *t*-statistic of 6.45. Since the average ROA of CIC firms is 0.061,

based on the coefficient in column (7), the 2009 deregulation leads to a 31.1% increase in ROA. In sum, the firms that can borrow from banks could benefit immensely from the bank deregulation by growing faster and becoming more profitable.

[Place Table 4 about here]

Furthermore, we explore the heterogeneous effects of the deregulation across cities. In particular, the new entrant banks should have more substantial impacts in the areas with limited competition among banks before the shock. In other words, new entrant banks would not change the landscape of the banking market if it is already very competitive. We calculate the *HHI* based on the outstanding branch numbers before the shock (i.e., in the year 2008) for each city. We then interact this ex-ante *HHI* with *After2009.4×Exposure* and repeat the DID regressions as in Table 4. Table 5 shows the regression results. The positive effects of the 2009 deregulation on borrowers are significantly more pronounced in the cities with lower competition levels ex-ante (i.e., higher *HHI*). The interaction term *After2009.4×Exposure×HHI* have significantly positive coefficients in most columns. For example, in column (1), the coefficient of *After2009.4×Exposure×HHI* is 1.542 with a *t*-statistic of 1.94 while the coefficient of *After2009.4×Exposure* is 0.247 with a *t*-statistic of 3.43. This suggests that asset growth rate is 9.1% more in the least competitive cities than in the most competitive ones.[22]

[Place Table 5 about here]

4.4. Banking Deregulation and Credit Allocation

We document the bright side of the deregulation in Section 4.3. In this section, we explore the potential costs of the deregulation. In particular, we study how joint equity banks change their credit allocation after the 2009 deregulation shock. It is well documented that, in China, the banking credit allocation is inefficient since the commercial banks (both big five and twelve joint equity banks) prefer to lend to SOEs.[23]

[22] Besides the heterogeneous effects across cities with different level of competition, we also explore the new entrant banks' size. In unreported results, we find that the positive effects of deregulation are stronger when the new entrant banks are more prominent.

[23] See, for example, Hsieh and Klenow (2009), Hsieh and Song (2015), Song and Wu (2015). In our sample, SOEs contribute to 9% of the output in China while they take 22% of the bank credit.

The main reasons are the government intervention and the soft budget constraint of SOEs. The SOEs have been enjoying the government guarantees which give them easy credit access from banks. Private firms, on the other hand, have minimal access to bank credit and rely heavily on informal lending channels (e.g., Allen and Qian (2014)). In our data, on average, 23.7% of the loans from joint equity banks go to SOEs. In contrast, 18% of the loans from big five banks loans go to SOEs. This is surprising since the common perception is that big five banks allocate more credit to SOEs in China than joint equity banks that should have been more efficient. We find the opposite in the data. One explanation is that joint equity banks are dominated by big five banks which pushes them to put more efforts on finding good lending opportunities. In China, SOEs have soft budget constraints and are considered "safe" assets compared to private firms and are more preferred by joint equity banks.

To understand the effects of deregulation on credit allocation, we calculate the ratio of loans made to SOEs to total loan amount for each city-bank-month as the dependent variable in the DID regressions. Table 6 Panel A shows that joint equity banks issue significantly more loans to SOEs after the 2009 deregulation in their deregulated cities where they can open branches freely. For example, in column (1), we restrict our sample to one year before and after the shock (i.e., two years in total). The coefficient of *After2009.4×Exposure* is 0.034 with significance at 5% level. On average, approximately 24.5% of bank loans are for SOEs. 0.034 in column (1) means that, during the first year after the deregulation shock, joint equity banks increase their shares of lending to SOEs by 13.9%. In column (2), for two years before and after the shock, we also find significantly positive coefficients of *After2009.4×Exposure*. When a joint equity bank opens new branches in a new city, compared to the incumbent big five banks, it usually does not have much information on the local firms. These new branches prefer to lend to SOEs which have implicit or explicit government guarantees. In contrast, lending to private firms is much riskier for loan officers who would be punished if the private firms default. Moreover, in column (3) and (4), we use the logarithm of the outstanding loan amount for SOEs as our dependent variable in the DID regressions. Consistent with column (1) and (2), the coefficients of *After2009.4×Exposure* are significantly positive. For example,

in column (3), the coefficient is 0.354 with significance at 1% level. This means that the joint equity banks increase their total lending amount to SOEs by 35.4%.

[Place Table 6 about here]

Besides the new entrant joint equity banks, we also study the effects of deregulation on incumbent big five banks regarding their credit allocation. We repeat these DID regressions for big five banks in Table A8 in the Appendix. From column (1) to (4), all the coefficients of *After2009.4×Exposure* are statistically insignificant. This means that the big five banks do not respond much to the shock regarding their SOE lending. Moreover, the increases in SOE lending from joint equity banks after the 2009 deregulation do not crowd out the SOE lending from the incumbent big five banks. Overall, the 2009 deregulation leads to more bank credit to the SOEs. It is well documented that, in general, SOEs are less efficient than private firms.[24] The 2009 bank entry deregulation leads to a worsening of credit allocation in China.

Furthermore, we explore how new entrant branches choose firms to lend among SOEs. In Table 6 Panel B, we calculate the TFP for each firm before the shock (e.g., in the year 2008). We then use the TFP to measure the firm efficiency and define the efficient firm if its TFP is above the median. In column (1) and (2), among SOEs, we calculate the percentage of loans made to SOEs with high TFP as the dependent variable at the city-bank-month level and perform the DID regressions. The coefficients of *After2009.4×Exposure* are significantly negative. This means that, besides joint equity banks' preference for SOEs, they further choose to lend to less efficient SOEs after the deregulation. For example, the coefficient in column (1) is -0.043 with significance at 5% level. This is equivalent to a 4.3% increase in lending to inefficient SOEs. We further explore the reason behind the preference for inefficient SOEs. In Panel B of Table A9, we find that the inefficient SOEs have significantly higher political hierarchies and significantly larger size. In China, different SOEs have different political rankings (e.g., local vs. central SOEs) and SOEs at the higher hierarchy usually have softer budget

[24] In Table A9, Panel A, we show that the efficiency of SOEs significantly lower than private firms in China. In particular, we use asset turnover ratio (sales/assets) and TFP to measure the efficiency and find that these two variables are significantly lower for SOEs than private firms.

constraints. Similarly, bigger SOEs also enjoy softer budget constraints due to the notion of "too big to fail". In column (3) and (4) of Table 6 Panel B, we perform the same analysis on private firms and find no significant results since private firms do not have soft budget constraint anyway, and banks have no apparent reasons to lend to inefficient private firms. These results further support our story that new entrant joint equity banks tend to lend to SOEs, especially to inefficient ones, since they are safer assets due to the government guarantees.

The key assumption behind the DID analysis is the parallel trends between treatment and control groups. In column (2) and (4) in both Panel A and B, we include three pre-trend dummies to indicate January, February, and March of 2009 (i.e., three months before the deregulation shock). All the pre-trend dummies have insignificant coefficients. This again verifies that our findings in DID are not driven by any underlying economic trends other than the deregulation in April 2009. Furthermore, in Table A10 in the Appendix, we perform the same analysis as in column (4) of Panel A but include dummies $Exposure \times Month_t$ (t is from April 2008 to March 2010). We find that before April 2009, all coefficients of dummies $Exposure \times Month_t$ are statistically insignificant. After April 2009, we have significantly positive coefficients of dummies $Exposure \times Month_t$. This is the strong evidence for the parallel trend assumption and that the shock did have impacts after April 2009.

4.5. Quantify the Positive and Negative Effects of Deregulation

On the one hand, the 2009 bank entry deregulation increased the interbank competition. This leads to significantly better loan contract terms which make the borrowers grow faster and become more profitable. On the other hand, the deregulation also leads to more credit flow to inefficient SOEs which should have been granted to more productive private firms. Disentangling these two opposing forces sheds new light on the mixed empirical evidence of previous studies and is also crucial for policymakers.

Based on the estimated coefficients, we perform the back-of-the-envelope calculation to quantify the magnitude of the positive and negative effects of the 2009 deregulation, respectively. For positive outcomes, the coefficient of After2009×Exposure is 0.213 in

column (2) of Table 4. This suggests that the deregulation leads to a 21.3% increase in fixed assets growth, which corresponds to an RMB 45 million increase in fixed assets per firm. Coupled with the average outstanding loan amount of RMB 350 million per firm in 2008, we can calculate that the deregulation leads to an RMB 0.13 increase in fixed assets per RMB 1 loans outstanding. The total amount of loans outstanding for private firms in 2008 was RMB 3 trillion. Thus, the deregulation leads to RMB 390 billion increase in total fixed assets (3×0.13), which equals to approximately 1.11% of China's GDP in 2008.

For adverse effects, we first trace the heterogeneous impacts of increased bank competition between SOEs and private firms. In particular, in Table 7, we interact the DID dummy with the dummy for private firms. Overall, private firms can benefit significantly more from the 2009 deregulation than SOEs can. The effects of the 2009 deregulation on SOEs are almost muted. In particular, compared with SOEs, after 2009, private firms in deregulated cities have significantly higher fixed asset growth, higher employment growth, higher net income growth, and higher ROA. On the other side, these effects are not statistically significant for SOEs. For example, in column (1), the coefficient of *After2009.4×Exposure×Private* is 0.505 with the *t*-statistic of 4.31. This suggests that, compared to SOEs, the fixed assets growth rates of private firms increase by 50.5% after the 2009 deregulation. On the other hand, the coefficient of *After2009.4×Exposure* is -0.167 which is statistically insignificant. This shows that, in contrast to private firms, the 2009 deregulation has no impact on SOEs' assets growth. Column (3) and (4) also show the similar patterns of employment growth.

Moreover, for firm performance (i.e., net income growth and ROA), private firms can benefit significantly more from the 2009 deregulation while the SOEs do not increase their net income and ROA. In particular, for private firms, the 2009 deregulation leads to increases in net income growth and ROA by 52.5% and 42.6%, respectively. These findings suggest that expansions of joint equity banks in China have more positive effects on private firms since these firms are more efficient and can better capture the benefits of this reform. This is also consistent with Table A7 which shows that the interest rates drop more for private firm loans after the 2009 deregulation.

[Place Table 7 about here]

In sum, Table 7 shows that, for firms with bank credit access, increased bank competition has positive effects on their growth and performance which come mainly from private firms. These positive effects are both statistically and economically significant. In other words, if a private firm can borrow from banks, bank entry deregulation could hugely improve its performance and profitability which makes it grow faster. On the other hand, bank entry deregulation leads to more credit allocated towards inefficient SOEs which should have been granted to private firms. We perform another back-of-the-envelope calculation to quantify this loss. In particular, the coefficient of After2009×Exposure is -0.117 in column (2) Table 7. This suggests that an SOE could lose 11.7% of its fixed assets after deregulation, which equals to an RMB 0.48 decrease in fixed assets for RMB 1 loans outstanding. In Table 6, we know that the 2009 deregulation led to a 4.1% increase in shares of SOE loans. The total loans outstanding is RMB 4.23 trillion. Thus, the deregulation leads to about RMB 173 billion SOE loans which should have been granted to more productive private firms (4.23×4.1%). The loss of total fixed assets is approximately RMB 107 billion, which equals about 0.31% of China's GDP in 2008.

Overall, on the one hand, the 2009 deregulation leads to increases in the growth of borrower's assets, employment, net income, and ROA. This accounts for 1.11% GDP gain. On the other hand, the 2009 deregulation leads to more bank credit flow to SOEs which should have been granted to more productive private firms. This accounts for 0.31% GDP loss. These two opposing forces suggest that, for policymakers, it is critical to fully understand all consequences of the reform, especially for the interactions among different frictions. Lifting one friction could lead to unintended adverse effects arising from the other frictions. The sequence is essential for the success of the reforms. In China, the soft budget constraint of SOEs could make the credit allocation worse off after the bank entry deregulation.

5. Conclusion

This paper examines 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. We find that, after the 2009 bank entry deregulation, firms

with bank credit access can benefit from increased competitions among banks and receive better loan terms (e.g., lower interest rate). In contrast, the deregulation leads to a worsening of credit allocation across firms, i.e., more bank credit flow into SOE, especially the inefficient ones with higher political hierarchy and softer budget constraints. These opposing forces shed new lights on the mixed evidence from previous studies on the economic consequences of banking deregulation.

Whether bank competition is good or bad for economic growth is the central question worldwide. This paper, for the first time, documents the detailed competition dynamics between new entrant banks and incumbent bank. We establish causal links between banking deregulation and growth in the context of China. China has been experiencing unprecedented high growth in the economy over the past decades and is now the second largest economy worldwide. During this economic growth, China has also developed the world's largest banking market. However, researchers, practitioners, and policymakers have heavily criticized the inefficient credit allocation in China. The government has been pushing the financial reforms to improve this situation such as deregulations in the banking sectors. For policymakers, it is essential to understand the countervailing effects of banking deregulation, especially the adverse effects. In China, there are many frictions in the financial markets, and it is critical to understand the interactions among different frictions. For example, other reforms should be implemented together with banking deregulation, i.e., removing government guarantees for SOEs. This would allow more (private/efficient) firms in China to undertake different financing strategies, e.g., switching from informal to formal lending channels.

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

References

Allen, F., and Gale, D., 2000. Financial contagion. Journal of Political Economy 108, 1-33.

Allen, F., Gersbach, H., Krahnen, J.P., and Santomero, A.M., 2001. Competition among banks: Introduction and conference overview. Review of Finance 5, 1-12.

Allen, F., Qian, J., and Qian, M., 2005. Law, finance, and economic growth in China. Journal of Financial Economics 77, 57-116.

Allen, F., and Qian, J., 2014. China's financial system and the law. Cornell International Law Journal 47, 499–553.

Barth, J.R., Caprio, G., and Levine, R., 2001. The regulation and supervision of banks around the world: A new database. Vol. 2588. World Bank Publications.

Barth, J.R., Caprio, G., and Levine, R., 2004. Bank regulation and supervision: What works best? Journal of Financial Intermediation 13, 205-248.

Barth, J.R., Caprio, Jr, G. and Levine, R., 2013. Bank Regulation and Supervision in 180 Countries from 1999 to 2011. Journal of Financial Economic Policy 5, 111-219.

Berger, A.N., Demirguc-Kunt, A., Levine, R., and Haubrich, J.G., 2004. Bank concentration and competition: An evolution in the making. Journal of Money, Credit, and Banking 36, 433-451.

Berger, A.N., and Hannan, T.H., 1989. The price-concentration relationship in banking. Review of Economic and Statistics 71, 291-299.

Berger, A.N., Demsetz, R., and Strahan, P., 1999. The consolidation of the financial services industry: Causes, consequences, and implications for the future. Journal of Banking and Finance 23, 135–194.

Berger, A.N., Saunders, A., Scalise, J.M., and Udell, G.F., 1998. The effects of bank mergers and acquisitions on small business lending. Journal of Financial Economics 50, 187-229.

Bertrand, M., Schoar, A., and Thesmar, D., 2007. Banking deregulation and industry structure: Evidence from the French banking reforms of 1985. Journal of Finance 62, 597-628.

Black, S., and Strahan, P., 2002. Entrepreneurship and bank credit availability. Journal of Finance 57, 2807–2833.

Boot, A.W., and Thakor, A.V., 2000. Can relationship banking survive competition? Journal of Finance 55, 679-713.

Calvo, G., 1998. The simple economics of sudden stops. Journal of Applied Economics 1, 35– 54.

Cetorelli, N., 2001. Does bank concentration lead to concentration in industrial sectors? Working Paper.

Cetorelli, N., 2003. Life-cycle dynamics in industrial sectors: The role of banking market structure. Quarterly Review, Federal Reserve Bank of St. Louis 85, 135-147.

Cetorelli, N., and Gambera, M., 2001. Banking market structure, financial dependence and growth: International evidence from industry data. Journal of Finance 56, 617-648.

Cetorelli, N., and Strahan, P., 2006. Finance as a barrier to entry: Bank competition and industry structure in local U.S. markets. Journal of Finance 61, 437-461.

Cetorelli, N., and Peretto, P., 2012. Credit quantity and credit quality: Bank competition and capital accumulation. Journal of Economic Theory 147, 967–998.

Chen, H., Petukhov, A., and Wang, J., 2017. The Dark Side of Circuit Breakers. Working Paper, MIT.

Chinn, M.D., and Ito, H., 2006. What matters for financial development? Capital controls, institutions, and interactions. Journal of Development Economics 81, 163–192.

Claessens, S., Demirguc-Kunt, A., and Huizinga, H., 2001. How does foreign entry affect domestic banking markets? Journal of Banking and Finance 25, 891-911.

Demirgüç-Kunt, A., and Maksimovic, V., 1998. Law, finance, and firm growth. Journal of Finance 53, 2107-2137.

Dick, A., and Lehnert, A., 2010. Personal bankruptcy and credit market competition. Journal of Finance 65, 655–686.

Fischer, S., 1998. Capital account liberalization and the role of the IMF. Essays on International Finance No. 207, Department of Economics, Princeton University.

Goldsmith, R.W., 1969. Financial structure and development. Yale University Press.

Gormley, T.A., 2010. The impact of foreign bank entry in emerging markets: Evidence from India. Journal of Financial Intermediation 19, 26-51

Gormley, T.A., 2014. Costly information, entry, and credit access. Journal of Economic Theory 154, 633-667

Gurley, J.G., and Shaw, E.S., 1955. Financial aspects of economic development. American Economic Review 45, 515-538.

Hachem, K., and Song, Z.M., 2016. Liquidity regulation and unintended financial transformation in China. Working Paper.

Hachem, K., and Song, Z.M., 2017. Liquidity rules and credit booms. Working Paper.

Hakenes, H., and Schnabel, I., 2010. Credit risk transfer and bank competition. Journal of Financial Intermediation 19, 308-332.

Hannan, T.H., 1991. Foundations of the structure-conduct-performance paradigm in banking. Journal of Money, Credit and Banking 23, 68-84.

Hellmann, T.F., Murdock, K.C., and Stiglitz, J.E., 2000. Liberalization, moral hazard in banking, and prudential regulation: Are capital requirements enough? American Economic Review 90, 147-165.

Hsieh, C.T., and Klenow, P.J., 2009. Misallocation and manufacturing TFP in China and India. Quarterly Journal of Economics 124, 1403-1448.

Hsieh, C.T., and Song, Z., 2015. Grasp the large, let go of the small: The transformation of the state sector in China. Brookings Papers on Economic Activity, 295-366.

Jayaratne, J., and Strahan, P., 1996. The finance-growth nexus: Evidence from bank branch deregulation. Quarterly Journal of Economics 111, 639-670.

Jayaratne, J., and Strahan, P., 1998. Entry restrictions, industry evolution, and dynamic efficiency: Evidence from commercial banking. Journal of Law and Economics 41, 239–273.

Jiang, L., Levine, R., and Lin, C., 2016. Competition and bank opacity. Review of Financial Studies 29, 1911-1942.

Kaminsky, G.L., and Schmukler, S.L., 2008. Short-run pain, long-run gain: Financial liberalization and Stock Market Cycles. Review of Finance 12, 253-292.

Keeley, M.C., 1990. Deposit insurance, risk, and market power in banking. American Economic Review 80, 1183-1200.

King, R.G., and Levine, R., 1993. Finance and growth: Schumpeter might be right. Quarterly Journal of Economics 108, 717-737.

King, R.G. and Levine, R., 1993. Finance, entrepreneurship and growth. Journal of Monetary Economics 32, 513-542.

Levine, R., and Zervos, S., 1998. Stock markets, banks, and economic growth. American Economic Review 88, 537-558.

Levine, R., Loayza, N., and Beck, T., 2000. Financial intermediation and growth: Causality and causes. Journal of Monetary Economics 46, 31-77.

Liu, Z., Wang P., and Xu, Z., 2017. Interest-rate liberalization and capital misallocation. Federal Reserve Bank of San Francisco Working Paper.

Marquez, R., 2002. Competition, adverse selection, and information dispersion in the banking industry. Review of Financial Studies 15, 901-926.

McKinnon, R.I., 1973. Money and capital in economic development. Brookings Institution.

Neumark, D., and Sharpe, S.A., 1992. Market structure and the nature of price rigidity: Evidence from the market for consumer deposits. Quarterly Journal of Economics 107, 657-680.

Petersen, M.A., and Rajan, R.G., 1995. The effect of credit market competition on lending relationships. Quarterly Journal of Economics 110, 407-443.

Petersen, M.A., and Rajan, R.G., 1994. The benefits of lending relationships: Evidence from small business data. Journal of Finance 49, 3-37.

Prasad, E., Rogoff, K., Wei, S., and Kose, A., 2003. Effects of financial globalization on developing countries: Some empirical evidence. IMF Occasional Paper No. 220.

Qian, Y., and Roland, G., 1998. Federalism and the soft budget constraint. American Economic Review 88, 1143-1162.

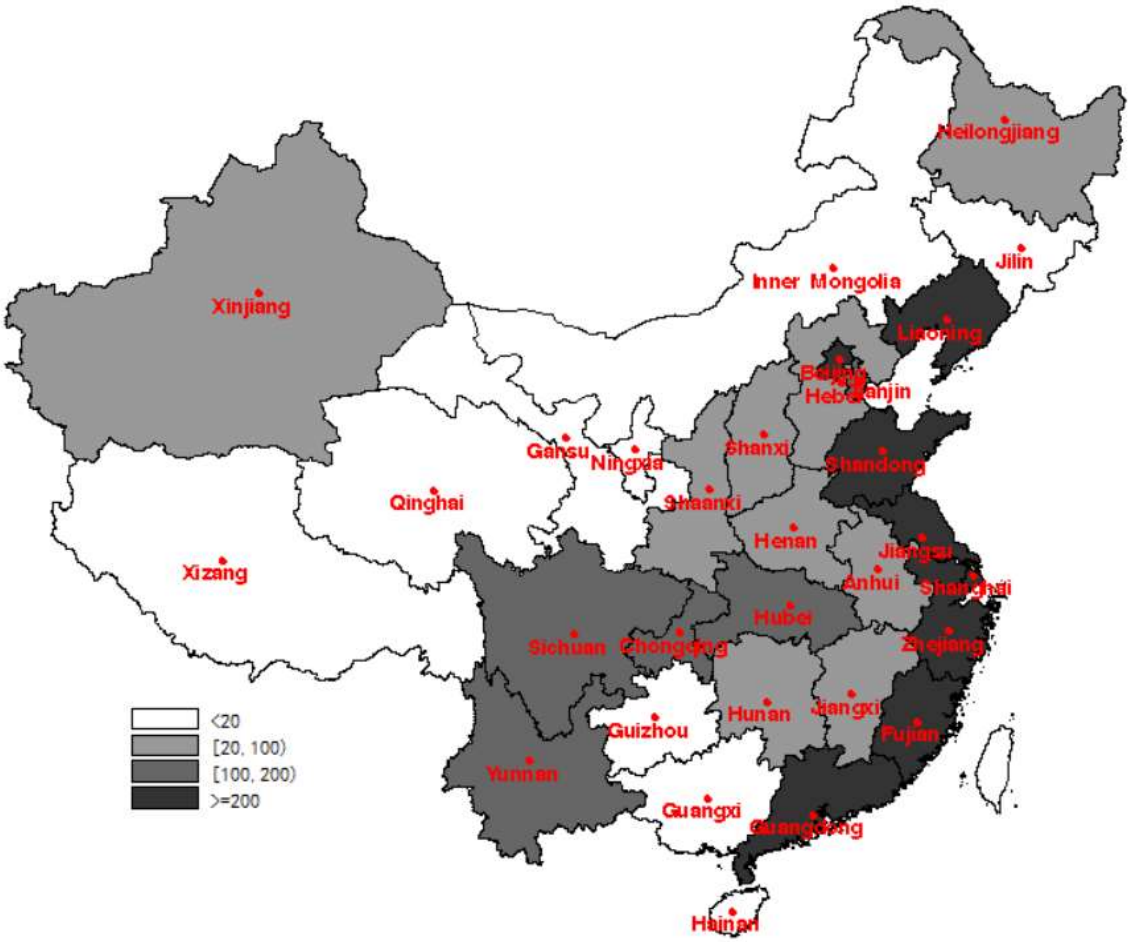
Rajan, R.G., and Zingales, L., 1998. Financial dependence and growth. American Economic Review 88, 559-586.

Smith, R., 1998. Banking competition and macroeconomic performance. Journal of Money, Credit, and Banking 30, 793-815.

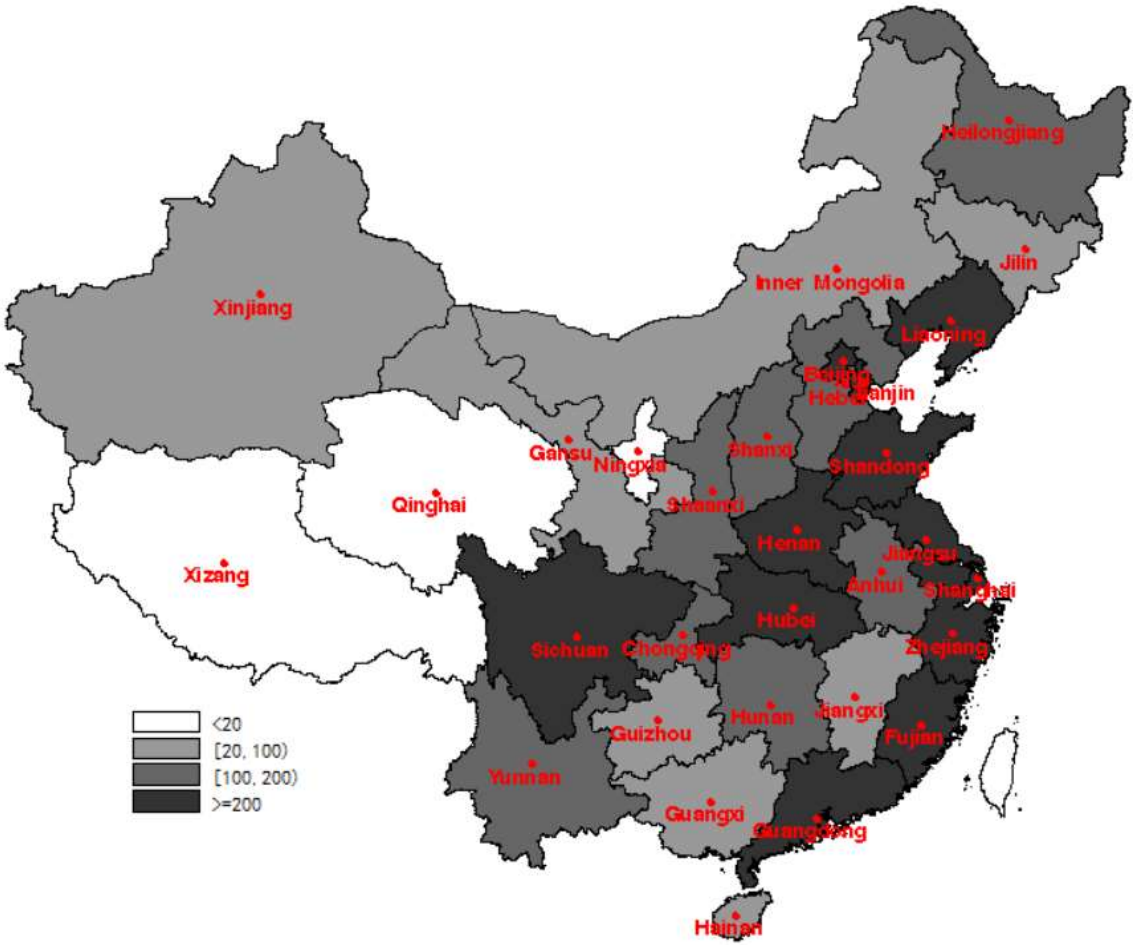
Song, Z., and Wu, G.L., 2015. Identifying capital misallocation. Working Paper.

Song, Z., and Xiong, W., 2017. Risks in China's financial system. Working Paper.

Wang, H., Wang, H., Wang, L., and Zhou, H., 2017. Shadow banking: China's dual-track interest rate liberalization. Working paper, Tsinghua University.



Panel A: By the Year 2008



Panel B: By the Year 2013

Figure 1: Heat Map of the Number of Joint-equity Branches across Provinces, 2008 versus 2013. This figure illustrates the number of all twelve joint-equity branches outstanding across 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).

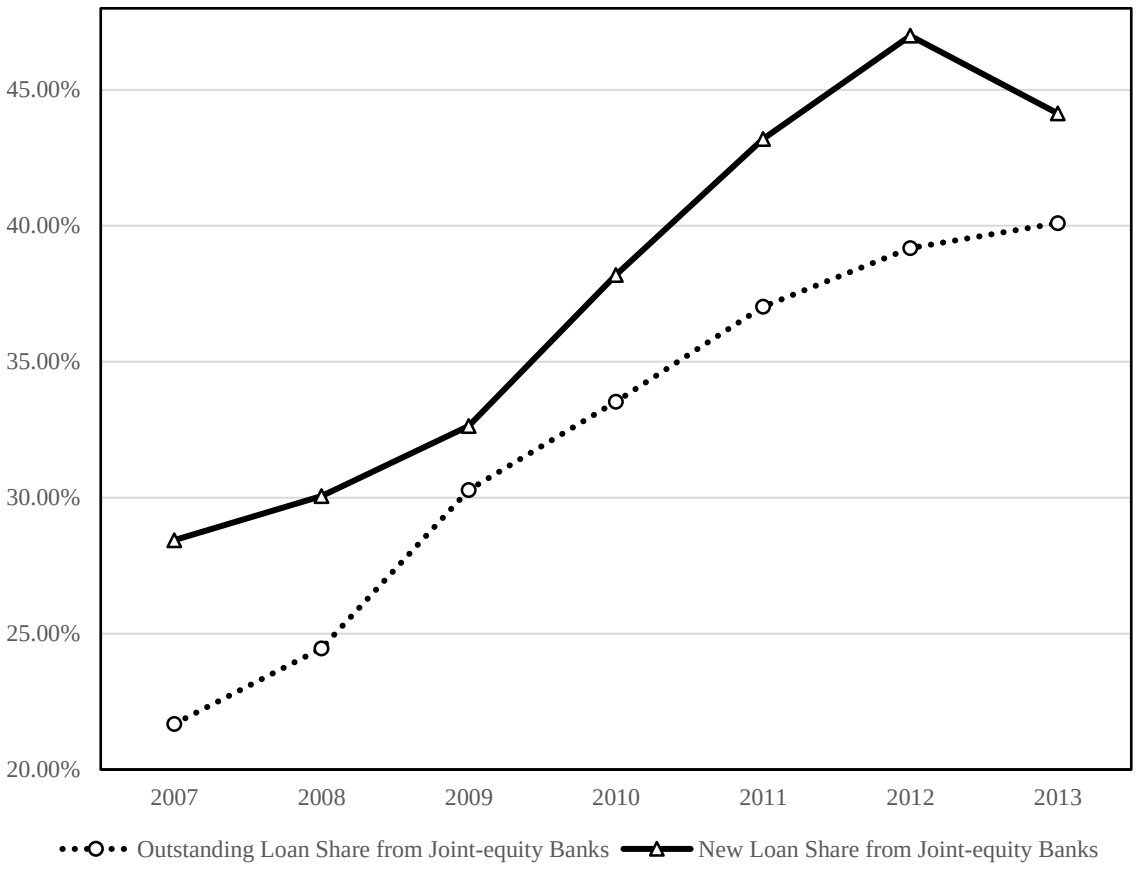


Figure 2: Expansion of Joint-equity Banks. This figure plots the annual share of joint-equity banks from 2007 to 2013. The dotted line with circles exhibits the joint equity banks' share of loans outstanding, and the solid line with triangles exhibits the share of new loan issuances. The share is calculated by the amount of loans granted by joint-equity banks over the total amount of loans granted by both joint-equity banks and big five commercial banks.

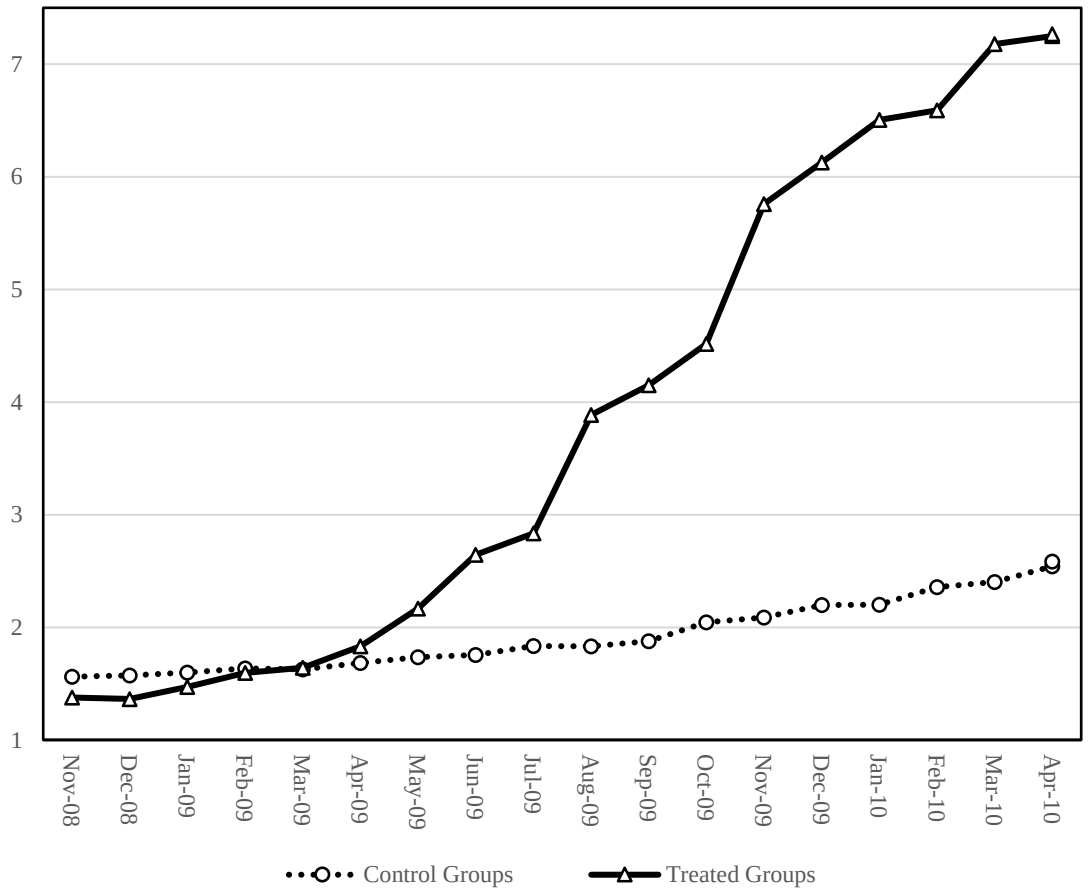


Figure 3: Time Trends of Loans Outstanding: treatment vs. control groups. This figure plots the amounts of loans outstanding between treatment and control groups before and after the April 2009 bank entry deregulation. The solid line with triangles exhibits the amount of loans outstanding in deregulated bank-cities while the dotted line with circles represents those still in regulated bank-cities. The vertical axis reports the demeaned amount of natural logarithm of loans outstanding. The treated bank *k* in city *j* requires that the joint-equity bank *k* has branches in this city or its capital city of the province before April 2009.

Table 1: Summary Statistics

This table describes summary statistics of the main variables used in this study. Panel A reports the city-bank-month sample from 2007 to 2013, Panel B reports the loan contract characteristics at loan level from January 2007 to June 2013, and Panel C reports the firm level characteristics for merged China Industrial Census (CIC) data from 2004 to 2013. All variables are defined in the Appendix Table A1.

	N	Mean	Median	Std. Dev.	P1	P99
	Panel A: City-Bank-Month Level					
Outstanding Branches	332,904	1.372	0.000	5.377	0.000	24.000
Outstanding Loans	332,904	9.568	0.000	35.458	0.000	167.534
After2009.4	332,904	0.654	1.000	0.476	0.000	1.000
Exposure	332,904	0.533	1.000	0.499	0.000	1.000
Local GDP (Billion RMB)	332,904	145.044	82.504	197.413	48.155	1111.500
SOE-Share	114,638	0.245	0.059	0.323	0.000	1.000
High-TFP	114,638	0.507	0.477	0.354	0.000	1.000
	Panel B: Loan Characteristics					
Loan Amount (Million RMB)	1,863,445	14.778	3.924	30.056	0.050	200.000
Maturity (in Months)	1,863,445	9.422	6.000	16.810	2.000	72.000
Rating Dummy	1,863,445	0.991	1.000	0.094	1.000	1.000
Guaranteed	1,863,445	0.241	0.000	0.428	0.000	1.000
Default	1,508,679	0.009	0.000	0.078	0.000	0.000
Existing Borrower	1,863,445	0.804	1.000	0.397	1.000	1.000
	Panel C: Firm Characteristics					
Assets (Million RMB)	343,071	415.862	198.665	512.657	5.350	1772.061
Fixed Assets (Million RMB)	342,905	140.653	52.094	197.887	0.369	683.694
Leverage	317,956	0.604	0.619	0.238	0.045	1.000
Sales (Million RMB)	343,114	400.077	183.548	503.864	5.520	1755.216
Employee	341,464	582.631	347.000	619.757	17.000	2271.000
Private	343,117	0.935	1.000	0.247	0.000	1.000
Fixed Assets Growth	293,321	0.599	0.021	2.502	-0.966	2.888
Employee Growth	292,739	0.261	0.028	0.949	-0.850	1.514
Net Income Growth	188,511	2.093	0.156	8.599	-0.979	8.869
ROA	342,354	0.061	0.030	0.112	-0.143	0.634
HHI	343,291	0.034	0.022	0.026	0.008	0.085

Table 2: Joint Equity Bank Expansions

This table presents the results of the DID regressions of joint equity bank expansion at city-bank-month level. 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, *After2009.4×Exposure*, where *After2009.4* equals one for observations after the policy shock in April 2009 and zero before that. *Exposure* equals one when joint equity banks *k* in city *j* has outstanding branches in city *j* or the capital city of the province that the city *j* is located in before April 2009 (i.e., deregulated bank-city) and equals zero for joint equity banks in still regulated cities and big five banks in cities where no joint equity banks are allowed to freely expand after April 2009 (i.e., unaffected bank-city). We exclude the bank's headquarter cities. For each panel, the column (1) reports the regression estimates for 3-month before and after the shock subsample (i.e., Jan 2009 to Jun 2009). The column (2), (3), and (4) report the regression estimates for 6-month, 12-month, 24-month before and after the shock subsample, respectively. *Log(City GDP)*, *Exposure* and *After2009.4* are included in all model specifications. Coefficients of these control variables are omitted for brevity. All variables are defined in the Appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. Fixed effects estimates including the constants are omitted for brevity. The *t*-statistics in parentheses are based on the two-way cluster-robust standard errors (cluster by city and bank) across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Number of Branches

	DV: Log (1 + No. Branches)			
	Shorter Window			Longer Window
	(1)	(2)	(3)	(4)
	[200901,200906]	[200810,2009009]	[200804,201003]	[200704,201103]
After2009.4×Exposure	0.007***	0.017***	0.043***	0.086***
	(4.94)	(8.59)	(13.73)	(17.13)
Controls	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	20,850	41,700	83,349	166,596
Adjusted R-squared	0.639	0.639	0.637	0.635

Panel B: Outstanding Loan Amount

	DV: Log (1 + Outstanding Loan)			
	Shorter Window			Longer Window
	(1)	(2)	(3)	(4)
	[200901,200906]	[200810,2009009]	[200804,201003]	[200704,201103]
After2009.4×Exposure	0.082***	0.144***	0.223***	0.312***
	(10.73)	(13.60)	(15.95)	(17.63)
Controls	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	20,850	41,700	83,349	166,596
Adjusted R-squared	0.695	0.695	0.693	0.688

Table 3: The Impacts of Deregulation on Loan Policy

This table reports the results of the DID regression estimates of loan contract terms. Panel A presents the firm-bank-month level regression results. The dependent variables are average *Default*, *Rating*, *Guaranteed*, and *Maturity* weighted by loan amounts. Panel B presents the loan-level regression results. The main independent variable is the interaction, *After2009.4×Exposure*, where *After2009.4* equals one for observations after the policy shock in April 2009 and zero before that. *Exposure* equals one when joint equity banks *k* in city *j* has outstanding branches in city *j* or the capital city of the province that the city *j* is located in before April 2009 (i.e., deregulated bank-city) and equals zero for joint equity banks in still regulated cities and big five banks in cities where no joint equity banks are allowed to freely expand after April 2009 (i.e., unaffected bank-city). We exclude the bank's headquarter cities. *Pretrend_1*, *Pretrend_2*, and *Pretrend_3* are the interactions between *Exposure* and the time dummies indicating the 1-month, 2-month, and 3-month before Apr 2009, respectively. *Log(Assets)*, *Leverage*, *Exposure*, and *After2009.4* are included in all model specifications. Coefficients of these control variables are omitted for brevity. All variables are defined in the Appendix Table A1. Firm-, Bank-, and Year-fixed effects are included across all models. The *t*-statistics in parentheses are based on the cluster-robust standard errors at firm level across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Firm-Bank-Month Sample

	All				SOEs				NonSOEs			
	(1) Default	(2) Rating	(3) Guaranteed	(4) Maturity	(5) Default	(6) Rating	(7) Guaranteed	(8) Maturity	(9) Default	(10) Rating	(11) Guaranteed	(12) Maturity
After2009.04×Exposure	-0.007**	0.005***	0.021***	0.106***	-0.004	0.005	0.014**	0.193**	-0.008*	0.005***	0.022***	0.082***
	(-2.22)	(3.51)	(4.69)	(3.76)	(-0.87)	(1.17)	(2.13)	(2.21)	(-1.95)	(3.66)	(4.04)	(3.53)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	248,331	260,125	260,125	260,125	36,291	39,008	39,008	39,008	212,040	221,117	221,117	221,117
Adjusted R-squared	0.277	0.266	0.474	0.639	0.187	0.206	0.408	0.598	0.291	0.211	0.476	0.641

Panel B: Loan Sample

	All				SOEs				NonSOEs			
	(1) Default	(2) Rating	(3) Guaranteed	(4) Maturity	(5) Default	(6) Rating	(7) Guaranteed	(8) Maturity	(9) Default	(10) Rating	(11) Guaranteed	(12) Maturity
After2009.04×Exposure	-0.003	0.006***	0.014***	0.043**	0.002	0.005	0.002	0.099***	-0.005*	0.008***	0.017***	0.030
	(-1.56)	(4.00)	(4.19)	(2.44)	(0.77)	(1.36)	(0.19)	(3.11)	(-1.94)	(4.16)	(4.15)	(1.42)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	975,651	1,002,873	1,002,873	1,002,873	120,265	129,049	129,049	129,049	854,510	872,852	872,852	872,852
Adjusted R-squared	0.295	0.289	0.488	0.721	0.197	0.199	0.482	0.706	0.310	0.218	0.488	0.716

Table 4: The Impacts of Deregulation on Firms

This table reports the results of the DID regressions of firm activities and performance. We merge the CIC firm-level data with the CBRC loan data and restrict the sample to the firms which have ever borrowed bank loans between 2006 and 2013. The dependent variable in column 1 and 2 is the growth of fixed assets. Column 3 and 4 are employee growth. The dependent variable in Column 5 and 6 is *Net Income Growth*. Column 7 and 8 are *ROA* (Return on Assets) of the firm. Regression results over the 6-year window and 10-year window are reported. Our main independent variable is *After2009×Exposure*, where *After2009* equals one for observations after the year of 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., either the city or its capital city has 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 *Exposure* and *Pre-trend*$_{t-2}$ equals year dummy for 2007 times *Exposure*. *Exposure*, *After2009*, and time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All regressions are controlled for firm fixed effect and year fixed effect. Standard errors are clustered at the 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)
	Fixed Assets Growth		Employee Growth		Net Income Growth		ROA	
	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]
After2009×Exposure	0.341***	0.213***	0.148***	0.081***	0.872***	0.440***	0.019***	0.018***
	(6.42)	(5.65)	(5.40)	(4.43)	(4.27)	(3.48)	(6.45)	(7.24)
Pre-trend$_{t-1}$	-0.080	-0.071	0.027	0.007	-0.098	-0.073	-0.004	-0.005
	(-1.48)	(-1.58)	(1.03)	(0.31)	(-0.54)	(-0.48)	(-1.10)	(-1.43)
Pre-trend$_{t-2}$	0.005	0.015	0.039	0.018	-0.292	-0.256	-0.004	-0.006*
	(0.10)	(0.37)	(1.43)	(0.80)	(-1.52)	(-1.53)	(-1.26)	(-1.75)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	174,275	293,125	173,104	292,545	96,386	188,434	205,658	342,096
Adjusted R-squared	0.053	0.050	0.058	0.051	0.006	0.008	0.019	0.015

Table 5: The Impacts of Deregulation on Firms across Cities

This table reports the results of the DID regressions of firm activities and performance. We merge the CIC firm-level data with the CBRC loan data and restrict the sample to the firms which have ever borrowed bank loans between 2006 and 2013. The dependent variable in column 1 and 2 is the growth of fixed assets. Column 3 and 4 are employee growth. The dependent variable in Column 5 and 6 is *Net Income Growth*. Column 7 and 8 are *ROA* (Return on Assets) of the firm. Regression results over the 6-year window and 10-year window are reported. Our main independent variable is *After2009×Exposure*, where *After2009* equals one for observations after the year of 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., either the city or its capital city has outstanding Joint-equity branches prior to the bank expansion policy shock) and zero for controlled cities. *HHI* is the Herfindahl-Hirschman Index of outstanding branch number prior to the shock for each city. *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 *Exposure* and *Pre-trend*$_{t-2}$ equals year dummy for 2007 times *Exposure*. *Exposure*, *After2009, HHI*, and time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All regressions are controlled for firm fixed effect and year fixed effect. Standard errors are clustered at the 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)
	Fixed Assets Growth		Employee Growth		Net Income Growth		ROA	
	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]
After2009×Exposure×HHI	1.542*	1.962***	0.642	0.522**	4.270	0.695	0.226***	0.246***
	(1.94)	(3.12)	(1.38)	(2.35)	(1.55)	(0.29)	(6.07)	(5.38)
After2009×Exposure	0.247***	0.108*	0.110***	0.055**	0.522*	0.237	0.015***	0.014***
	(3.43)	(1.91)	(2.77)	(2.44)	(1.93)	(1.13)	(3.43)	(3.04)
Pre-trend$_{t-1}$	-0.078	-0.070	0.110	0.203	-1.726**	-1.108*	-0.017	-0.004
	(-1.62)	(-1.64)	(0.43)	(0.95)	(-2.46)	(-1.71)	(-0.99)	(-0.24)
Pre-trend$_{t-2}$	0.005	0.014	0.029	0.008	-0.087	-0.060	-0.004	-0.005
	(0.10)	(0.36)	(1.02)	(0.36)	(-0.44)	(-0.36)	(-0.96)	(-1.23)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	174,067	292,764	172,894	292,180	96,249	188,185	205,400	341,654
Adjusted R-squared	0.246	0.210	0.232	0.190	0.304	0.268	0.548	0.522

Table 6: The Impacts of Deregulation on Credit Allocation

This table reports the results of the DID regressions of the bank loan allocation between SOEs and private firms. The dependent variables in Panel A are SOE loans outstanding and the percentage of loans to SOEs at the city-bank-month level. In Panel B, the dependent variables is the shares of outstanding loans to firms with higher TFP (i.e., *High TFP Share*) at city-bank-month level. The main independent variable is the interaction, *After2009.4×Exposure*, where *After2009.4* equals one for observations after the policy shock in April 2009 and zero before that. *Exposure* equals one when joint equity banks *k* in city *j* has outstanding branches in city *j* or the capital city of the province that the city *j* is located in before April 2009 (i.e., deregulated bank-city) and equals zero for joint equity banks in still regulated cities and big five banks in cities where no joint equity banks are allowed to freely expand after April 2009 (i.e., unaffected bank-city). We exclude the bank's headquarter cities. *Pre-trend$_{t-1}$*, *Pre-trend$_{t-2}$*, and *Pre-trend$_{t-3}$* are the interactions between *Exposure* and the time dummies indicating the 1-month, 2-month, and 3-month before April 2009, respectively. *Exposure*, *After2009.4* and time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All variables are defined in the Appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. The *t*-statistics in parentheses are based on the two-way cluster-robust standard errors (cluster by city and bank) across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Lending to SOEs

	Dependent Variable: Loans to SOE			
	SOE-Share		Log(Outstanding Loans)	
	(1)	(2)	(3)	(4)
	1-Year	2-Year	1-Year	2-Year
After2009.4×Exposure	0.034**	0.041**	0.354***	0.497***
	(2.01)	(2.06)	(2.89)	(3.63)
Pre-trend$_{t-1}$		0.001		0.032
		(0.03)		(0.24)
Pre-trend$_{t-2}$		0.015		0.168
		(0.82)		(1.48)
Pre-trend$_{t-3}$		0.011		0.102
		(0.64)		(0.96)
Controls	Yes	Yes	Yes	0.032
City FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	27,940	58,690	27,947	58,701
Adjusted R-squared	0.453	0.411	0.694	0.669

(*To be continued*)

Table 6: The Impacts of Deregulation on Credit Allocation—*continued*

Panel B: Lending to Efficient Firms

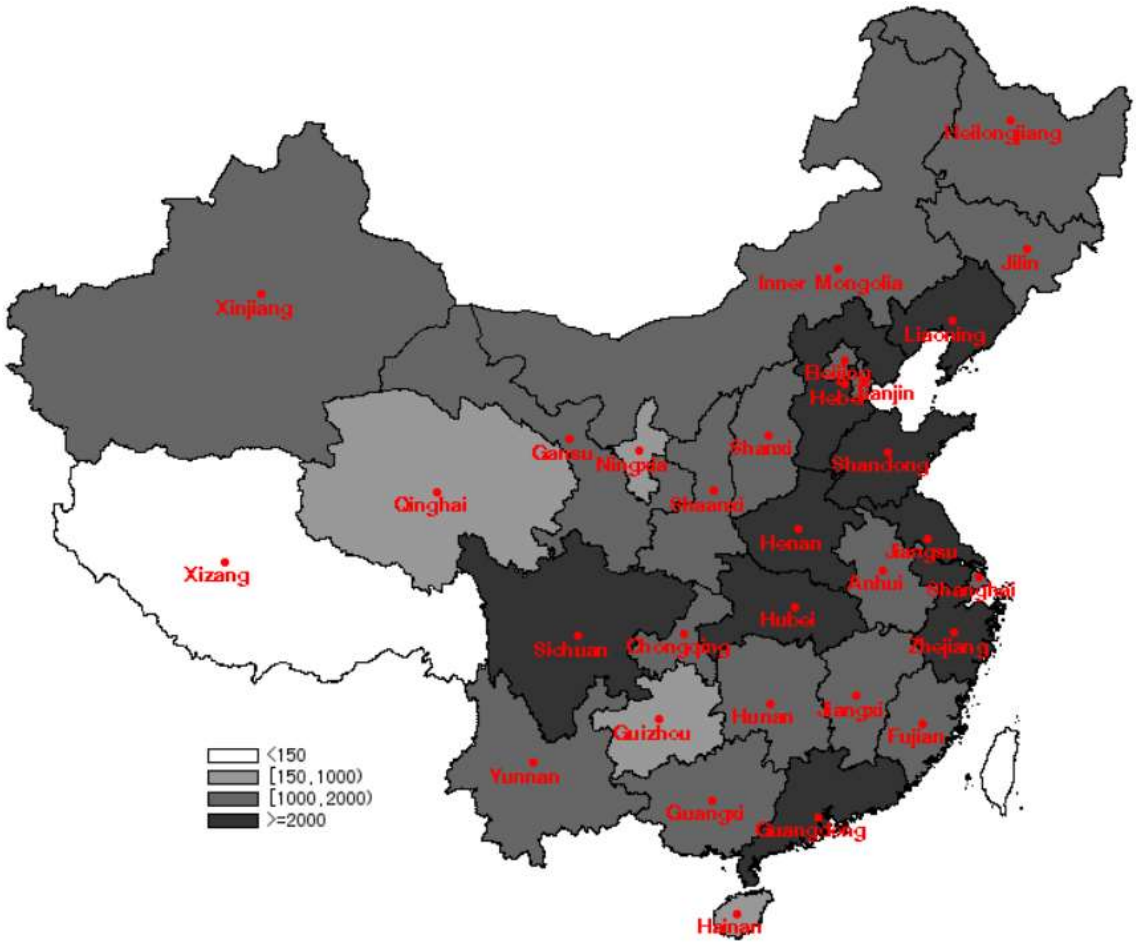
	Dependent Variable: High TFP Share			
	For SOEs		For Non-SOEs	
	(1)	(2)	(3)	(4)
	1-Year	2-Year	1-Year	2-Year
After2009.4×Exposure	-0.043**	-0.047**	0.003	0.023
	(-2.27)	(-2.00)	(0.17)	(0.88)
Pre-trend$_{t-1}$		-0.021		-0.003
		(-1.11)		(-0.12)
Pre-trend$_{t-2}$		-0.021		0.001
		(-1.17)		(0.03)
Pre-trend$_{t-3}$		-0.014		-0.010
		(-0.83)		(-0.45)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	15,245	32,047	24,999	52,769
Adjusted R-squared	0.551	0.509	0.433	0.385

Table 7: The Impacts of Deregulation on SOEs vs. Private Firms

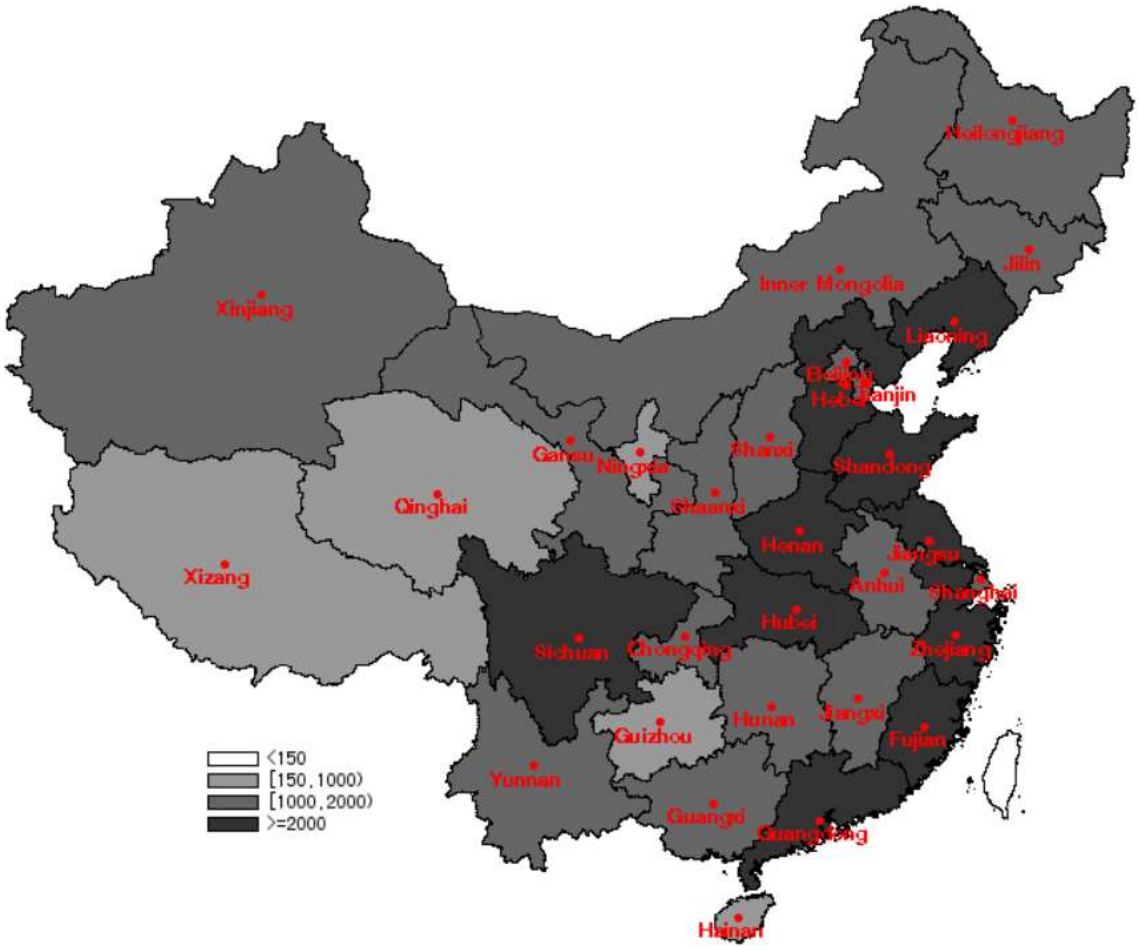
This table reports the results of the DID regressions of activities and performance for SOEs and private firms. We merge the CIC firm-level data with the CBRC loan data and restrict the sample to the firms which have ever borrowed bank loans between 2006 and 2013. The dependent variable in column 1 and 2 is the growth of fixed assets. Column 3 and 4 are employee growth. The dependent variable in Column 5 and 6 is *Net Income Growth*. Column 7 and 8 are *ROA* (Return on Assets) of the firm. Regression results over the 6-year window and 10-year window are reported. Our main independent variable is *After2009×Exposure*, where *After2009* equals one for observations after the year of 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., either the city or its capital city has outstanding Joint-equity branches prior to the bank expansion policy shock) and zero for controlled cities. *Private* equals one if the firm is private-owned and zero otherwise. *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 *Exposure* and *Pre-Trend*$_{t-2}$ equals year dummy for 2007 times *Exposure*. *Exposure*, *After2009*, and time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All regressions are controlled for firm fixed effect and year fixed effect. Standard errors are clustered at the 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)
	Fixed Assets Growth		Employee Growth		Net Income Growth		ROA	
	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]	[2006, 2011]	[2004, 2013]
After2009×Exposure×Private	0.505***	0.336***	0.160***	0.112***	1.099**	0.918***	0.026***	0.026***
	(4.31)	(4.05)	(2.71)	(2.91)	(2.22)	(2.85)	(4.39)	(5.02)
After2009×Exposure	-0.167	-0.117	0.020	0.002	-0.209	-0.435	-0.004	-0.003
	(-1.56)	(-1.58)	(0.36)	(0.05)	(-0.45)	(-1.45)	(-0.65)	(-0.96)
Pre-trend$_{t-1}$	-0.084	-0.072	0.014	0.000	-0.109	-0.072	-0.004	-0.005
	(-1.57)	(-1.61)	(0.62)	(0.00)	(-0.61)	(-0.48)	(-1.07)	(-1.41)
Pre-trend$_{t-2}$	-0.007	0.005	0.033	0.016	-0.288	-0.254	-0.004	-0.006*
	(-0.14)	(0.13)	(1.41)	(0.83)	(-1.51)	(-1.53)	(-1.24)	(-1.78)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	174,067	292,764	172,894	292,180	96,249	188,185	205,400	341,654
Adjusted R-squared	0.055	0.051	0.060	0.053	0.006	0.008	0.020	0.015

Appendix



Panel A: By the Year 2008



Panel B: By the Year 2013

Figure A1: Heat Map of the Number of Big Five Banks' Branches across Provinces, 2008 versus 2013. This figure illustrates the number of big five bank branches outstanding 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).

Table A1: Variables' Definition and Construction

Variables	Definitions
After2009.4	A dummy variable that equals one if it is after the deregulation shock and zero otherwise.
Exposure	A dummy variable at city-bank level that equals one if the joint-equity bank has outstanding branches in this city or its capital city of the province before the bank expansion policy shock and zero otherwise.
Loan Amount (Million RMB)	The balance of each loan contract. The unit is in a million RMB.
Maturity	The term of each loan contract. The unit is in years.
Rating Dummy	The credit score placed by the loan officers in the bank. The larger the number, the worse the credit quality of the obligor. It takes the value of one if the rating is at the first category and zero otherwise.
Guaranteed	A dummy variable that equals one if the bank requires third-party guarantee protections and zero otherwise.
Existing Borrower	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.
ATR	Asset turnover ratio is defined as the total operating income divided by total assets.
Higher ATR	A dummy indicates whether the assets turnover ratio is above the median value of the firms' assets turnover ratio in census 2008.
Assets (Million RMB)	The total assets of firms. The unit is in a million RMB.
Fixed Assets (Million RMB)	The amount of fixed assets. The unit is in a million RMB.
Liabilities (Million RMB)	The total liabilities of firms. The unit is in a 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 a million RMB.
Employee	The amount of employment.
Fixed Assets Growth	The year-on-year growth of fixed assets.
Employee Growth	The year-on-year growth of employees.
Net Income Growth	The year-on-year growth of net incomes.
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.
Interest Rate	The ratio of firm interest expense in CIC data divided by the total loans outstanding of the firm in year *t*-1 in CBRC data. The sample is restricted to firms in CIC data with bank loans outstanding
HHI	The Herfindahl-Hirschman Index of outstanding branch number before the shock for each city (i.e., higher HHI, less competitive).
Local GDP	It is the city level GDP.

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) the 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
Shaanxi	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: 4T Effect on Deregulated Bank-Cities and Regulated Bank-Cities

This table reports the comparisons of the growth rate of loans outstanding from Nov 2008 to Mar 2009 between deregulated bank-cities (i.e., treated groups) and regulated bank-cities (i.e., control groups). The growth rate of loans outstanding is calculated at the bank-city-month level. The *t*-test was employed to show the significance of mean difference, and *t*-statistics are reported in parentheses.

	Before winsorization		After winsorization		After winsorization conditional on Growth>0	
From Nov 2008 to Mar 2009	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Deregulated Joint Equity Bank-Cities (1)	34.42%	236.86%	26.81%	88.11%	69.51%	94.86%
Deregulated Big Five Bank-Cities (2)	32.67%	89.96%	30.06%	61.61%	40.54%	62.84%
Regulated Bank-Cities (3)	32.75%	121.47%	27.65%	89.37%	52.36%	103.97%
Mean Difference (1)-(3)	1.66%		-0.01%		17.15%	
t-statistics (1)-(3)	(0.06)		(-0.09)		(1.27)	
Mean Difference (2)-(3)	-0.08%		2.40%		-11.82%	
t-statistics (2)-(3)	(-0.01)		(0.34)		(-1.29)	

Table A4: 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 set up in less than 12 months before the loan issuing month. *Loan Amount* is loan balance in unit of Million RMB, *Maturity* is in unit of year, *Rating Dummy* measures the five-category loan classification where it takes the value of one if the internal rating equals one and zero if the internal rating is larger than 1, *Guaranteed* is a dummy indicating whether the loan is guaranteed by third-parties, and *Default* is a dummy indicating whether the loan is repaid three months after due date. *Assets* measure the size of borrowers in a 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 (Million RMB)	6,279,220	15.031	4.000	52,098	22.060	9.798	7.029***	50.96
Maturity	6,279,220	0.997	0.500	52,098	0.950	0.583	-0.047***	-5.65
Rating Dummy	6,279,220	0.979	1.000	52,098	0.995	1.000	0.016***	26.33
Guaranteed	6,279,220	0.206	0.000	52,098	0.294	0.000	0.088***	49.06
Default	5,111,093	0.011	0.000	41,780	0.006	0.000	-0.005***	-9.31
				Joint-equity Bank subsample				
Loan Amount (Million RMB)	1,925,172	14.435	3.213	51,375	22.220	10.000	7.785***	57.23
Maturity	1,925,172	0.733	0.500	51,375	0.930	0.583	0.197***	35.34
Rating Dummy	1,925,172	0.993	1.000	51,375	0.996	1.000	0.003***	8.73
Guarantee Requirement	1,925,172	0.233	0.000	51,375	0.295	0.000	0.062***	33.28
Default	1,567,829	0.006	0.000	41,175	0.006	0.000	-0.000	-0.51

Table A5: Bank Expansion Effect on Big Five Banks

This table presents the regression estimates of difference-in-difference analysis on the impact of deregulation shock in joint equity bank expansion on big five banks. The dependent variables are *Log(1+Outstanding Loan)* and *Log(1+Number of Branches)*. The main independent variable is the interaction, *After2009.4×Exposure*, where *After2009.4* equals one for observations after the policy shock in April 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 where at least one of the joint-equity banks 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. Column (1) and (3) report the regression estimates for subsample during Apr 2008 to Mar 2010 (two-year event window) and column (2) and column (4) report the regression estimates for subsample during Apr 2007 to Mar 2011 (four-year event window). *Pretrend_1*, *Pretrend_2*, and *Pretrend_3* are the interactions between *Exposure* and the time dummies indicating the 1-month, 2-month, and 3-month before Apr 2009, respectively. *Exposure*, *After2009.4*, time dummies and *Log(City GDP)* are included in all model specifications. Coefficients of these control variables are omitted for brevity. All variables are defined in the Appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. Fixed effects estimates, including the constant, are omitted for brevity. The *t*-statistics in parentheses are based on the two-way cluster-robust standard errors (cluster by city and by bank) across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Log (1 + No. Branches)		Log (1 + Outstanding Loan)	
	(1)	(2)	(3)	(4)
	[200804,201003]	[200704,201103]	[200804,201003]	[200704,201103]
After2009.4*Exposure	0.016	0.021	0.002	-0.055
	(1.48)	(1.03)	(0.04)	(-0.77)
Pre-trend$_{t-1}$		0.005		0.032
		(0.37)		(0.68)
Pre-trend$_{t-2}$		0.005		-0.038
		(0.33)		(-0.80)
Pre-trend$_{t-3}$		0.004		-0.078*
		(0.30)		(-1.65)
Controls	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	34,185	68,340	34,185	68,340
Adjusted R-squared	0.862	0.861	0.851	0.853

Table A6: Deregulation Effect on Local Deposits

This table presents the OLS regression estimates of difference-in-difference analysis of the banking deregulation effect on local deposits. The overall sample includes 1,740 city-year observations with no null values and the dependent variables are *Log(1+ Local Deposit)* and *Local Deposits/Local GDP*. The main independent variable is the interaction, *After2009.4×Exposure*, where *After2009* equals one for observations after the year of 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., either the city or its capital city has outstanding joint-equity branches prior to the bank expansion policy shock) and zero for controlled cities. We exclude the bank headquater cities. The column (1) and (4) report the regression estimate only with year-fixed effect, the column (2) and (5) further include the Province-fixed effects, and the column (3) and (6) report the regression estimates with both City- and Year-fixed effects. *Exposure*, *After2009.4*, time dummies and *Log(City GDP)* are included in all model specifications. Coefficients of these control variables are omitted for brevity. All other variables are defined in the Appendix Table A1. Fixed effects estimates, including the constant, are omitted for brevity. 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.

	Local Deposits					
	Log(1+ Local Deposits)			Local Deposits/Local GDP		
	(1)	(2)	(3)	(4)	(5)	(6)
After2009.4×Exposure	-0.089	-0.087	-0.151*	0.012	0.017	-0.121
	(-1.20)	(-1.16)	(-1.89)	(0.22)	(0.32)	(-1.48)
Controls	YES	YES	YES	YES	YES	YES
Province FE	NO	YES	NO	NO	YES	NO
City FE	NO	NO	YES	NO	NO	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	1,740	1,740	1,740	1,740	1,740	1,740
Adjusted R-squared	0.852	0.900	0.979	0.150	0.391	0.829

Table A7: Impacts of Deregulation on Interest Rates

This table presents the OLS regression estimates of difference-in-difference analysis of the banking deregulation effect on borrowing costs. The sample in Panel A restricts to CIC firms with outstanding loans in a given year and covers 124,830 firm-year observations. The dependent variable in Panel A is a proxy for interest rate, the ratio of interest payments over the amount of loans. Panel B reports the interaction analyses between deregulation effect and the firm's state ownership. The sample in Panel C is from CSMAR loan database and includes 457 loan contracts with null values. The dependent variable in Panel C is the interest rate recorded in loan contracts. The main independent variable is the interaction, *After2009.4×Exposure*, where *After2009.4* equals one for observations after April 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., either the city or its capital city has 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 *Exposure* and *Pre-trend*$_{t-2}$ equals year dummy for 2007 times *Exposure*. *Log(Assets), Leverage, Private, Exposure, After2009.4,* and time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All other variables are defined in the Appendix Table A1. Firm- and Year-fixed effects are included in Panel A and City- and Industry-fixed effects are included in Panel B. Standard errors are clustered at the 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.

Panel A: CIC Sample

	Nominal Interest Rate (%)	
	(1)	(2)
After2009.4×Exposure	-1.019***	-1.163***
	(-2.92)	(-2.70)
Pre-trend$_{t-1}$		-0.159
		(-0.27)
Pre-trend$_{t-2}$		-0.220
		(-0.33)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	108,580	108,580
Adjusted R-squared	0.621	0.621

(*To be continued*)

Table A7: Deregulation Effect on Interest Rate—*continued*

Panel B: Interactions with Private Dummy for CIC Sample

	Nominal Interest Rate (%)	
	(1)	(2)
Private×After2009.4×Exposure	-0.603***	-0.603***
	(-2.91)	(-2.92)
After2009.4×Exposure	-0.460	-0.610
	(-1.19)	(-1.30)
Pre-trend$_{t-1}$		-0.167
		(-0.28)
Pre-trend$_{t-2}$		-0.221
		(-0.33)
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES
Observations	108,580	108,580
Adjusted R-squared	0.621	0.621

Panel C: CSMAR Loan Sample

	Nominal Interest Rate (%)			
	(1)	(2)	(3)	(4)
After2009.4×Exposure	-1.044**	-1.069*	-8.005***	-6.083***
	(-2.05)	(-1.89)	(-7.87)	(-2.86)
Controls	YES	YES	YES	YES
City FE	NO	NO	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	457	457	457	457
Adjusted R-squared	0.382	0.410	0.660	0.668

Table A8: The Impacts of Deregulation on Big Five Banks' Credit Allocation

This table reports the results of the DID regressions of the big five bank loan allocation between SOEs and private firms. The sample is restricted to big five banks. The dependent variables in Panel A are SOE loans outstanding and the percentage of loans to SOEs at the city-bank-month level. In Panel B, the dependent variables is the shares of outstanding loans to firms with higher TFP (i.e., *High TFP Share*) at city-bank-month level. The main independent variable is the interaction, *After2009.4×Exposure*, where *After2009.4* equals one for observations after the policy shock in April 2009 and zero before that. *Exposure* equals one in cities where some joint equity banks are allowed to freely expand after April 2009 and zero otherwise (i.e., in those unaffected bank-city). We also exclude the bank's headquarter cities. *Pretrend_1*, *Pretrend_2*, and *Pretrend_3* are the interactions between *Exposure* and the time dummies indicating the 1-month, 2-month, and 3-month before April 2009, respectively. *Exposure*, *After2009.4*, and time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All variables are defined in the Appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. The *t*-statistics in parentheses are based on the two-way cluster-robust standard errors (cluster by city and bank) across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Lending to SOEs

	Dependent Variable: Loans to SOE			
	Log(Outstanding Loans)		SOE-Share	
	(1)	(2)	(3)	(4)
	1-Year	2-Year	1-Year	2-Year
After2009.4×Exposure	0.072	0.237	0.007	0.020
	(0.48)	(1.22)	(0.40)	(0.88)
Pre-trend$_{t-1}$		0.058		0.006
		(0.31)		(0.27)
Pre-trend$_{t-2}$		0.195		0.012
		(1.34)		(0.53)
Pre-trend$_{t-3}$		0.121		0.015
		(0.89)		(0.82)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	32,016	65,618	32,014	65,614
Adjusted R-squared	0.685	0.672	0.518	0.490

(*To be continued*)

Table A8: The Impacts of Deregulation on Big Five Banks' Credit Allocation—*continued*

Panel B: Lending to Efficient Firms

	Dependent Variable: High TFP Share			
	For SOEs		For Non-SOEs	
	1-Year	2-Year	1-Year	2-Year
After2009.4×Exposure	-0.033	-0.044	-0.019	-0.010
	(-1.48)	(-1.61)	(-0.94)	(-0.39)
$Pre\text{-}trend_{t-1}$		-0.008		0.008
		(-0.44)		(0.35)
$Pre\text{-}trend_{t-2}$		-0.026		0.029
		(-1.39)		(1.47)
$Pre\text{-}trend_{t-3}$		-0.015		0.035*
		(-0.91)		(1.86)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	24,882	51,124	31,162	63,772
Adjusted R-squared	0.581	0.556	0.435	0.401

Table A9: Descriptive Statistics of Borrower Characteristics

This table reports the descriptive statistics of borrower characteristics. Panel A reports the mean difference tests on operating efficiency variables between SOE borrowers and Non-SOE borrowers, i.e., ATRs (Asset Turnover Ratio) and TFP. For SOE subsample, Panel B reports the mean difference tests on proportion of borrowers at higher hierarchy and size between the lower-TFP group and the higher-TFP group. Borrowers in *Lower TFP* group are those of which TFP estimated is lower than the median value. *Higher Hierarchy* takes the value of one if the borrower's hierarchy is at the city level or above. *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.

	Panel A: Overall Sample			
	ATRs		TFP	
	N	Mean	N	Mean
SOE=0	4,560,173	2.551	4,560,173	2.856
SOE=1	376,607	2.189	376,607	1.134
Diff (1-0)		-0.362***		-0.722***
t-statistics		(-49.97)		(-124.24)
	Panel B: SOE Subsample			
	Higher Hierarchy		Assets	
Lower TFP	229,637	0.627	229,635	66.800
Higher TFP	147,007	0.606	146,972	29.990
Diff (H-L)		-0.021***		-36.810 ***
t-statistics		(-12.96)		(-113.46)

Table A10: Pre-trend Analyses

This table reports the difference-in-difference regression estimates of the bank expansion effect on how banks target borrowers. The dependent variable are the percentage of loans to SOEs and the logarithm of SOE loans outstanding at city-bank-month level. The main independent variable is the interaction, *M_j*×*Exposure*, where *M_j* equals one for observations in month *j* (j is from Apr 2008 to Mar 2010) and zero otherwise. *Exposure* equals one when joint equity banks *k* in city *j* has outstanding branches in city *j* or the capital city of the province that the city *j* is located in before April 2009 (i.e., deregulated bank-city) and equals zero for joint equity banks in still regulated cities and big five banks in cities where no joint equity banks are allowed to freely expand after April 2009 (i.e., unaffected bank-city). We also exclude the bank's headquarter cities. Time dummies are included in all model specifications. Coefficients of these control variables are omitted for brevity. All variables are defined in the Appendix Table A1. City-, Bank-, and Year-fixed effects are included across all models. The *t*-statistics in parentheses are based on the two-way cluster-robust standard errors (cluster by city and by bank) across all these model specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

(*To be continued*)

Table A10: Long Term Pre-trend Analyses—*continued*

	Dependent Variable: Percentage of Loans to SOEs	Dependent Variable: Log(SOE Loans)
	[200704, 201103]	[200704, 201103]
Exposure	0.004	-0.034
	(0.23)	(-0.91)
After2009.4	0.003	-0.009
	(0.85)	(-0.52)
Exposure×M2008.04	0.012	-0.027
	(0.34)	(-0.13)
Exposure×M2008.05	0.004	-0.068
	(0.12)	(-0.31)
Exposure×M2008.06	0.007	-0.080
	(0.19)	(-0.36)
Exposure×M2008.07	-0.016	-0.163
	(-0.46)	(-0.75)
Exposure×M2008.08	-0.018	-0.087
	(-0.53)	(-0.41)
Exposure×M2008.09	0.005	-0.027
	(0.16)	(-0.13)
Exposure×M2008.10	0.007	-0.078
	(0.22)	(-0.40)
Exposure×M2008.11	0.010	0.035
	(0.33)	(0.19)
Exposure×M2008.12	0.024	0.125
	(0.89)	(0.73)
Exposure×M2009.01	0.017	0.048
	(0.74)	(0.33)
Exposure×M2009.02	0.016	0.058
	(0.77)	(0.42)
Exposure×M2009.03	0.025	0.118
	(1.28)	(0.89)
Exposure×M2009.04	0.030	0.302*
	(1.09)	(1.80)
Exposure×M2009.05	0.061**	0.486***
	(2.39)	(2.74)
Exposure×M2009.06	0.071**	0.652***
	(2.39)	(3.34)
Exposure×M2009.07	0.064*	0.608***
	(1.96)	(2.90)
Exposure×M2009.08	0.074**	0.689***
	(2.22)	(3.07)
Exposure×M2009.09	0.066**	0.700***
	(1.99)	(3.10)
Exposure×M2009.10	0.073**	0.719***
	(2.12)	(3.14)
Exposure×M2009.11	0.090**	0.830***
	(2.50)	(3.52)
Exposure×M2009.12	0.082**	0.753***
	(2.30)	(3.24)
Exposure×M2010.01	0.080**	0.739***
	(2.26)	(3.27)
Exposure×M2010.02	0.083**	0.839***
	(2.31)	(3.57)
Exposure×M2010.03	0.066*	0.764***
	(1.83)	(3.23)
Controls	Yes	Yes
City FE	Yes	Yes
Bank FE	Yes	Yes
Year FE	Yes	Yes
Observations	55,155	55,166
R-squared	0.406	0.665