Kang, Shulong; Dong, Jianfeng; Yu, Haiyue; Cao, Jin; Dinger, Valeriya

**Working Paper**

# City commercial banks and credit allocation: Firm-level evidence

BOFIT Discussion Papers, No. 4/2021

**Provided in Cooperation with:**
Bank of Finland, Helsinki

*Suggested Citation:* Kang, Shulong; Dong, Jianfeng; Yu, Haiyue; Cao, Jin; Dinger, Valeriya (2021) : City commercial banks and credit allocation: Firm-level evidence, BOFIT Discussion Papers, No. 4/2021, ISBN 978-952-323-369-0, Bank of Finland, Bank of Finland Institute for Emerging Economies (BOFIT), Helsinki, https://nbn-resolving.de/urn:nbn:fi:bof-202103091126

BOFIT Discussion Papers
4 • 2021

Shulong Kang, Jianfeng Dong,
Haiyue Yu, Jin Cao and Valeriya Dinger

# City commercial banks and credit allocation: Firm-level evidence

SUOMEN PANKKI 18 11 FINLANDS BANK EUROSYSTEM
BOFIT
THE BANK OF FINLAND
INSTITUTE FOR
EMERGING ECONOMIES

BOFIT Discussion Papers
Editor-in-Chief Zuzana Fungáčová

BOFIT Discussion Papers 4/2021
8.3.2021

Shulong Kang, Jianfeng Dong, Haiyue Yu, Jin Cao and Valeriya Dinger:
City commercial banks and credit allocation: Firm-level evidence

ISBN 978-952-323-369-0, online
ISSN 1456-5889, online



Bank of Finland
Helsinki 2021

# Contents

Shulong Kang, Jianfeng Dong, Haiyue Yu, Jin Cao and Valeriya Dinger

# City commercial banks and credit allocation: Firm-level evidence

## Abstract

This paper investigates how government-led banking liberalization affects credit allocation by banks using as a quasi-natural experiment the establishment of city commercial banks (CCBs) in China. Based on more than three million corporate financial statements spanning over 16 years, we find that the establishment of CCBs led to a 6–14 % drop in debt funding for private firms, as well as a 1–2 % rise in their funding costs. At the same time, private infrastructure firms enjoyed a nearly 6 % increase in debt funding and more than 100-basis-point drop in interest costs despite their inferior credit quality. The debt financing of private firm appears most severely affected in municipalities where officials face high promotional pressures or fiscal constraints.

Keywords: banking liberalization, city commercial banks, bank lending, credit allocation, political economy in banking

JEL Classification: D7, G21, G32, G38, P2

**Shulong Kang**, orcid.org/0000-0003-2098-4492. Dongbei University of Finance and Economics, China. Email: shulongkang@dufe.edu.cn

**Jianfeng Dong**, orcid.org/0000-0003-2976-7080. Dongbei University of Finance and Economics, China. Email: jianfengdong_dufe@163.com

**Haiyue Yu**, orcid.org/0000-0003-0938-1500. Dongbei University of Finance and Economics, China. Email: yuhaiyue@dufe.edu.cn

**Jin Cao**, orcid.org/0000-0002-1686-2233. Norges Bank, Norway. CESifo, Germany. Corresponding author, address: Bankplassen 2 PB1179 Sentrum, NO-0107 Oslo, Norway. Tel: +47 22 31 69 55. Email: jin.cao@norges-bank.no

**Valeriya Dinger**, orcid.org/0000-0001-8481-6047. University of Osnabrück, Germany. Leeds University Business School, UK. Email: valeriya.dinger@uni-osnabrueck.de

**Acknowledgements**
The authors thank Denis Davydov, Zuzana Fungáčová, Camille Macaire, as well as participants at seminar in Norges Bank, Jack Welch College of Business & Technology, BOFIT Workshop on Finance and Politics, and the European Central Bank China Expert Network Workshop 2020 for useful comments and discussions. This paper should not be reported as representing the views of Norges Bank, and the views expressed are those of the author and do not necessarily reflect those of Norges Bank.

# 1 Introduction

How well did banking liberalization in China manage to improve credit allocation to make optimal use of scarce financial resources? Here, we consider an important aspect of China's banking liberalization, city commercial banks (CCBs), which were created with a view to providing local competition to China's large state-owned banks. Starting in 1995, municipal governments were allowed to convert dysfunctional urban credit cooperatives (UCCs) into urban CCBs through injections of new capital and divestment of non-performing assets. By Q4 2019, there were 134 CCBs across China (CBIRC, 2019) with total assets of CNY 37.275 trillion (USD 5.325 trillion), accounting for 16.0 % of total assets of commercial banks in China. CCBs, along with regional commercial banks (RCBs),[1] today comprise one of the three pillars of Chinese banking (the other two pillars are joint-stock commercial banks, and the large state-owned banks).[2]

Various studies document the positive influence of CCBs in fostering competition, improving cost-efficiency, and raising profitability. For example, Beck et al. (2004), Guiso et al. (2004) and Zhang et al. (2016) indicate that the enhanced competition from CCBs has improved the efficiency of banks in local credit markets. Berger et al. (2005) and Berger et al. (2009) present evidence that profitability and cost-efficiency generally improved when municipalities were permitted to partner with private and foreign owners in the creation of CCBs.

Most studies on Chinese banking liberalization, however, overlook the potentially detrimental effects of CCBs on allocative efficiency, i.e. the potential distortions in the distribution of credit to projects deemed "most productive" for subjective political reasons. Although CCBs successfully diverted substantial regional financial resources (loanable funds) from the incumbent "Big Four" banks (e.g. the share of CCBs in the retail deposit market exceeded 25 % by 2013 at the end of our sample), efficient, creditworthy regional borrowers were not necessarily better off with the credit-allocation schemes of CCBs.

More specifically, scant investigation has been devoted to how efficient credit allocation might be impeded by local government administrations. As both founders and main shareholders of the new entrant CCBs, local government officials found themselves poised to influence appoint-

[1] The institution of "rural commercial bank" was created in 2001 to improve financial services in the countryside. As of 2019 Q4, there were 1,423 RCBs, as well as 1,622 village banks, and 782 rural credit cooperative unions that had made the transition to RCB status (CBIRC, 2019). RCBs are founded by governments in rural villages, towns, and counties. They mainly provide services to farmers and small (mostly agricultural) firms. Although they may be subject to the same credit allocation problems, their borrowers have very little overlap with borrowers in our sample which are sizeable, non-agricultural, industrial firms. In addition, RCBs mainly focus on rural markets, while CCBs focus on urban markets.

[2] China's large, state-owned, as defined by the China Banking and Insurance Regulatory Commission (see CBIRC, 2019), comprise the "Big Four" (Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, and China Construction Bank), plus the Bank of Communications and Postal Savings Bank of China.

ments of CCB senior managers (Qian et al., 2015; Hung et al., 2017). They could exploit the possibility of channeling credit to projects aligned with their political agendas, especially projects that increased their likelihood of career advancement.

Unlike representative democracies, where local officials increase their chances of reelection by creating incentives for politically connected banks to channel credit to projects that benefit target voter groups or by intervening in the process of bank resolution (Khwaja and Mian, 2005; Brown and Dinç 2005; Dinç, 2005; Carvalho, 2014; Agarwal et al., 2016; Agarwal et al., 2018; Behn et al., 2016; Englemeier and Stowasser, 2017; Koetter and Popov, 2020), the goals and mechanisms of exerting political control over banks are quite different in China. In the winnowing process of political success, local Chinese officials must strive to win promotion tournaments, not reelection, at the end of their term in office. They are thus incentivized to interfere in bank credit policy in ways that increase their odds of promotion (Qian et al., 2011; Chen et al., 2019).

Since local GDP growth is a top criterion for promotion (Chen et al., 2005; Li and Zhou, 2005; Zhou, 2007), an ambitious municipal official may seek to bend local banking liberalization efforts by diverting credit supply through the local CCB to select projects in order to take credit for the resulting short-term bump in municipality GDP. As such projects often involve real estate or infrastructure development projects that are not beneficial to the municipality's long-term economic development, they can lead to a misallocation of resources and exacerbation of credit constraints on more productive private firms that face limits on their access to funding.

In this paper, we explore how the creation of CCBs in China has affected the allocative efficiency of the credit system, focusing on whether local officials exploit their control over the CCBs to channel funding to infrastructure projects that contribute to a short-term spurt in local GDP growth in ways that enhance their prospects of promotion and simultaneously reduce the credit access of privately-owned enterprises.

Local officials in China have long resorted to boosting regional GDP by investing in infrastructure and real estate projects. After the fiscal reform of 1994, however, local governments were only permitted to retain a third of tax revenues and were barred from borrowing from banks. The establishment of CCBs gave local officials an opportunity to overcome, at least partially, this limited access to credit by allowing them to influence the distribution of credit to infrastructure and real estate projects. An obvious potential side-effect from preferential treatment of infrastructure projects was the crowding out of privately-owned firms in other sectors. As the newly created CCBs enjoyed public confidence and could mobilize a substantial proportion of their deposits, the ability to influence credit-allocation decisions of CCBs became a key determinant of credit access for many local firms.

To empirically examine the impact of CCBs, we proceed as follows. We start by estimating the impact of establishment of CCBs on the amount and cost of funding available to firms of different ownership and industries using multi-period difference-in-differences (DID) models. We construct a panel spanning the years 1998 to 2013 that combines the financial reporting of over three million non-financial firms with macroeconomic variables from all 337 municipalities in China. We also note the years in which each of 183 CCBs were established. We find that establishment of CCBs led to a 6–14% decrease in debt financing of private firms as well as a rise of 1–2 percentage points in their debt costs. The advent of CCBs, however, appears to have no significant impact on either access to debt financing or the funding costs of SOEs. Moreover, some private firms do not suffer from tight financial conditions in the presence of CCBs. Across all industries, we find that access to debt financing of private infrastructure firms improved, and that their average funding costs declined. Diagnostic tests show the exogeneity of establishment of CCBs, indicating our DID approach is appropriate.

We relate these results to allocative distortions by showing that private infrastructure firms are not better borrowers in ex ante terms as their z-scores prior to the establishment of a local CCB are lower than those of non-infrastructure private firms. We further show that the z-scores of private infrastructure firms deteriorated after the establishment of CCBs, implying more credit risk on CCB balance sheets. These findings may explain why CCBs have become warehouses for non-performing assets. Despite enormous supervision efforts by China's regulatory authorities, the average non-performing loan (NPL) ratio of CCBs has risen steadily. It is now almost 60 % higher than the average NPL ratio of the Big Four banks. Indeed, as of Q2 2020, the average provisioning coverage ratio (PCR) of CCBs was 75 % lower than that of the Big Four. Since 2019, a number of ailing CCBs have had to be recapitalized, restructured, or place under conservatorship by regulators.

We also consider other indications of allocative distortions, showing that increased funding to infrastructure firms does not generate positive spillovers in terms of the performance of non-infrastructure firms, which, in turn, suggests that CCB-induced regional investment booms in infrastructure have been socially wasteful. Consistent with this finding, we document that the brief GDP spurt associated with the establishment of a CCB is largely exhausted within two years.

To demonstrate how the above results relate to the incentive of local politicians to manipulate credit allocation via CCBs, we demonstrate that these allocative distortions are reinforced when local officials face promotion pressures or suffer from limited fiscal capacity. This finding confirms our conjecture that the desire of local officials to win promotions motivates them to divert local financial resources to GDP-boosting projects through CCBs under their control.

These results highlight certain detrimental effects of CCBs on allocative efficiency. They contribute to the literature on how public interventions contribute to credit market allocation. Our findings are also consistent with the results of Gropp et al. (2020), who, using data on German public banks, show that public guarantees of bank liabilities are associated with shifting credit to less productive enterprises. Our results contradict the conventional wisdom in banking literature that regional banks such as CCBs are positioned to better assess the creditworthiness of local borrowers, and hence better at strategic allocation of credit (Broecker, 1990; Agarwal and Hauswald, 2010).

More generally, this paper contributes to the literature investigating the role of ownership structure in financial liberalization. As documented in La Porta et al. (2002), Sapienza (2004), Shen and Lin (2012), Carvalho (2014), government ownership in financial institutions typically reduces their performance. In addition, the introduction of private and foreign ownership improves performance of banks (Berger et al., 2009; Ferri, 2009; Lin and Zhang, 2009).

Our results reflect the adverse impact of government ownership by unveiling firm-level evidence of a credit allocation channel through which government affects CCB loan quality negatively by redirecting bank loans to risky borrowers. The role of ownership and political control is highlighted in the contrast of our results with those of Gao et al. (2019), who focus on a new phase of banking liberalization in which local officials lost power to influence new market entrants. Specifically, they study the effects of the new entrance of joint-stock banks to numerous municipalities that was allowed after a branching reform of 2009. The opening of local branches improved the access of joint-stock banks to local knowledge. By showing that joint-stock banks were better able to screen and monitor local borrowers, Gao et al. (2019) suggest these banks were able to reduce credit losses and provide easy, relatively inexpensive access to credit for the productive, creditworthy private firms propelling economic growth. These private firms, they argue, had previously been largely neglected by the Big Four state banks, which tended to engage more in policy-oriented lending to the ailing state-owned enterprises (SOEs).[3] In contrast to our findings regarding liberalization through establishment of CCBs, liberalization that truly intensified competition without increasing the market share of publicly-controlled banks seems to have had substantial positive effects.

Our research relates to the literature on financial liberalization and growth in the context of China. Chang et al. (2010) find that economic growth leads to financial development in China, not the other way around. Guo and Xiong (2017) observe that establishment of CCBs led to higher local GDP growth. This contradicts our micro-level evidence that the credit allocation underlying

[3] See also Allen et al. (2005), Ferri (2009), and Hsieh and Klenow (2009).

these GDP growth episodes is tilted towards risky, poor-performing infrastructure firms. Excessive infrastructure investments do not improve the performance of local private firms or affect the bias in credit allocation that leads to wasteful growth.

This study also relates to the recent strand of literature on local government's moral suasion in banking, i.e. a home bias of politically connected local banks in allocating resources to local firms (De Marco and Macchiavelli, 2016) or holding local government debt (Baskaran, 2012; Ongena, Popov, and Van Horen, 2019). Our results indicate that CCB credit allocation is not particularly favorable to local firms or firms with political connections. Instead, there is a singular, almost ineluctable, bias towards infrastructure firms and real estate projects – a finding that aligns with the argument that promotional incentives drive the behavior of local officials.

Finally, the paper contributes to the debate on whether public debt crowds out private investment. Recent evidence for China in this direction is provided by Huang et al. (2020), who document that high indebtness of local governments leads to low investment on the part of private firms. Our results indicate this public finance channel causing a crowding-out of private investment is complemented by a credit channel that prefers to allocate financial ressources to projects public officials deem beneficial. This is especially relevant in the case where municipal governments in China are prevented from borrowing freely from banks while pressed to stimulate regional economies under tight fiscal constraints. Our analysis also shows that credit misallocation cannot be fully explained by the conventional political favoritism argument, i.e. that SOEs are favored over private firms in access to funding. We show that private firms, too, receive preferential treatment as long as they engage in GDP-enhancing infrastructure projects.

The rest of the paper proceeds as follows. Section 2 is a brief introduction to the institutional background and sources of our data. Section 3 presents baseline results on how CCB creation affects debt financing and funding costs for firms of different types, and the identification strategy through multi-period DID is justified in several ways. Section 4 investigates how fiscal constraints and promotional pressures facing local officials affect credit allocation after CCBs are created, as well as the implications for social welfare. Section 5 provides the robustness checks that consider different setups. Section 6 concludes.

# 2 Institutional background and data

## 2.1 Financial liberalization and the rise of CCBs

During the era of planned economy, the People's Bank of China (PBOC) acted as a mono-bank that was both China's central bank and the country's sole commercial bank. After economic reforms launched in 1978, the commercial banking wing of the PBOC was spun off to create the

four state-owned banks (Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, and China Construction Bank) referred to today as the "Big Four." The structure of the banking system was enshrined under the 1995 central bank act (Law of the People's Republic of China on the People's Bank of China) and the 1995 commercial bank act (Law of the People's Republic of China on Commercial Banks). The legislation declared that the PBOC would serve as central bank, while the state-owned banks, defined as commercial banks, would be tasked with intermediating funding on market-based principles. This revised legal framework allowed new entrants into the banking sector, most notably joint-stock commercial banks and CCBs.

Unlike joint-stock commercial banks (twelve in total as of 4Q 2019), which were established and owned by market investors and operated nationally,[4] CCBs were established by municipal governments phasing out their local urban credit cooperatives (UCCs). UCCs were quite common from the 1970s up until the banking reforms of the 1990s.[5] Funded mainly by municipal fiscal authorities, local enterprises, and public institutions, they provided small loans to urban collective firms, individual businesses, and urban residents. In an effort to liberalize the banking sector and reduce financial risks, the financial supervisory authority requested that municipal governments to convert their UCCs into modern commercial banks by injecting capital, divesting non-performing assets, and improving corporate governance. If the newly created CCB could show a low non-performing loan (NPL) ratio, ample common equity, and high capital adequacy ratio, it could mobilize new deposits aggressively and substantially expand its credit supply. CCBs soon became non-negligible players in China's banking system.

## 2.2 Summary of the data

Our dataset is constructed by matching firm-level financial statements, the year in which each CCB was established, and macroeconomic variables at the municipal level.

### Firm-level data

Our firm-level data are taken from the 1998–2013 Chinese Industrial Enterprises Survey, which covers both SOEs and non-SOEs with annual sales revenues exceeding CNY 5 million in 1998–2010 and over CNY 20 million during 2011–2013 (adjusted to 2013 values, these amounts, respectively, are roughly USD 0.83 and USD 3.32 million). The firms in our data cover more than

[4] Their main shareholders are typically not regional governments. Instead, they include publicly listed state-owned financial and non-financial firms, foreign banks, and publicly-listed private firms.

[5] In 2006, city commercial banks were permitted to open branches in other municipalities as long as they met certain requirements as to size, capital ratio, and operational records. Existing CCB branches, however, tend to be located in the same region as their parent bank. Our research shows that only six CCBs (Beijing, Shanghai, Ningbo, Hangzhou, Dalian, and Tianjin) had more than five branches in other provinces as of Q2 2018.

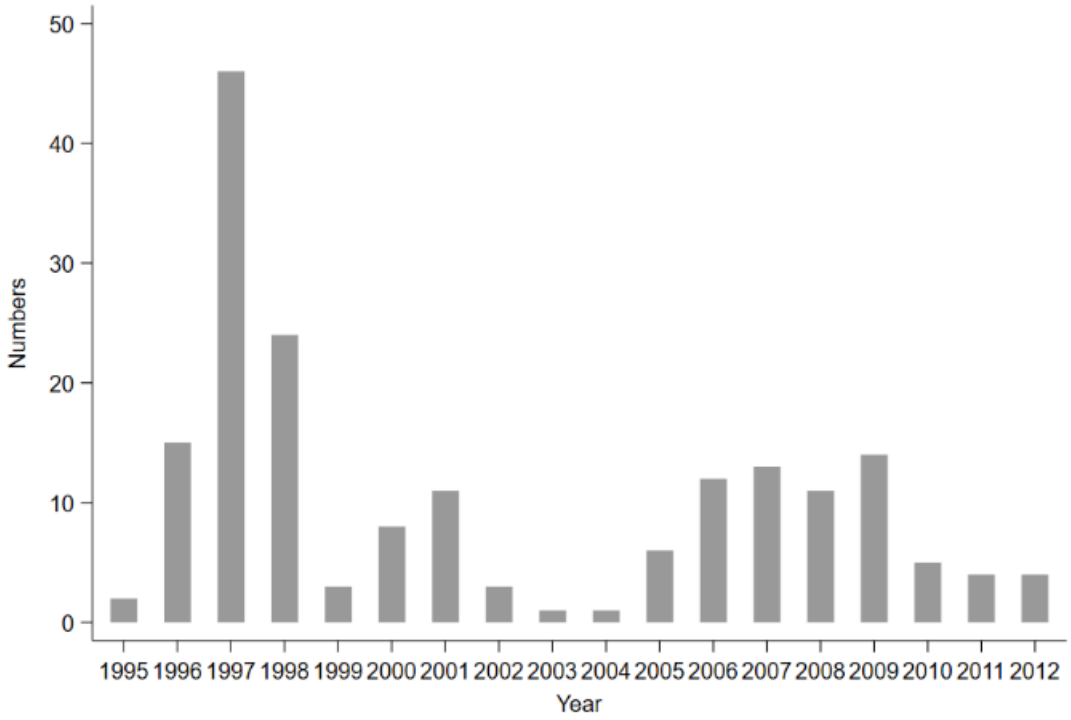
90 % of industrial output in China in 2004 (Brandt et al., 2012). the coverage is still above 70% of industrial output even after the raise of the entry threshold in 2011 (Huang et al. 2020). This broad coverage allows us to capture a majority of borrowing firms in China. While the survey data only extend to 2013, this still allows us to explore the effects from the establishment of most CCBs.

Following the approach of Brandt et al. (2012), we construct our panel data by matching the organization code, name, area code, phone numbers, year of establishment, industrial code, etc of each firm. Keeping with Nie et al. (2012), we exclude abnormal observations, including firms with fewer than eight employees, observations that obviously violate accounting principles. Specifically, firms with total assets less than fixed assets; total assets less than current assets; total liabilities less than current liabilities; annual depreciation greater than accumulated depreciation; firms with negative total assets, total liabilities, fixed assets/total income, or total output; and firms observed for just one year.

### CCB establishment timeline

We hand-collect the information of establishment of CCBs from each bank's official website, annual reports, and online news resources. Figure 1 presents the number of CCBs established in each year of the observation period. All but two CCBs were established before 2013, the final year of our sample. As CCBs were gradually rolled out over the years, we can use the establishment of a CCB as quasi-natural experiment and identify its impact on funding of local firms using difference-in-differences models with multiple time periods.

Figure 1 Number of CCBs established each year, 1995–2012



Municipality-level data

We hand-collect macroeconomic data covering all 337 municipalities in China for the period 1998–2013 from a variety of printed sources, including the *China City Statistical Yearbook, China Statistical Yearbook for Regional Economy, China Land and Resources Statistical Yearbook,* the statistical yearbooks of all provinces, and the Wind Economic Database. Our variables include municipal GDP, population density, total loans and deposits of financial institutions, total investment in fixed assets, public expenditure, and revenue from land right sales.

Appendix A presents definitions and summary statistics of our main variables.

# 3 Empirical analysis

## 3.1 Baseline regressions

We first investigate whether CCBs improve *debt* financing and reduce funding costs of privately-owned and state-owned firms. We identify the impact of a CCB establishment on debt funding of firms and interest rates using multi-period difference-in-differences (DID) models. Multi-period DID regression allows us to identify differences between treatment and control groups when treatments are implemented over time.[6] DID regressions also eliminate disturbances from aggregate or macroeconomic shocks such as credit or leverage cycles. Our baseline regression is specified as follows:

$$y_{ijct} = \alpha + \beta CCB_{ct} + \eta X_{ijct} + \lambda Z_{ct} + \gamma_c + \delta_j + \theta_t + \varepsilon_{ijct}. \quad (1)$$

We run the regressions using two alternative dependent variables $y_{ijct}$ for firm $i$ in industry $j$ from municipality $c$ in year $t$ to measure the access of firms to credit. The first variable is the volume of debts in logarithmic form. Since firm debt in China stems almost exclusively from bank loans, the volume of debts is a good proxy for bank financing of firms. The second variable is interest rate paid on debt, i.e. a firm's funding cost for debt, computed as the firm's total interest payment in year $t$ divided by the firm's total debt in the same year. Our key explanatory variable that picks the effect of establishing a CCB ($CCB_{ct}$) is a dummy variable. For a CCB of municipality $c$ established in year $t$, $CCB_{ct}$ equals 1 for year $t$ and subsequent years, and 0 otherwise.

Vector $X_{ijct}$ includes control variables on the firm level, including log total assets, return on assets (ROA), fixed assets/total assets ratio, log firm age, and log sales revenue. These control for the impacts of firm size, capital structure, performance, and life cycle on bank financing. Vector $Z_{ct}$ includes control variables at the municipal level, including the ratio of total retail deposits

[6] Recent applications include Almond et al. (2019) and Beck et al. (2010).

to GDP, ratio of total bank loans to GDP, and GDP growth rate. These control for the impact of municipality economic development and financial resources on access to bank financing of local firms. $\gamma_c$, $\delta_j$, and $\theta_t$ are municipal, industry, and year fixed effects, respectively.

Results from the baseline regressions for all private firms in our sample are reported in Table 1. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on the municipal*industry level. Columns (1) and (2) present the results for these firms' total debts, and columns (3) and (4) for the interest rates. The results show that establishment of CCBs led to a fall of 6.1–14.4 % in debt financing of private firms, as well as a rise of 120–180 basis points in interest rates, with or without controlling for firm-level and municipality-level variables.[7]

Table 1 Debt funding and interest rate for private firms versus SOEs

| | Private firms | | | | SOEs | | | |
|---|---|---|---|---|---|---|---|---|
| | Log debts | | Interest rate | | Log debts | | Interest rate | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| CCB | –0.061*** | –0.144*** | 0.018*** | 0.012*** | –0.001 | –0.007 | 0.001 | 0.001 |
| | (0.020) | (0.010) | (0.001) | (0.001) | (0.033) | (0.015) | (0.001) | (0.001) |
| No. of obs. | 2,449,947 | 2,333,048 | 1,766,261 | 1,727,384 | 269,473 | 217,286 | 203,238 | 188,390 |
| R-squared | 0.215 | 0.787 | 0.100 | 0.202 | 0.370 | 0.898 | 0.031 | 0.067 |
| Controls | NO | YES | NO | YES | NO | YES | NO | YES |
| Municipality FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating our basic regression equation (1) for firm debt funding and interest rate of private firms and SOEs on the establishment of CCBs. Firm-level controls include log total assets, return on assets (ROA), the ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level. Columns (1), (3), (5) and (7) are based on regressions without firm-/municipality-level controls, while columns (2), (4), (6) and (8) are based on regressions with firm- and municipality-level controls.

Similar adverse impacts of CCBs are not observed for SOEs. Re-doing the same regressions using the sub-samples of SOEs, the results in columns (5)–(8) of Table 1 imply that the establishment of CCBs had no significant impact on debt funding for those firms or the interest rate. SOEs generally enjoy guaranteed funding from the large state-owned banks and do not rely on CCBs for financing.

[7] Table A2, Appendix B presents the estimates for all variables. These results are in line with standard theories and empirical evidence in corporate finance (including, among many others, Lian and Ma, 2020). Large (higher log total assets), well-established (higher log firm age) firms typically have better access to debt financing than small, new firms. A firm with a higher ROA tends to enjoy stronger cash flows and rely more on internal funds than their lower ROA counterparts.

## 3.2 Validating our identification strategy

The baseline regressions are based on multi-period DID models, taking the establishment of CCBs as quasi-natural experiments. The validity of such identification strategy requires that (i) the establishment of a CCB is not correlated with any exogenous municipality-level shocks that drive bank lending to firms, and (ii) the treatments of establishment of CCBs are exogenous with regards to the dependent variables.

In Section 3.2.1., we rule out that the coincidence of an exogenous local shock with establishment of a CCB by including a comparison with two types of firms that operate in the same municipalities as the CCB. The fimes are subject to the same local shocks, but rely on different funding sources. To further strengthen the evidence that observed shifts in credit are not related to an unobservable exogenous local shock, we also conduct a placebo test using randomly simulated control groups

To verify that establishment of CCBs is exogenous with regard to the dependent variables, we show in Section 3.2.2. that the dependent variables for pre-CCB municipalities and the dependent variables for municipalities without CCBs follow the same trend. They only diverge from each other after the establishment of CCBs. Finally, we show that our results remain qualitatively unchanged after controlling for potential endogenous selection and common trends.

### 3.2.1 Ruling out exogenous local shocks that correlate with the establishment of a CCB

Although private firms and SOEs in the same municipality are exposed to the same local shocks, the results in Table 1 suggest that only private firms are affected by CCBs. This divergence in the results within the same region suggests that establishment of a CCB is not a reaction to exogenous local shocks affecting bank lending to firms. This allows us to draw causal interpretations of the effects of establishing CCBs. We futher presume that SOEs are unaffected as they likely borrow from state-owned banks rather than CCBs.

To sharpen this argument, we narrow our sample to central SOEs and the firms owned and operated by the central government. These firms are exposed to the same local shocks as other local private firms in the same municipalities, but receive funding almost exclusively from the big state-owned banks. The re-estimation of model (1) for this sub-sample is reported in Table 2.

Private firms see bank funding declines after establishment of CCBs as shown in columns (1) and (2) of Table 1. In contrast, as shown in columns (1) and (2) of Table 2, establishment of CCBs has no significant impact on the bank funding of central SOEs in terms of volume or cost. This result confirms our intuition that our results are not driven by unobserved local shocks other than the establishment of CCBs. Indeed, if this were the case, the debt funding of both private firms and central SOEs located in the same municipality should react to local shocks.

Table 2 Establishment of CCBs and debt funding for central SOEs versus private firms

| | Central SOEs | |
|---|---|---|
| | (1) | (2) |
| CCB | –0.036 | –0.040 |
| | (0.027) | (0.029) |
| No. of obs. | 42,377 | 37,345 |
| R-squared | 0.901 | 0.902 |
| Controls | NO | YES |
| Municipality FE | YES | YES |
| Industry FE | YES | YES |
| Year FE | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating basic regression equation (1) for firm debt funding for central SOEs as shown in columns (1) and (2), and private firms as shown in columns (3) and (4), on establishment of CCBs. Firm-level controls include log total assets, return on assets (ROA), the ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level. Columns (1) and (3) are based on regressions without firm-/municipality-level controls, while columns (2) and (4) are based on regressions with firm- and municipality-level controls.

Comparing the impacts on central SOEs with private firms, however, only allows us to exclude the causal effects from the *common* shocks faced by both types of firm. We cannot exclude the effects from the *idiosyncratic* shocks, such as industrial policy, that would only pertain to a particular type of firm.

To further ensure that the dynamics of private firms' loan supply are not driven by unobservable municipality-level shocks that coincide with establishment of CCBs, we implement a placebo test (Leary and Roberts, 2014) using random samples generated from treated and non-treated municipalities. We first assign a random year $t = 1998, \dots, 2013$ to each observation in the treatment group, and then estimate the baseline regression equation (1). We repeat this procedure 500 times and obtain 500 estimated coefficients. If the coefficients were statistically different from 0, our results *could* be driven by the municipal-level characteristics, i.e. our baseline estimates would be potentially biased. As shown in Table 3, however, the coefficients estimated from the randomly generated samples are not significantly different from 0, rejecting the null hypothesis that the results are driven by municipality-level unobservable variables that coincide with establishment of CCBs. This result further strengthens the causal interpretation of the impact of establishment of CCBs on debt of private firms. Appendix C presents the probability distribution of coefficients estimated from the placebo test described above. The estimates concentrate around 0 symmetrically, suggesting that our results are unlikely driven by confounding unobservable municipality-level variations.

Table 3 Placebo tests

| | Private firms |
|---|---|
| Average of coefficients | –0.008 |
| Standard error calculated from the coefficients | 0.020 |
| Calculated t-statistics | –0.400 |

This table summarizes the results of estimating basic regression equation (1) for debt funding of firms on establishment of CCBs with firm- and municipality-level controls, using randomly generated samples. Firm-level controls include log total assets, return on assets (ROA), the ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. Random samples are generated by assigning a random year $t = 1998, \dots, 2013$ to each observation in the treatment group. We then estimate the baseline regression equation (1). We repeat this procedure 500 times and obtain 500 estimated coefficients. The table reports the summary statistics of the estimates.

### 3.2.2 Exogeneity of establishment of CCBs

We further strengthen the evidence on exogeneity by tracing the dynamics of debt funding of firms before and after the establishment of CCBs by estimating $\beta_k$ $(k = -3, -2, \dots, 5)$ from

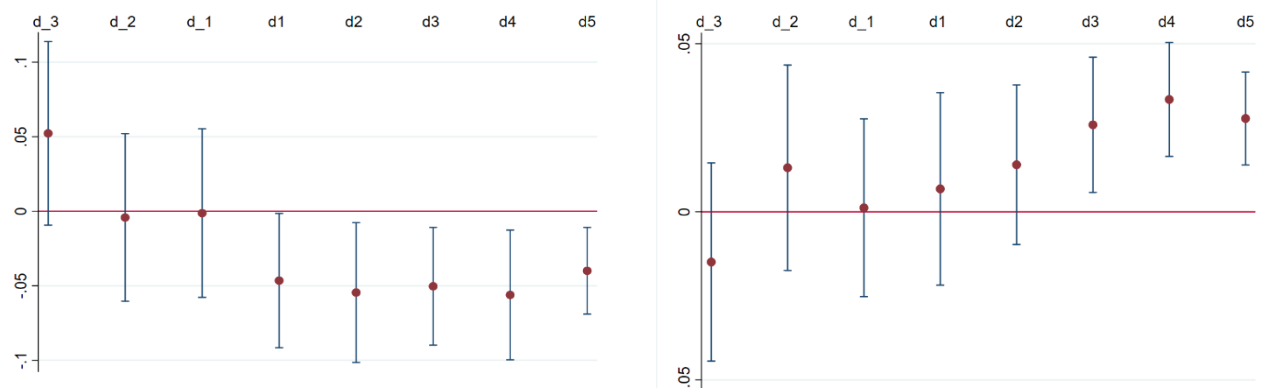
$$ln\ \_debt_{ijct} = \alpha + \beta_{-3} CCB_{c,t-3} + \beta_{-2} CCB_{c,t-2} + \cdots + \beta_0 CCB_{c,t+1} + \cdots + \beta_4 CCB_{c,t+5} + \lambda Z_{ct} + \gamma_c + \delta_j + \theta_t + \varepsilon_{ijct}, \quad (2)$$

where ln $\_debt_{ijct}$ is firms' log debts, $CCB_{c,t-k}$ equals 1 for observations taken from $k$ years before the CCB establishment, and $CCB_{c,t+k}$ equals 1 for observations taken from $k$ years after the establishment of CCBs. $\gamma_c$, $\delta_j$, and $\theta_t$ are municipal, industry, and year fixed effects, respectively.

Panel (A) of Figure 2 shows the dynamics of private firms' $\beta_k$ with 95 % confidence intervals. It can be seen that $\beta_k$ is not significantly different from 0 before the CCB is established, but becomes significantly negative in the years after the CCB was established. This suggests that the fall in debt funding of private firms after establishment of a CCB reflects post-establishment dynamics, not a pre-establishment trend.

Next, we estimate regression model (2) for SOEs only. The results in Panel (B) suggest that the $\beta_k$ for SOEs is not significantly different from 0 prior to establishment of a CCB. This finding is similar to the private firms, but unlike what is reported for private firms, the $\beta_k$ of SOEs is not statistically different from 0 after year $t$, and turns significantly positive after three years. SOEs, as noted, receive most of their funding from the large state-owned banks. It is thus unremarkable that their debt volume is unaffected by the establishment of CCBs. Although CCBs diverted some financial resources away from the large state-owned banks, a comparison of Panel (A) and (B) in Figure 2 suggests that they did not increase credit supply to local private firms. Quite the contrary, the debt funding of local private firms deteriorates after the establishment of a CCB.

Figure 2 $\beta_k$ dynamics for (A) private firms and (B) SOEs




Figures 2, Panel (A) and Panel (B) delineate the impact establishment of CCBs has on credit supply to private firms and SOEs, respectively. We consider an 8-year window that spans the three years before establishment of the CCB to five years after. The vertical lines represent 95 % confidence intervals adjusted for clustering. The figures report estimated coefficients $\beta_k$ $(k = -3, -2, \dots, 5)$ from the regression (2), in which $CCB_{c,t-k}$ equals 1 for observations taken from $k$ years before the CCB establishment, $CCB_{c,t+k}$ equals 1 for observations taken from $k$ years after the CCB establishment. The regression takes into account municipal, industry, and year fixed effects.

To further strengthen our causality claims, we provide evidence that our results are not driven by the fact that a municipality with observable characteristics related to firm debt levels is more likely to establish a CCB. To pin down this potential endogenous selection of municipalities, we estimate an augmented version of our baseline regression equation:[8]

$$y_{ijct} = \alpha + \beta CCB_{ct} + \varphi Treatment_c \times t + \eta X_{ijct} + \lambda Z_{ct} + \psi Z_{c,1998} \times \theta_t + \gamma_c + \delta_j + \theta_t + \varepsilon_{ijct}. \qquad (3)$$

The dependent variable $y_{ijct}$ again denotes total debt of firms (in logarithm)/interest rate paid on debt. The interaction term $Treatment_c \times t$ controls for the time trends in the treated municipalities, in which $Treatment_c$ is a dummy variable that equals 1 if municipality $c$ established a CCB during our sample period. The interaction term $Z_{c,1998} \times \theta_t$ controls for endogenous selection of municipalities in establishing CCBs. The vector of variables potentially affecting the selection into establishing a CCB, $Z_{c,1998}$, contains municipal-level controls for the first year in our sample period, including rural population to total population, employment rate, ratio of the number of college students to total population, growth rate in fixed-asset investments, population density, GDP growth rate, ratio of retail deposits to GDP, and ratio of total bank loans to GDP.

[8] A similar approach has been adopted in the DID literature. For example, Li et al. (2016) use such specification to control for the endogenous selection on flattening government hierarchy.

Table 4 Controlling for endogenous selection

| | Log debts | | Interest rate | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| CCB | –0.093*** | –0.077*** | 0.009*** | 0.007*** |
| | (0.011) | (0.011) | (0.001) | (0.001) |
| $Treatment_c \times t$ | | –0.008*** | | 0.001*** |
| | | (0.001) | | 0.000 |
| No. of obs. | 2,011,910 | 2,011,910 | 1,463,519 | 1,463,519 |
| R-squared | 0.789 | 0.789 | 0.202 | 0.202 |
| Firm controls | YES | YES | YES | YES |
| $Z_{c,1998} \times Post_{ct}$ | YES | YES | YES | YES |
| Municipality FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

This table reports the results of estimating regressions equation (3) of debt funding of private firms as shown in columns (1) and (2) and interest rate for private firms as shown in columns (3) and (4), on establishment of CCBs. Firm-level controls include log total assets, return on assets (ROA), the ratio of fixed assets to total assets, log firm age, and log sales revenue. Selection variables $Z_{c,1998}$ are municipal-level controls for the first year in our sample period, including the ratio of rural population to total population, employment rate, ratio of student population to total population, growth rate in fixed-asset investments, population density, GDP growth rate, ratio of retail deposits to GDP, and ratio of total bank loans to GDP. $Treatment_c$ is a dummy variable that equals 1 if municipal $c$ established a CCB during our sample period. $Post_{ct}$ is a dummy variable that equals 1 if municipal $c$ has a CCB in year $t$. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level.

The results of the estimation are presented in Table 4. These results are qualitatively the same as our baseline estimates, implying that the selection variables do not significantly shape the relation between CCB establishment and firm debt. This evidence that our baseline results are not driven by municipalities' endogenous selection further validates our choice of a DID approach.

## 3.3 Which firms benefit from establishment of CCBs?

In this section, we examine whether all private firms' debt funding conditions are adversely affected by CCBs to differing degrees. Based on equation (1), we estimate an augmented regression

$$y_{ijct} = \alpha + \beta CCB_{ct} + \beta' CCB_{ct} \times industry_{i,j=j_0} + \eta' X_{ijct} + \lambda' Z_{ct} + \gamma_c + \delta_i + \theta_t + \varepsilon_{ijct} \quad (4)$$

in which dependent variable $y_{ijct}$ denotes the total debt of firms (in logarithm) and interest rate paid on debt. We interact $CCB_{ct}$ with a dummy variable $industry_{i,j=j_0}$, which equals 1 if firm $i$ belongs to industry $j_0$ of all broadly-defined industries,[9] and 0 otherwise. In unreported tests, we

[9] According to the Chinese national standards publication Industrial Classification for National Economic Activities, GB/T 47542002, our data from the Chinese Industrial Enterprises Survey covers firms under three classifications: B. mining, C. manufacturing, and D. infrastructure (which includes water, gas, energy production and supply).

estimate equation (4) across all industries and find that, with the exception of private infrastructure firms, establishment of CCBs negatively impacts the debt funding of all private firms and their funding costs. For the sake of parsimonious exposition, we only report the estimated results for private firms from the infrastructure industry in Table 5. These results illustrate that establishment of CCBs led to a rise of 5.7 % in debt funding for private infrastructure firms, as well as a fall of 100–120 basis points in funding costs.[10] Unlike non-infrastructure firms, infrastructure firms are clear winners when CCBs are established. This finding contrasts with the convential wisdom that Chinese private firms are *unconditionally* worse off in their access to finance than SOEs due to political favoritism.

Table 5 Debt funding for infrastructure firms

| | Log debts | | Interest rate | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| CCB*Infra | –0.257*** | 0.057** | –0.012*** | –0.010*** |
| | (0.056) | (0.024) | (0.004) | (0.004) |
| CCB | –0.000 | –0.071*** | 0.011*** | 0.008*** |
| | (0.015) | (0.009) | (0.001) | (0.001) |
| No. of obs. | 2,437,905 | 2,310,042 | 1,650,511 | 1,613,447 |
| R-squared | 0.861 | 0.921 | 0.618 | 0.640 |
| Controls | NO | YES | NO | YES |
| Municipality FE | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the regression equation (4) of debt funding of firms as shown in columns (1) and (2), and interest rate as shown in columns (3) and (4), on establishment of CCBs. It also includes an interaction term with an industry dummy Infra, which equals 1 if the firm is a private infrastructure firm, and 0 otherwise. Firm-level controls include log total assets, return on assets (ROA), the ratio of fixed assets and total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, firm, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level. Columns (1) and (3) are based on regressions without firm-/municipality-level controls, while columns (2) and (4) are based on regressions with firm- and municipality-level controls.

Drilling down on this finding, we ask whether the improved funding conditions for private infrastructure firms are driven by better creditworthiness relative to private non-infrastructure firms. For this purpose, we compute z-scores of both infrastructure and non-infrastructure firms by estimating the model proposed in Altman (1983) and Altman et al. (2014) on the bankruptcy likelihood of firms, which itself is an augmented version of Altman (1968). Table 6 presents the comparison between z-scores of the two types of firms.

[10] Results for firms in other industries are available upon request.

Table 6 Z-score: private infrastructure versus private non-infrastructure firms

| | Min | Max | Median | Mean | Diff. in mean |
|---|---|---|---|---|---|
| Infrastructure | 0.994 | 2.263 | 1.197 | 1.408 | –1.751*** |
| Non-infrastructure | 1.934 | 4.924 | 3.113 | 3.159 | |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table presents the summary statistics of z-scores for private infrastructure and non-infrastructure firms, respectively. Z-scores are computed by estimating an Altman (1983, 2014) model of the bankruptcy likelihood of firms. The difference in mean between the two subsamples is also reported.

The mean z-score of private non-infrastructure firms is significantly higher than that of private infrastructure firms, meaning that infrastructure firms generally have *inferior* credit quality. The mean z-score of infrastructure firms is 1.41, implying that they are often financially unstable. Further, their median z-score is below the bankruptcy threshold of 1.23, when computed from the model proposed in Altman et al. (2014).[11] In contrast, the median z-score of non-infrastructure firms is above the stability threshold 2.90 (Altman et al., 2014), implying that non-infrastructure firms are much healthier financially.

We further find that the credit quality of infrastructure firms deteriorates after the establishment of CCBs. As seen in Table 7, estimating regression equation (1) and using the z-scores of private firms as the dependent variable, we document that CCBs led to a significant drop in z-scores of infrastructure firms and a significant rise in the z-scores of non-infrastructure firms. In our unreported tests, we also find that both the discrepancy in z-scores between these two types of firms and the z-score dynamics after establishment of CCBs are not merely driven by the difference in their leverage ratios. This implies that the herding of CCB loans in the infrastructure sector results in both higher indebtness and cumulating financial risks in the infrastructure industry.

We now present evidence that the deterioration of the credit quality of infrastructure firms is related to the establishment of CCBs by examining the dynamics of the z-scores of infrastructure and non-infrastructure firm. Specifically, we look at $ZSCORE_{ijct}$ in equation (5) before and after the establishment of CCBs by estimating $\alpha_k$ $(k = -3, -2, \dots, 5)$ from

$$ZSCORE_{ijct} = \alpha + \alpha_{-3}CCB_{c,t-3} + \alpha_{-2}CCB_{c,t-2} + \cdots + \alpha_0 CCB_{c,t+1} + \cdots \alpha_4 CCB_{c,t+5} + \gamma_c + \delta_i + \theta_t + \varepsilon_{ijct}\,, \quad (5)$$

where $\gamma_c$, $\delta_i$, and $\theta_t$ are municipal, firm, and year fixed effects, respectively.

[11] Please note that the thresholds estimated in Altman et al. (2014) model are not based on the same set of Chinese firms as ours. We thus use their thresholds for reference, not as hard criteria.

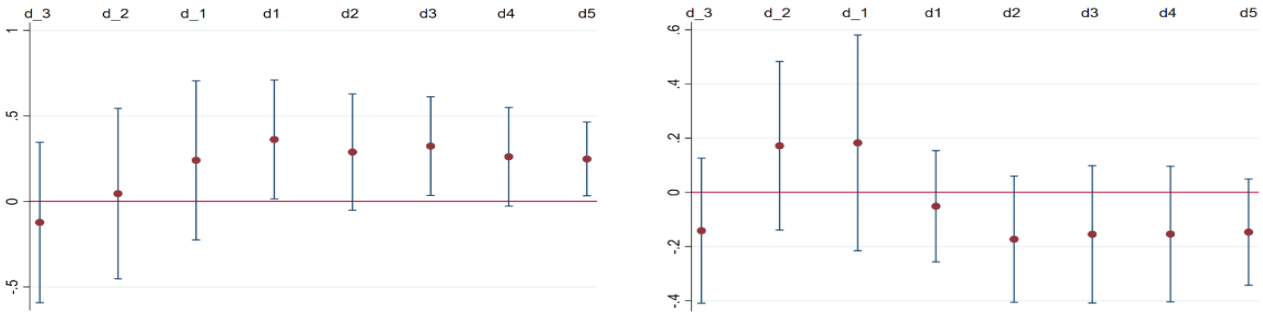
Table 7 Establishment of CCBs and z-scores of firms

| | Private infrastructure firms | | Private non-infrastructure firms | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| CCB | –0.292** | –0.198* | 0.725*** | 0.308*** |
| | (0.126) | (0.114) | (0.061) | (0.045) |
| No. of obs. | 31,517 | 28,034 | 2,261,871 | 2,155,122 |
| R-squared | 0.682 | 0.705 | 0.691 | 0.779 |
| Controls | NO | YES | NO | YES |
| Municipality FE | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the basic regression equation (1) for firms' z-scores for private infrastructure firms as shown in columns (1) and (2), and private and non-infrastructure firms as shown in columns (3) and (4) on the establishment of CCBs. Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, firm, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level. Columns (1) and (3) are based on regressions without firm-and municipality-level controls, while columns (2) and (4) are based on regressions with firm- and municipality-level controls.

Figure 3 Dynamics of $\alpha_k$ for (A) private non-infrastructure firms and (B) private infrastructure firms




(A) (B)

Panel (A) and Panel (B) delineate the impact of establishing CCBs on the credit quality of private non-infrastructure firms and private infrastructure firms, respectively. We consider an 8-year window that spans the three years before establishment of the CCB to five years after. The vertical lines represent 95 % confidence intervals, adjusted for clustering. The panels report estimated coefficients $\alpha_k$ $(k = -3, -2, \ldots, 5)$ from the regression (5), in which $CCB_{c,t-k}$ equals 1 for observations taken from $k$ years before the CCB establishment, $CCB_{c,t+k}$ equals 1 for observations taken from $k$ years after the CCB establishment. The regression takes into account municipal, industry, and year fixed effects.

Panel (A) of Figure 3 shows the dynamics of private non-infrastructure $\alpha_k$ with 95 % confidence intervals. Panel (B) illustrates the corresponding estimates for infrastructure firms. For firms in both subsamples, $\alpha_k$ is not significantly different from zero before the establishment of CCBs. $\alpha_k$ of non-infrastructure firms improves after the establishment of CCBs, while $\alpha_k$ of infrastructure firms deteriorates. This evidence, taken as a whole, implies that the concentration of CCB loans in the infrastructure industry is not driven by the superior credit quality of such firms.

# 4 What mechanisms drive credit shifts following the establishment of a CCB?

The previous section documents evidence that the establishment of CCBs leads to a tightening of debt volumes for private non-infrastructure firms, as well as higher funding costs. In contrast, private infrastructure firms benefit from the creation of CCBs, even with their inferior credit quality. In the following subsections, we acknowledge that municipal governments as founders and main shareholders of CCBs often appoint CCB directors (Qian et al., 2015), which gives local officials an opportunity to exploit CCB credit allocation to advance their personal career prospects. We then explore how the credit allocation outcomes described above are affected by the incentives of local officials to interfere with the CCB credit supply.

## 4.1 CCB establishment and municipal GDP growth

Why would CCBs grant borrowers with worse credit quality better access to financing? This behavior may reflect the interests of their main shareholders, i.e. the municipal governments. Unlike officials in representative democracies seek re-election after a successful term in office, promotion with China's political structure is a top career concern of local officials (Maskin et al., 2000), and GDP growth is the most powerful explanatory variable for the likelihood of promotion (Li and Zhou. 2005).[12] Therefore, local officials have strong incentives to back projects that promptly boost GDP such as infrastructure and real estate projects in their municipalities.

China's tax-sharing reform in 1994 severely curtailed the fiscal resources that local officials could divert to such projects. The reform adjusted the tax distribution between central and local governments, leaving local governments a much smaller share of tax revenues, thereby limiting the ability of local governments to stimulate their local economy through *direct* public spending. The establishment of CCBs in the mid-1990s provided municipal governments a means of boosting local GDP growth through the banking channel, i.e. via allocating credit resources to GDP-enhancing projects.

To verify the conjecture that establishment of CCBs boosted local GDP, we regress log GDP per capita $\ln\_GDP_{ct}$ of municipality $c$ in year $t$ on the establishment of a CCB and municipality-level controls by estimating the following model:

[12] Very late in our sample period (December 6, 2013), the Organization Department of the Chinese Communist Party (CCP), the human resource management department of CCP in charge of staffing positions, moved to expand the promotion criteria for local CCP officials beyond GDP-centered criteria. The new set of criteria included metrics for economic, political, cultural, social, and environmental progress, as well as explicit language that the evaluation and promotion of local officials will no longer depend solely on regional GDP growth rankings. See *Notice on Improving the Performance Evaluation of Local Party and Government Leaders*,
http://renshi.people.com.cn/n/2013/1210/c139617-23793409.html.

$$\ln\_GDP_{ct} = \alpha + \beta CCB_{ct} + \lambda Z_{ct} + \gamma_c + \theta_t + \varepsilon_{ct}. \quad (6)$$

The vector of municipality-level controls $Z_{ct}$ includes the ratio of total bank loans to GDP, ratio of foreign direct investment to GDP, ratio of population of college students to registered population, ratio of public expenditure to GDP, and the growth rate of investment in fixed assets. $\gamma_c$ and $\theta_t$ are municipality and year fixed effects, respectively. The results presented in Table 8 suggest that establishment of a CCB on average contributed to a 2–4 % rise in local GDP per capita and that the effect is statistically significant.

Table 8 Impact of CCBs on local GDP per capita

| | Log GDP per capita | |
|---|---|---|
| | (1) | (2) |
| CCB | 0.042*** | 0.024** |
| | (0.011) | (0.012) |
| No. of obs. | 4,387 | 2,805 |
| R-squared | 0.977 | 0.983 |
| Controls | NO | YES |
| Municipality FE | YES | YES |
| Year FE | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

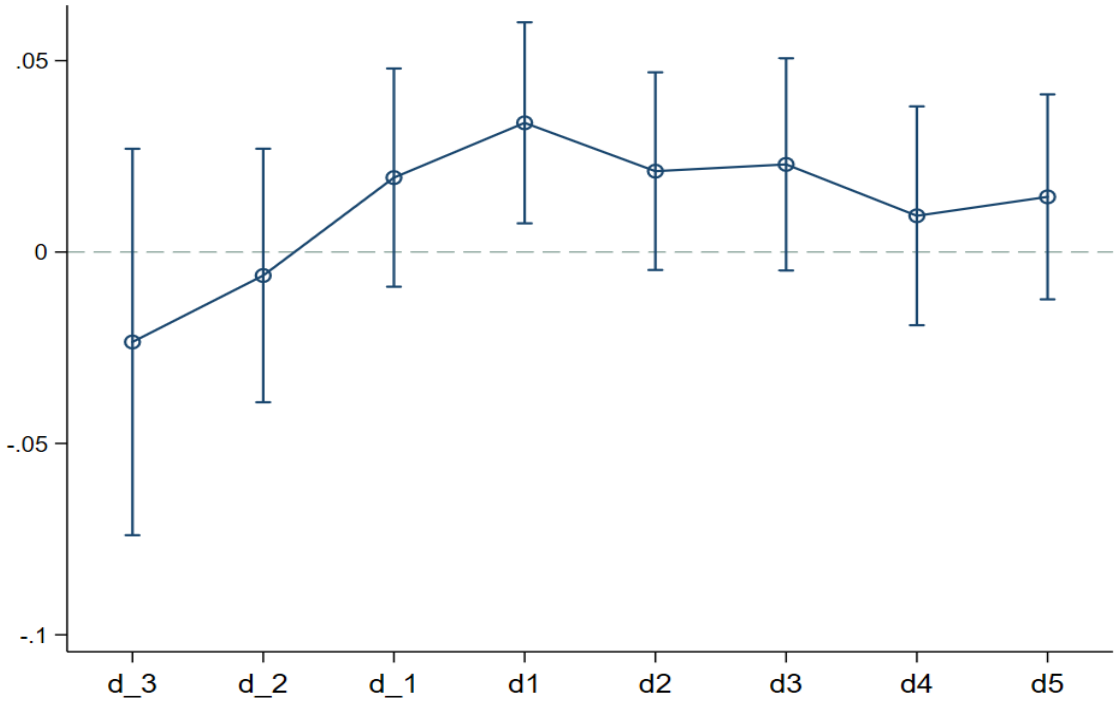
This table reports the results of estimating the regressions of municipalities' log GDP per capita as specified in equation (6) on establishment of CCBs. Control variables include the ratio of total bank loans to GDP, ratio of foreign direct investment to GDP, ratio of population of college students to registered population, ratio of public expenditure to GDP, and the growth rate of investment in fixed assets. All regressions include municipal and year fixed effects, and standard errors of the estimated coefficients are robust Huber-White standard errors. Column (1) is based on regressions without municipality-level controls, while column (2) is based on regressions with municipality-level controls.

To assess whether the GDP growth documented above signals sustainable economic growth or just a short-term boost that may be related to some local official's short-term agenda, we estimate the dynamics of a municipalitie's GDP growth before and after the establishment of a CCB for longer periods $(k = -3, -2, \ldots, 5)$ around the CCB establishment event:

$$\ln\_GDP_{ct} = \alpha + \alpha_{-3} CCB_{c,t-3} + \alpha_{-2} CCB_{c,t-2} + \cdots + \alpha_0 CCB_{c,t+1} + \cdots + \alpha_4 CCB_{c,t+5} + \lambda Z_{ct} + \gamma_c + \theta_t + \varepsilon_{ct}, \quad (7)$$

where $\ln\_GDP_{ct}$ is log GDP per capita of municipality $c$ in year $t$; $\gamma_c$ and $\theta_t$ are municipality and year fixed effects, respectively. The estimates of $\alpha_k$ plotted in Figure 4 suggest that the stimulating effect of CCB on GDP growth is the strongest during the year after the year of the CCB establishment. It diminishes afterwards, becoming statistically insignificant after two years. These results overall suggest that establishment of a CCB was only likely to boost the regional economy briefly.

Figure 4 Dynamic effect of CCB on GDP per capita, $\alpha_k$ $(k = -3, -2, \dots, 5)$




This figure shows the average impact of establishment of a CCB on municipal GDP per capita. We consider an 8-year window that spans the three years before establishment of the CCB to five years after. The vertical lines represent 95 % confidence intervals, adjusted for robust standard errors. We report estimated coefficients $\alpha_k$ $(k = -3, -2, \dots, 5)$ from estimation regression equation (7), in which $CCB_{c,t-k}$ equals 1 for observations taken from $k$ years before the CCB was established, $CCB_{c,t+k}$ equals 1 for observations taken from $k$ years after the CCB was established. The regression takes into account municipal and year fixed effects.

To relate these aggregate level results to our firm-level evidence that indicates a shift of funding to infrastructure firms and explore the real effects further, we examine the aggregate impact of establishment of a CCB on local real estate investment. Infrastructure investments are often closely related to real estate development, but many real estate firms in China are registered in part of the service sector, which is not covered by our data. Therefore, we pursue total real estate investment at the municipality level. Similar to the specification of equation (6), we regress the total real estate investment of municipality $c$ in year $t$ on establishment of a CCB and municipality-level controls using $real\ estate\ investments_{ct}$ as the dependent variable. The results, reported in Table 9, suggest that total real estate investment in a municipality on average increases by up to 21 % after a CCB is established.

Table 9 Establishment of CCBs and total real estate investments

| | Log municipality-level real estate investment | |
|---|---|---|
| | (1) | (2) |
| CCB | 0.197*** | 0.215*** |
| | (0.065) | (0.066) |
| No. of obs. | 4,401 | 1,771 |
| R-squared | 0.936 | 0.962 |
| Control | NO | YES |
| Municipality FE | YES | YES |
| Year FE | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the regressions of municipalities' log real estate investment on establishment of CCBs,following the specification of equation (6), using $real\ estate\ investments_{ct}$ as the dependent variable. Control variables include the ratio of total bank loans to GDP, ratio of total bank deposit to GDP, population, population density, income from sale of land rights, fiscal income, house price, and GDP in logarithm form. All regressions include municipal and year fixed effects, and standard errors of the estimated coefficients are clustered on the municipal level. Column (1) is based on regressions without municipality-level controls, while column (2) is based on regressions with municipality-level controls.

This finding is consistent with existing studies that argue that infrastructure (Geng et al., 2016) and real estate (Qian et al., 2011) projects are the preferred means by which municipal officials seek to stimulate local GDP.

Finally, we show that the aggregate shift to more real estate investments is related to the crowding out of non-infrastructure non-real estate firms documented in Section 3. Specifically, we present evidence that the more the credit resources are diverted towards infrastructure or real estate investment, the less credit is extended to private non-infrastructure firms. For this purpose, we rank all municipalities by the share of real estate investment in local GDP and define a dummy variable $real\ estate\ dependence_{ct}$ which equals 1 if the share is above the mean,[13] or 0 otherwise. We estimate model (8), an augmented version of our basic equation (1), using the interaction term $CCB \times real\ estate\ dependence$ as an independent variable.

$$ln\_debt_{ijct} = \alpha + \beta CCB_{ct} + \phi CCB_{ct} \times real\ estate\ dependence_{ct} + \eta X_{ijct} + \lambda Z_{ct} + \gamma_c + \delta_j + \theta_t + \varepsilon_{ijct}. \quad (8)$$

As the results in Table 10 show, a CCB establishment in a real-estate-dependent municipality adds an extra 3 % to the crowding out effect on the debt funding of private firms, as well as an extra 40–70 basis points in funding cost.

[13] Our results are also robust if we use median value.

Table 10 Real estate dependence and credit allocation to private firms

| | Log debts | | Interest rate | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| CCB*real estate dependence | –0.029*** | –0.032*** | 0.007*** | 0.004*** |
| | (0.010) | (0.004) | (0.001) | (0.001) |
| CCB | –0.052*** | –0.134*** | 0.016*** | 0.011*** |
| | (0.020) | (0.010) | (0.001) | (0.001) |
| No. of obs. | 2,449,947 | 2,333,048 | 1,766,261 | 1,727,384 |
| R-squared | 0.215 | 0.787 | 0.100 | 0.202 |
| Controls | NO | YES | NO | YES |
| Municipality FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating regression equation (8) for debt funding of private firms shown in columns (1) and (2) and interest rate shown in columns (3) and (4) on establishment of CCBs), using an interaction term $CCB_{ct} \times real\ estate\ dependence_{ct}$ with firm- and municipality-level controls. The dummy variable $real\ estate\ dependence$ equals 1 if the share of a municipality's real estate investment in local GDP is above the median, and 0 otherwise. Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets to total assets, log firm age, and log sales revenue; municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level. Columns (1) and (3) are based on regressions without firm- and municipality-level controls, while columns (2) and (4) is based on regressions with firm- and municipality-level controls.

## 4.2 Credit allocation and promotion pressure

If GDP growth is a crucial criterion for career advancement for local officials, it seems reasonable to posit that officials might seek to exploit resources that stimulate local economic growth to win promotion tournaments.

To explore the impact of promotion pressure on the allocation of credit following the establishment of a CCB, we estimate equation (9), augmented from baseline regression (1), such that

$$ln\_debt_{ijct} = \alpha + \beta CCB_{ct} + \theta CCB_{ct} \times M_{ct} + \eta X_{ijct} + \lambda Z_{ct} + \gamma_c + \delta_j + \theta_t + \varepsilon_{ijct}, \quad (9)$$

where $M_{ct}$ denotes the value of promotion pressure index (PPI) for municipality $c$ in year $t$. Following Qian et al. (2011), for each municipality, we construct the promotion pressure index of local officials by combing municipal GDP growth, fiscal deficit/fiscal income ratio, and unemployment rate. The promotion pressure index is constructed as follows: In year $t$, for each of the three pressure measures $P_{ict}$, $i = \{1,2,3\}$, municipal GDP growth, fiscal surplus/fiscal income ratio, and employment rate, the pressure indicator $\iota_{ict}$ for municipality $c$ is defined as

$$\iota_{ict} = \begin{cases} 1 & if\ P_{ict} \leq \overline{P}_{ict} \\ 0 & otherwise \end{cases},$$

where $\overline{P}_{ict}$ denotes the average of measure $P_i$. The PPI of municipality $c$ in year $t$ is computed as $PPI_{ct} = \sum_{i=1}^{3} \iota_{ict}$.

Municipal officials compete with each other for promotion. As a higher index value reflecting a below-average level of municipality GDP growth, fiscal surplus, and employment, signals poor performance relative to their peers, an official in a low-growth municipality faces greater challenges in obtaining a promotion. Thus, we presume that higher levels of the promotion pressure index reflect greater incentives for local officials to stimulate the economy. The term $CCB_{ct} \times M_{ct}$ captures the interaction between establishment of CCBs and promotion pressure, $M_{ct}$.

The results, reported in column (1) of Table 11, confirm that the debt of private firms declines is greater after the establishment of a CCB in a municipality when local officials face higher promotion pressure.

## 4.3 Credit allocation and fiscal condition

A local official, including one under heightened promotion pressure, can exploit fiscal resources to boost economic outcomes. However, as the local government's fiscal constraint becomes more binding, the likelihood increases that the official must turn to alternative financial instruments such as credit allocation by a CCB. To explore this possibility, we re-estimate model (9) using fiscal pressure instead of promotion pressure. We measure fiscal pressure in two ways.[14] Municipality $c$'s *ratio of fiscal deficit to GDP* in year $t$ directly reflects the tightness of the local government's fiscal constraint. Municipality $c$'s *ratio of land right sales revenue to total fiscal income* in year $t$, as well as its *ratio of land right sales revenue to GDP* in year $t$ provide indirect measures of fiscal pressure. The latter indirect proxies should capture the 1994 tax-sharing reform that limited the capability of local governments to stimulate the economy through *direct* public spending. As a result, sales of urban land rights became an important alternative for municipal fiscal income. Thus, the market supply of urban land reflects the local government officials' incentive to increase income as a response to their fiscal constraints.

The results, as reported in Table 11 columns (2)–(4), clearly show that debt volumes of private firms are reduced more severely in the municipalities with higher fiscal pressure. These indirect pressures are reflected in a higher ratio of land right sales to fiscal income as shown in

[14] Data on total debt of most municipalities are only available after 2009. This prevents us from using debt *level* as a measure of fiscal pressure.

column (2), higher ratio of land right sales to GDP as shown in column (3), and higher ratio of fiscal deficit to GDP ratio as shown in column (4).

Table 11 Fiscal and promotion pressure and debt financing of private firms

| | Log debts | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| CCB*promotion pressure | –0.009*** | | | |
| | (0.002) | | | |
| CCB*(land right sales/fiscal income) | | –0.002*** | | |
| | | (0.000) | | |
| CCB*(land right sales/GDP) | | | –0.023*** | |
| | | | (0.005) | |
| CCB*(deficit/GDP) | | | | –0.276*** |
| | | | | (0.066) |
| CCB | –0.118*** | –0.141*** | –0.144*** | –0.122*** |
| | (0.012) | (0.011) | (0.010) | (0.011) |
| No. of obs. | 1,873,131 | 1,978,355 | 2,300,548 | 2,007,315 |
| R-squared | 0.7774 | 0.7810 | 0.7879 | 0.7799 |
| Controls | YES | YES | YES | YES |
| Municipality FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating regression equation (9) for debt financing of private firms on establishment of CCBs with an interaction term $CCB_{ct} \times M_{ct}$ and firm- and municipality-level controls. Fiscal and promotion pressure $M_{ct}$ is measured by a promotion pressure index shown in column (1), land right sales/fiscal income pressure shown in column (2), land right sale/GDP as shown in column (3), and fiscal deficit/GDP as shown in column (4), respectively. Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level.

## 4.4 Social welfare implications

So far, we have considered whether establishment of a CCB relates to a shift in credit allocation from private non-infrastructure enterprises to private infrastructure firms. We have also documented that this shift cannot be explained by the superior credit quality of private infrastructure firms and that any boost in local GDP related to establishment of a CCB is short-lived. To relate this shift to credit misallocation, however, we need to develop evidence on the social welfare implications from the credit reallocation through CCBs. In particular, we explore whether infrastructure investments exert positive externalities that improve the performance of non-infrastructure entities. To investigate the contribution of establishment of a CCB to the performance of local private firms, we re-estimate regression equation (1) using various indicators of firm performance

as dependent variables: return on assets (ROA), return on equity (ROE), and gross profit margin (GPM).[15] The results are presented in Table 12.

Table 12 Establishment of CCBs and performance of private firms

| | All private firms | | |
|---|---|---|---|
| | ROA (1) | ROE (2) | GPM (3) |
| CCB | –0.009*** | –0.027*** | –0.005*** |
| | (0.002) | (0.005) | (0.001) |
| No. of obs. | 2,333,048 | 2,324,707 | 2,333,048 |
| R-squared | 0.452 | 0.350 | 0.240 |
| Controls | YES | YES | YES |
| Municipality FE | YES | YES | YES |
| Industry FE | YES | YES | YES |
| Year FE | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the basic regression equation (1) of firm performance measured by return on assets (ROA) as shown in column (1), return on equity (ROE as shown in column (2), and gross profit margin (GPM) as shown in column (3), respectively, on establishment of CCBs, with firm- and municipality-level controls, for private firms. Firm-level controls include log total assets, fixed assets/total assets ratio, log firm age, and log sales revenue; municipality-level controls include total retail deposits/GDP ratio, total bank loans/GDP ratio, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level.

Although municipal governments mobilized more credit to infrastructure firms through the establishment of CCBs, our results suggest that the resulting boost in infrastructure investment did not benefit local firms generally. There is no significant impact from the establishment of a CCB on the ROA of private firms or adverse impacts on the ROE and GPM of firms on the performance of non-infrastructure firms.

This result is consistent with our aggregate level analysis in Section 4.2 (and Figure 4, in particular), where we have shown no positive long-run impact of establishment of a CCB on local economic development. Although local GDP is boosted right after the launch of CCB operations, the stimulating effect is quickly exhausted. This implies that financial resources are allocated to projects, many related to infrastructure or real estate, that trigger a temporary boost in output but do not contribute to long-term economic growth.

[15] We also estimate the model by excluding infrastructure firms from the sample. The results are qualitatively unchanged.

# 5 Robustness check

In this section, we conduct several checks to ensure that our results are robust to different assumptions and setups, as well as assure they are not driven by certain subsamples in the data.

## 5.1 Different fixed effects

To examine the sensitivity of our results to the set of fixed effects, we redo our baseline regression (1) using different sets of fixed effects. The results are reported in Table 13. Columns (1) and (2) are based on municipality, industry, year, and $industry * year$ fixed effects in order to take care of the time-varying characteristics of industries, and columns (3) and (4) exclude industry fixed effect. The outcome (Table 13) suggests that all the results are qualitatively unchanged, so that our baseline results are not biased by any particular setup of fixed effects.

Table 13 Robustness check: fixed effects

| | All private firms | | | |
|---|---|---|---|---|
| | Log loans (1) | Interest rate (2) | Log loans (3) | Interest rate (4) |
| CCB | –0.125*** | 0.012*** | –0.070*** | 0.007*** |
| | (0.009) | (0.001) | (0.009) | (0.001) |
| No. of obs. | 2,332,973 | 1,727,294 | 2,310,042 | 1,613,447 |
| R-squared | 0.788 | 0.208 | 0.922 | 0.647 |
| Controls | YES | YES | YES | YES |
| Municipality FE | YES | YES | YES | YES |
| Industry FE | YES | YES | NO | NO |
| Firm FE | NO | NO | YES | YES |
| Year FE | YES | YES | YES | YES |
| Industry*year FE | YES | YES | NO | NO |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the basic regression equation (1) of debt funding of firms as shown in columns (1) and (2), and interest rate as shown in columns (3) and (4), on establishment of CCBs with firm- and municipality-level controls for private firms, with different settings of fixed effects. Columns (1) and (2) are based on regressions with municipality, industry, year, and industry*year fixed effects, while columns (3) and (4) are based on municipality, firm, and year fixed effects. Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets and total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits and GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level.

Table 14 Establishment of CCBs and private start-up firms

*Panel A. Log loans*

| | Gap year = 0 | | Gap year = 1 | | Gap year = 2 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| CCB | –0.254 | –0.138 | –0.301 | –0.116 | –0.475*** | –0.172*** |
| | (0.239) | (0.118) | (0.189) | (0.079) | (0.144) | (0.065) |
| No. of obs. | 89,053 | 86,276 | 100,512 | 98,232 | 110,240 | 108,764 |
| R-squared | 0.256 | 0.805 | 0.239 | 0.798 | 0.242 | 0.798 |
| Controls | NO | YES | NO | YES | NO | YES |
| Municipality FE | YES | YES | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES |

*Panel B. Interest rate*

| | Gap year = 0 | | Gap year = 1 | | Gap year = 2 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| CCB | 0.012 | –0.001 | 0.019*** | 0.010** | 0.020*** | 0.009* |
| | (0.010) | (0.011) | (0.005) | (0.005) | (0.004) | (0.005) |
| No. of obs. | 67,717 | 67,130 | 76,010 | 75,370 | 82,826 | 82,200 |
| R-squared | 0.144 | 0.240 | 0.143 | 0.243 | 0.149 | 0.246 |
| Controls | NO | YES | NO | YES | NO | YES |
| Municipality FE | YES | YES | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the basic regression equation (1) for debt funding of firms (Panel A), and interest rate (Panel B) on establishment of CCBs. There are three subsamples of private start-up firms: firms established *in the same year* as the local CCB (Gap year = 0, columns (1) and (2) in both panels), firms established *one year before* (Gap year = 1, columns (3) and (4) in both panels) the local CCB, and firms established *two years before* (Gap year = 2, columns (5) and (6) in both panels) before the local CCB. Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects. and standard errors of the estimated coefficients are clustered on municipal*industry level. In both panels, columns (1), (3), and (5) are based on regressions without firm- and municipality-level controls, while columns (2), (4), and (6) are based on regressions with firm-/municipality-level controls.

## 5.2 Impact on private start-ups

Since start-up firms own less pledgeable assets as collateral and their creditworthiness hard to determing based on their short operational and credit histories, banks typically reject start-up loan applications. Therefore, including start-up firms in our sample may overestimate the impact of the establishment of a CCB on the credit supply to local firms. To investigate the effects of CCB presence on private start-ups, we construct sub-samples containing firms established in the same year as the local CCB (Gap year = 0), firms that are established one year (Gap year = 1) before the

local CCB, and firms established two years (Gap year = 2) before the local CCB, respectively. We then rerun regression (1) on each of these subsamples. The results presented in Table 14 (odd-numbered columns report results without controls, and even-numbered columns report results with controls) suggest that establishment of a CCB had no impact, or at most vaguely negative impact, on the volume of debt funding or funding cost for the youngest start-ups (Gap year = 0 and 1). This possibly reflects the fact that the youngest firms have difficulties in funding from any banks. However, the effects on debt funding and funding cost are significant for older start-ups. The economic magnitude of the estimated effects is qualitatively the same as all private firms on average (compare to Table 1). However, considering the very small share of start-up firms with Gap year = 0 (less than 4% of all private firms), our baseline results are not substantially biased.

## 5.3 Sub-sample analysis

We also rerun regression (1) using various sub-samples and confirm that our results are not biased by a particular sub-sample.

### Excluding observations from infrastructure firms

Since CCB establishments significantly increase debt financing of private infrastructure firms, including such firms in our baseline regression may bias our estimation upwards. Estimating the model on a sub-sample excluding infrastructure private firms, we confirm, as shown in columns (1) and (2) of Table 15, that the estimated coefficients remain qualitatively the same. As expected, the effect on debt funding of firms is slightly more negative and the rise in firms' funding cost slightly smaller than in our baseline results.

### Excluding observations with CCBs established before 1999

Due to limitation of data availability, our data start from 1998. As a result, CCBs established before 1999 play no role in our diff-in-diff analysis. The firms in the same municipalities as their CCB are always in the treatment group. We rerun regression (1) by excluding observations with these CCBs. The the results, which appear in columns (3) and (4) of Table 15, remain qualitatively unchanged. This suggests that our results are primarily driven by the establishment of CCBs, and not unobservable factors in municipalities with CCBs established before 1999.

### Excluding direct-controlled and sub-provincial municipalities

Centrally-controlled, direct-administered and sub-provincial municipalities are directly governed by the provincial administration. The munidicpalities often enjoy better economic development and provide more job opportunities. Thus, demand for infrastructure and real estate development in these municipalities tends to be high and their municipal governments have a strong incentive

to allocate bank credit through CCBs to infrastructure and real estate sector. To ensure that our results are not only driven by these municipalities, we exclude them from our sample and redo the estimation. The results, shown in columns (5) and (6) of Table 15, remain qualitatively unchanged. This finding indicates that the impact of establishment of a CCB on the debt funding of firms is still significant, but the magnitude is slightly smaller compared with Table 1.

### Excluding observations after 2010

It has been suspected in the literature (e.g. Brandt et al., 2014; Chen, 2018) that the quality of the 2010 survey was relatively low. It featured a much higher share of SOEs than average years and had many more inconsistencies in equity capital than surveys from other years. To check whether our results are affected by these contaminated observations, we exclude all observations from 2010 and redo the estimation. The results, which appear in columns (7) and (8) of Table 15, remain qualitatively the same, and quantitatively similar to our baseline results, implying that our findings are robust to including 2010 observations.

Table 15 Robustness check: regressions with sub-samples

| | Log loans (1) | Interest rate (2) | Log loans (3) | Interest rate (4) | Log loans (5) | Interest rate (6) | Log loans (7) | Interest rate (8) |
|---|---|---|---|---|---|---|---|---|
| CCB | –0.146*** | 0.012*** | –0.138*** | 0.018*** | –0.132*** | 0.013*** | –0.141*** | 0.012*** |
| | (0.010) | (0.001) | (0.011) | (0.002) | (0.010) | (0.002) | (0.010) | (0.001) |
| No. of Obs. | 2,309,057 | 1,709,978 | 927,841 | 661,903 | 1,798,245 | 1,319,023 | 2,313,817 | 1,710,405 |
| R-squared | 0.785 | 0.203 | 0.756 | 0.178 | 0.780 | 0.193 | 0.787 | 0.204 |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Municipality FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating basic regression equation (1) for debt funding of firms as shown in odd-numbered columns and interest rate as shown in even-numbered columns, on establishment of CCBs with firm- and municipality-level controls, for private firms from various subsamples. *Excluding infrastructure firms* is shown in columns (1) and (2). *Excluding observations with CCBs established before 1999* appears in columns (3) and (4). *Excluding direct-controlled and sub-provincial municipalities* are given in columns (5) and (6). *Excluding observations after 2010* is presented in columns (7) and (8). Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include the ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects. Standard errors of the estimated coefficients are clustered on municipal*industry level.

# 6 Conclusion

In this paper, we investigated the impact of establishment of a CCB on credit allocation to local firms. As one of the three pillars in China's modern banking system, CCBs were created to foster regional banking competition, improve the allocation of financial resources, and ease access to

credit for local private firms. However, using firm-level data, we find that the establishment of CCBs actually led to a significant fall in debt funding of private firms, as well as a significant rise in their funding cost. At the same time, the establishment of CCBs appears to have increased access to bank funding for private infrastructure firms, reduced their funding cost, and inspired a rise in local real estate investment. We further show that the improvement of debt conditions of private infrastructure firms following the establishment of a CCB was not driven by the superior creditworthiness of these firms. Indeed, these private infrastructure firms tended to be riskier borrowers than private non-infrastructure firms. Moreover, as the credit quality of these infrastruction firms deteriorated over time, it increased CCB credit risk.

We further show that in municipalities where local officials face strong promotion pressure or tight fiscal constraints, the access of private non-infrastructure firms to CCB funding becomes particularly scarce. In sum, our evidence points to an incentive for local officials incentive to exploit the local CCBs under their control. They use their authority to shift credit from more efficient, more creditworthy borrowers to infrastructure and real estate development projects that they hope will briefly boost local GDP and improve their chances at promotion.

This study sheds light on the political economy of induced distortions in resource allocation and financial risks behind banking liberalization in China. After two decades of lending to firms with inferior credit quality, CCBs have become NPL warehouses. Shaky borrowers, who once enjoyed easy funding access thanks to an immaterial, implicit public guarantee, discover that public guarantee has vaporized once their financial troubles become explicit.

Unsurprisingly, a number of CCBs suddenly found themselves on the brink of bankruptcy when the central government began its cleanup of financial system in 2019. As of Q2 2020, the NPL ratios of CCBs were on average 40 % higher than those of joint-stock commercial banks established in the same time period.

Moreover, despite the rapid development of financial markets and services in China, more innovative, productive, and creditworthy private firms still struggle for access to affordable funding. Our results suggest that the creation of competitive regional banks through banking liberalization failed to deliver efficient allocation of credit where local officials could exploit the institutional transition for their own interest. Therefore, our paper provides a financial explanation to the counterintuitive notion that the once-booming private firms that made China’s economic miracle possible from the 1980s to early 2000s, the very firms that contributed so much to China’s great leap forward to becoming the world’s second-largest economy, found themselves in retreat and subordinated to the advance of state-owned firms in the 2010s due to credit misallocation. Whether China can sustain such credit misallocation without harming its prospects for long-term economic growth and financial stability remains valuable question for future research.

# References

Agarwal, S., and Hauswald, R. (2010). "Distance and private information in lending," *Review of Financial Studies*, 23, 2757–2788.

Agarwal, S., Morais, B., Ruiz, C., and Zhang, J. (2016). "The political economy of bank lending: Evidence from an emerging market," *Policy Research Working Paper Series* 7577, World Bank.

Agarwal, S., Amromin, G., Ben-David, I., and Dinç, S. (2018). "The politics of foreclosures," *Journal of Finance*, 73, 2677–2717.

Allen, F., Qian, J., and Qian, M. (2005). "Law, finance and economic growth in China," *Journal of Financial Economics*, 77, 57–116.

Almond, D., Li, H., and Zhang, S. (2019). "Land reform and sex selection in China," *Journal of Political Economy*, 127, 560–585.

Altman, E.I. (1968). "Financial ratios, discriminant analysis and the prediction of corporate bankruptcy," *Journal of Finance*, 23, 589–609.

Altman, E.I. (1983). *Corporate Financial Distress: A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy (Frontiers in Finance Series)*, John Wiley & Sons.

Altman, E.I., Iwanicz-Drozdowska, M., Laitinen, E.K., and Suvas, A. (2014). "Distressed firm and bankruptcy prediction in an international context: A review and empirical analysis of Altman's z-score model." Available at SSRN: https://ssrn.com/abstract=2536340.

Asonuma, T., Bakhache, S., and Hesse, H. (2015). "Is banks' home bias good or bad for public debt sustainability?" IMF Working Paper WP/15/44.

Baskaran, T. (2012). "Soft budget constraints and strategic interactions in subnational borrowing: Evidence from the German States, 1975–2005," *Journal of Urban Economics*, 71, 114–127.

Beck, T., Demirgüç-Kunt, A., and Maksimovic, V. (2004). "Bank competition and access to finance: International evidence." *Journal of Money, Credit and Banking*, 36, 627–648.

Beck, T., Levine, R., and Levkov, A. (2010). "Big bad banks? The winners and losers from bank deregulation in the United States," *Journal of Finance*, 65, 1637–1667.

Behn, M., Haselmann, R., Kick, T., and Vig, V. (2016). "The political economy of bank bailouts," *SAFE Working Paper Series*, No. 133.

Berger, A.N., Miller, N.H., Petersen, M.A., Rajan, R.G., and Stein, J.C. (2005). "Does function follow organizational form? Evidence from the lending practices of large and small banks." *Journal of Financial Economics*, 76, 237–269.

Berger, A.N., Hasan, I., and Zhou, M. (2009). "Bank ownership and efficiency in China: What will happen in the world's largest nation?" *Journal of Banking & Finance*, 33, 113–130.

Brandt, L., Van Biesebroeck, J., and Zhang, Y. (2012). "Creative accounting or creative destruction? Firm-level productivity growth in Chinese manufacturing," *Journal of Development Economics*, 97, 339–351.

Brandt, L., Van Biesebroeck, J., and Zhang, Y. (2014). "Challenges of working with the Chinese NBS firm-level data," *China Economic Review*, 30, 339–352.

Broecker, T. (1990). "Credit-worthiness tests and interbank competition," *Econometrica*, 58,429–52.

Brown, C.O. and Dinç, I.S. (2005). "The politics of bank failures: Evidence from emerging markets," *Quarterly Journal of Economics*, 120, 1413–1444.

Carvalho, D. (2014). "The real effects of government-owned banks: Evidence from an emerging market." *Journal of Finance*, 69, 577–609.

CBIRC (2019). *Supervisory Statistics of the Banking and Insurance Sectors*, 2019 Q4.

Chang, P.C., Jia, C., and Wang, Z. (2010). "Bank fund reallocation and economic growth: Evidence from China," *Journal of Banking & Finance*, 34, 2753–2766.

Chen, Y., Li, H., and Zhou, L. (2005). "Relative performance evaluation and the turnover of provincial leaders in China," *Economics Letters*, 88, 421–425.

Chen, L. (2018). "Re-exploring the usage of Chinese Industrial Enterprise Database," *Economic Review*, 2018–6, 140–153 (in Chinese).

Chen, S., Ratnovski, L., and Tsai, P.-H. (2019). "Credit and fiscal multipliers in China," BOFIT Discussion Papers 5/2019.

Chen, Z., Poncet, S., and Xiong, R. (2020). "Local financial development and constraints on domestic private firm exports: Evidence from city commercial banks in China," *Journal of Comparative Economics*, 48, 56–75.

Chong, T.T.-L., Lu, L., and Ongena, S. (2013). "Does banking competition alleviate or worsen credit constraints faced by small- and medium-sized enterprises? Evidence from China," *Journal of Banking & Finance*, 37, 3412–3424.

Cong, L.W., Gao, H., Ponticelli, J., and Yang, X. (2019). "Credit allocation under economic stimulus: Evidence from China." *Review of Financial Studies*, 32, 3412–3460.

De Marco, F., and Macchiavelli, M. (2016). "The political origin of home bias: The case of Europe," *Finance and Economics Discussion Series* 2016–060. Washington: Board of Governors of the Federal Reserve System.

Dinç, I.S. (2005). "Politicians and banks: Political influences on government-owned banks in emerging markets," *Journal of Financial Economics*, 77, 453–479.

Dinç, I.S., and Gupta, N. (2011). "The decision to privatize: Finance and politics," *Journal of Finance*, 66, 241–269.

Duchin, R., and Sosyura, D. (2012). "The politics of government investment," *Journal of Financial Economics*, 106, 24–48.

Englmaier, F., and Stowasser, T. (2017). "Electoral cycles in savings bank lending," *Journal of the European Economic Association*, 15, 296–354.

Ferri, G. (2009). "Are New Tigers supplanting Old Mammoths in China's banking system? Evidence from a sample of city commercial banks," *Journal of Banking & Finance*, 33, 131–140.

Fungáčová, Z., Pessarossi, P., and Weill, L. (2013). "Is bank competition detrimental to efficiency? Evidence from China." *China Economic Review*, 27, 121–134.

Gao, H., Ru, H., Townsend, R., and Yang, X. (2019). "Rise of bank competition: Evidence from banking deregulation in China," NBER Working Paper No. 25795.

Geng, S., Pang, B., and Zhong, L. (2016). "The political economy of the term factor in China: The term of local cadres and the behavior of local governments," *China Economic Quarterly*, 15, 893–916 (in Chinese).

Gropp, R., Guettler, A., and Saadi, V. (2020). "Public bank guarantees and allocative efficiency," *Journal of Monetary Economics*, forthcoming.

Guiso, L., Sapienza, P., and Zingales, L. (2004). "Does local financial development matter?" *Quarterly Journal of Economics*, 119, 929–969.

Guo, F., and Xiong, R. (2018). "Local financial institutions and regional economic growth: A quasi-natural experiment of city commercial banks in China," *China Economic Quarterly*, 17, 221–246 (in Chinese).

Huang, Y., Pagano, M., and Panizza, U. (2020). "Local crowding out in China," *Journal of Finance*, 75, 2855–2898.

Igan, D., Lambert, T., Wagner, W., and Zhang, Q. (2017). "Winning connections? Special interests and the sale of failed banks," IMF Working Papers WP/17/262.

Jiang, C., Yao, S., and Feng, G. (2013). "Bank ownership, privatization, and performance: Evidence from a transition country." *Journal of Banking & Finance*, 37, 3364–3372.

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

Hung, C.H.-D., Jiang, Y., Liu, F.H., Tu, H., and Wang, S. (2017). "Bank political connections and performance in China," *Journal of Financial Stability*, 32, 57–69.

Khwaja, A.I., and Mian, A. (2005). "Do lenders favor politically connected firms? Rent provision in an emerging financial market," *Quarterly Journal of Economics*, 120, 1371–1411.

Koetter, M., and Popov, A. (2020). "Political cycles in bank lending to the government," *Review of Financial Studies* (forthcoming).

La Porta, R., Lopez-De-Silanes, F., and Shleifer, A. (2002). "Government ownership of banks," *Journal of Finance*, 57, 265–301.

Leary, M.T., and Roberts, M.R. (2014). "Do peer firms affect corporate financial policy?" *Journal of Finance*, 69, 139–178.

Li, P., Lu, Y., and Wang, J. (2016). "Does flattening government improve economic performance? Evidence from China," *Journal of Development Economics*, 123, 18–37.

Li, H., and Zhou, L. (2005). "Political turnover and economic performance: The incentive role of personnel control in China," *Journal of Public Economics*, 89, 1743–1762.

Lian, C., and Ma, Y. (2020). "Anatomy of corporate borrowing constraints," *Quarterly Journal of Economics*, (forthcoming).

Lin, J.Y., and Li, Y. (2001). "Promoting the growth of medium and small sized enterprises through the development of medium and small sized financial institutions," *Economic Research Journal*, 2001–1, 10–18 (in Chinese).

Maskin, E., Qian, Y., and Xu, C. (2000). "Incentives, information, and organizational form," *Review of Economic Studies*, 67, 359–378.

Ongena, S., Popov, A., and Van Horen, N. (2019). "The invisible hand of the government: Moral suasion during the European sovereign debt crisis," *American Economic Journal: Macroeconomics*, 11, 346–79.

Qian X., Cao, T., and Li, W. (2011). "Promotion pressure, officials' tenure and lending behavior of the city commercial banks," *Economic Research Journal*, 2001–12, 72–85 (in Chinese).

Qian, X., Zhang, G., and Liu, H. (2015). "Officials on boards and the prudential behavior of banks: Evidence from China's city commercial banks," *China Economic Review*, 32, 84–96.

Rajan, R.G. and Ramcharan, R. (2009). "Land and credit: A study of the political economy of banking in the United States in the early 20th century," NBER Working Paper No. 15083.

Sapienza, P. (2004). "The effects of government ownership on bank lending," *Journal of Financial Economics*, 72, 357–384.

Shen, C.-H., Lin, C.-Y. (2012). "Why government banks underperform: A political interference view," *Journal of Financial Intermediation*, 21, 181–202.

Tan, Y., Tan, Z., Huang, Y., and Hu, Y. (2017). "The crowding-out effect of zombie firms on investments," *Economic Research Journal*, 2017–5, 175–188 (in Chinese).

Xu, C. (2011). "The fundamental institutions of China's reforms and development," *Journal of Economic Literature*, 49, 1076–1151.

Zhang, D., Cai, J., Dickinson, D.G., and Kutan, A.M. (2016). "Non-performing loans, moral hazard and regulation of the Chinese commercial banking system," *Journal of Banking & Finance*, 63, 48–60.

Zhou, L. (2007). "Governing China's local officials: An analysis of promotion tournament model," *Economic Research Journal*, 2007–7, 36–50 (in Chinese).

# Appendix

## A Summary statistics

Table A1 Summary statistics

| | Mean | Std. error | Median | Min | Max |
|---|---|---|---|---|---|
| *Firm-level variables* | | | | | |
| Log bank loans | 9.2741 | 1.6939 | 9.2032 | 5.0106 | 13.7930 |
| Loan rate | 0.0524 | 0.1091 | 0.0241 | 0.0002 | 0.8253 |
| Log total assets | 10.0684 | 1.4599 | 9.9173 | 7.1180 | 14.3067 |
| Fixed assets/total assets | 0.3659 | 0.2294 | 0.3340 | 0.0126 | 0.9240 |
| Return on assets (ROA) | 0.1102 | 0.2032 | 0.0410 | –0.1930 | 0.9912 |
| Return on equity (ROE) | 0.2746 | 0.6341 | 0.1156 | –1.3599 | 3.9984 |
| Loan/total assets | 0.5636 | 0.2910 | 0.5714 | 0.0176 | 1.4432 |
| Log firm age | 2.0835 | 0.8048 | 2.0794 | 0 | 3.9512 |
| Log sales revenue | 10.4311 | 1.4151 | 10.3371 | 6.7569 | 14.2757 |
| *Municipality-level variables* | | | | | |
| GDP growth rate | 0.1509 | 0.0690 | 0.1483 | –0.0167 | 0.4387 |
| Log GDP per capita | 9.8855 | 0.9001 | 9.9460 | 7.9132 | 11.7786 |
| Deposits/GDP | 1.3816 | 0.6721 | 1.2043 | 0.5287 | 4.2596 |
| Loans/GDP | 0.9654 | 0.4985 | 0.8109 | 0.3108 | 2.5264 |
| Land right sales/fiscal income | 0.5178 | 0.4088 | 0.4363 | 0.0008 | 2.0067 |
| Land right sales/GDP | 0.0293 | 0.0297 | 0.0209 | 0.0000 | 0.1475 |
| Fiscal deficit/GDP | 0.0867 | 0.0807 | 0.0649 | –0.0012 | 0.4191 |
| Promotion pressure index | 1.6658 | 0.9344 | 2.0000 | 0.0000 | 3.0000 |

# B Estimates for all variables in baseline regressions

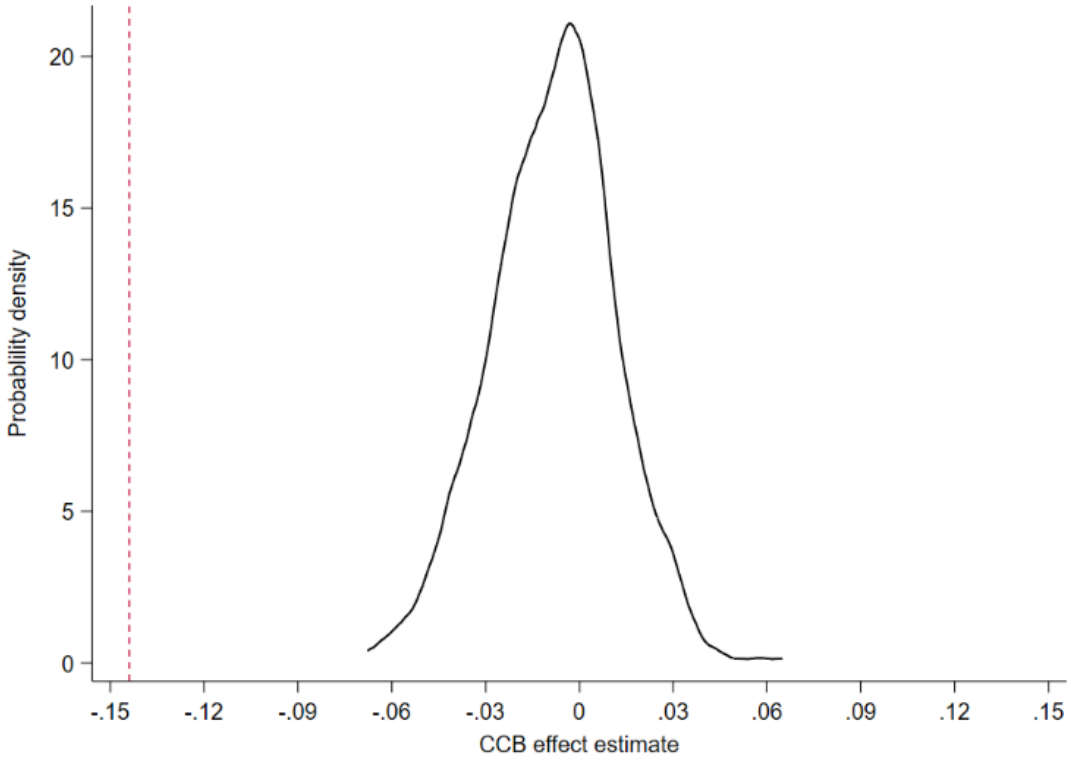
Table A2 Debt funding and interest rate for private firms, estimates for all variables

| | Log debts | | Interest rate | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| CCB | –0.061*** | –0.144*** | 0.018*** | 0.012*** |
| | (0.020) | (0.010) | (0.001) | (0.001) |
| Log total assets | | 1.031*** | | –0.015*** |
| | | (0.004) | | (0.001) |
| ROA | | –0.204*** | | 0.025*** |
| | | (0.031) | | (0.004) |
| Fixed assets / total assets ratio | | –0.727*** | | 0.020*** |
| | | (0.009) | | (0.003) |
| Log firm age | | 0.039*** | | 0.003*** |
| | | (0.002) | | (0.000) |
| Log sales revenue | | –0.057*** | | 0.014*** |
| | | (0.005) | | (0.001) |
| | | | | –0.099*** |
| | | | | (0.010) |
| Deposits / GDP ratio | | –0.003 | | –0.000 |
| | | (0.008) | | (0.001) |
| Loans / GDP ratio | | 0.045*** | | 0.001*** |
| | | (0.010) | | (0.001) |
| GDP growth rate | | –0.050*** | | –0.002* |
| | | (0.008) | | (0.001) |
| Constant | 9.136*** | –0.228*** | 0.046*** | 0.099*** |
| | (0.015) | (0.017) | (0.001) | (0.008) |
| No. of obs. | 2,449,929 | 2,333,048 | 1,766,261 | 1,727,384 |
| R-squared | 0.215 | 0.787 | 0.100 | 0.202 |
| Municipality FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

This table reports the results of estimating the basic regression equation (1) for debt funding of firms and interest rate for private firms on establishment of CCBs. Firm-level controls include log total assets, return on assets (ROA), ratio of fixed assets to total assets, log firm age, and log sales revenue. Municipality-level controls include ratio of total retail deposits to GDP, ratio of total bank loans to GDP, and GDP growth rate. All regressions include municipal, industry, and year fixed effects, and standard errors of the estimated coefficients are clustered on municipal*industry level. Columns (1) and (3) are based on regressions without firm- and municipality-level controls, while columns (2) and (4) are based on regressions with firm- and municipality-level controls.

# C Probability distribution of placebo test



# BOFIT Discussion Papers

A series devoted to academic studies by BOFIT economists and guest researchers. The focus is on works relevant for economic policy and economic developments in transition / emerging economies.

2020
- No 1 Chang Ma, John Rogers and Sili Zhou: The effect of the China connect
- No 2 Karlo Kauko: The vanishing interest income of Chinese banks
- No 3 Mariya Hake and Philipp Poyntner: Keeping up with the Novaks? Income distribution as a determinant of household debt in CESEE
- No 4 Risto Herrala and Fabrice Orlandi: Win-Win? Assessing the global impact of the Chinese economy
- No 5 Weijia Li, Gérard Roland and Yang Xie: Erosion of state power, corruption control, and political stability
- No 6 Ryan Banerjee, Boris Hofmann and Aaron Mehrotra: Corporate investment and the exchange rate: The financial channel
- No 7 Amanda Gregg and Steven Nafziger: Financing nascent industry: Leverage, politics, and performance in Imperial Russia
- No 8 Zuzana Fungáčová, Koen Schoors, Laura Solanko and Laurent Weill: Political cycles and bank lending in Russia
- No 9 Francis Osei-Tutu and Laurent Weill: Sex, language, and financial inclusion
- No 10 Josef C. Brada, Chunda Chen, Jingyi Jia and Ali M. Kutan: Does bilateral investment treaty arbitration have any value for multinational corporations?
- No 11 Cristiano Perugini: Patterns and drivers of household income dynamics in Russia: The role of access to credit
- No 12 Michael Funke and Andrew Tsang: The People's Bank of China's response to the coronavirus pandemic – A quantitative assessment
- No 13 Alin Marius Andrieș, Anca Maria Podpiera and Nicu Sprincean: Central bank independence and systemic risk
- No 14 Cevat Giray Aksoy, Barry Eichengreen and Orkun Saka: The political scar of epidemics
- No 15 Hong Ru, Endong Yang and Kunru Zou: Combating the COVID-19 pandemic: The role of the SARS imprint
- No 16 Chang Ma, John Rogers and Sili Zhou: Modern pandemics: Recession and recovery
- No 17 William Pyle: Russians' "impressionable years": life experience during the exit from communism and Putin-era beliefs
- No 18 Hao Wang, Jan Fidrmuc and Qi Luo: Grandparenting and well-being of the elderly in China
- No 19 Michael Funke and Doudou Zhong: The political globalisation trilemma revisited: An empirical assessment across countries and over time
- No 20 Hao Liang, Rong Wang and Haikun Zhu: Growing up under Mao and Deng: On the ideological determinants of corporate policies
- No 21 Hong Ru and Kunru Zou: How do individual politicians affect privatization? Evidence from China
- No 22 Michael Funke, Julius Loermann and Andrew Tsang: Volatility transmission and volatility impulse response functions in the main and the satellite Renminbi exchange rate markets
- No 23 Xuan Fei: The misallocation in the Chinese land market
- No 24 Jakub Lonsky: Gulags, crime, and elite violence: Origins and consequences of the Russian mafia
- No 25 Jarko Fidrmuc, Serhiy Moroz and Fabian Reck: Regional risk-sharing in Ukraine
- No 26 Amanda Gregg and Steven Nafziger: The births, lives, and deaths of corporations in late Imperial Russia
- No 27 Qing He and Xiaoyang Li: The failure of Chinese peer-to-peer lending platforms: Finance and politics

2021
- No 1 Eeva Kerola and Benoît Mojon: What 31 provinces reveal about growth in China
- No 2 Ekaterina Paustyan: Politically motivated intergovernmental transfers in Russia: The case of the 2018 FIFA World Cup
- No 3 Zuzana Fungáčová, Eeva Kerola and Laurent Weill: Does bank efficiency affect the bank lending channel in China?
- No 4 Shulong Kang, Jianfeng Dong, Haiyue Yu, Jin Cao and Valeriya Dinger: City commercial banks and credit allocation: Firm-level evidence



BOFIT Discussion Papers
http://www.bofit.fi/en • email: bofit@bof.fi
ISSN 1456-5889 (online)