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Haizhi Wang and Mingming Zhou

Banking structure, marketization
and small business development:
Regional evidence from China



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Iftekhhar Hasan, Nada Kobeissi, Haizhi Wang and Mingming Zhou

Banking structure, marketization and small business development: Regional evidence from China

Abstract

This paper provides an empirical examination of the regional banking structures in China and their effects on entrepreneurial activity. Using a panel of 27 provinces and four directly controlled municipalities from 1997 through 2008, we find that the presence of large banking institutions negatively correlates with small business development in local markets and that this negative relation is driven mainly by participation of large banks in the short-term loan market. Rural banking institutions, in contrast, are found to promote regional entrepreneurial activity. Moreover, large state banks facilitate small business development in concentrated markets. When we interact measures of banking financing by state banks and rural banking institutions with a set of provincial level marketization indexes, we find that extensive marketization, factor market development, and sophistication of legal frameworks mitigate the negative effect of large state banks on small business development. In provinces with advanced market development, efficient factor markets, and favorable institutional settings, the positive effect of rural banking institutions on small business growth is even stronger. Finally, we present evidence that banks do a better job of promoting regional entrepreneurship when it occurs in conjunction with policies to foster innovation activity and assure protection of intellectual property rights.

JEL classification: G21 O16 P23 P25.

Keywords: banking structure, marketization, small business development, China.

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1 Introduction

Small businesses represent important sources of innovation, employment growth, and economic development (Audretsch, 2002; Lafontaine and Shaw, 1999). As a small business develops, its ability to acquire resources, particularly financial resources, is crucial for its owner to pursue his or her entrepreneurial vision and transform innovative ideas into reality. Banks accumulate financial capital in this process and channel scarce resources to support the growth of small firms (Rousseau and Wachtel, 1998). Using the data from the 1993 National Survey of Small Business Finance, Cole *et al.* (1996) report that banks at that time provided over 60 percent of small business credit. Moreover, the high failure rate of small firms in that period reflected their inability to secure external funds and a lack of support from creditors. A sound and efficient banking sector is therefore important not just in establishing a small business, but in assuring the firm's ongoing ability to thrive.

As one might expect, most research on the effects of financial development of banking systems on the formation and growth of small businesses focuses on North America and Europe. Even so, the lack of study of related domains outside these developed economic regions is striking – particularly in the case of China. The world's largest emerging economy has managed high growth without a long-standing legal framework or highly developed financial systems (Allen *et al.*, 2005). An important clue here is the Chinese government's consistent acknowledgement of the difficulties small business face in accessing external financial resources and the implementation of numerous regulatory measures to facilitate small business development.

Indeed, China offers a unique environment for examining how banking sector policy can affect growth of small businesses for three reasons. First, cross-country samples of previous studies often fall short in controlling for the systematic differences among markedly different economies. This hinders the ability of the researcher to make meaningful inferences. We argue that a methodological design focused on intra-country information, rather than cross-country samples, avoids this idiosyncrasy and ensures the requirement of Sekaran (1983) for “data comparability and functional equivalence.”

Second, focusing on provincial-level data allows us to explore the rich variation in banking structures to explain the growth of small businesses. As discussed by Stein (2002), lending to small business requires that banks rely heavily on “soft information,” because “hard information” on small borrowers is difficult to collect due to a lack of historical re-

cords and audited financial reports. With different expertise in gathering and processing soft information, large banks and small banks may exhibit different lending behaviors toward small firms. Thus, we can infer the existence of differential effects of state-owned banks (i.e. large banks) and rural banking institutions (i.e. small banks) on small business growth.

Finally, in the process of marketization, uneven paces and significant disparities exist among provinces in terms of regulatory policies, openness, labor markets, infrastructure endowment, and institutional settings (Demurger, 2001; Cai et al., 2002). The coevolution of real and financial sectors allows us to draw meaningful inferences regarding the joint effect of banking structure and marketization on small business development (Boyd and Smith, 1996).

We collect data from different regions of China to form a panel of 27 provinces and four directly controlled municipalities over the period from 1997 to 2008. This sample size ensures sufficient variations in both cross-sectional and time-series dimensions. We further obtain information from various sources on the number and output of small businesses to construct two measures to capture the growth of small businesses in local markets. Regional banking structures are measured from several aspects based on theoretical underpinnings, and we employ a set of indexes constructed by the National Economic Research Institute (NERI) to gauge marketization disparities across provinces. Controlling for the provincial economic environment and demographic differences, our empirical analysis yields novel evidence and thereby contributes to the existing literature.

The presence of large banks appears to have a negative effect on small business growth, which is consistent with the view that large banks have an informational disadvantage in making loans to small business (Strahan and Weston, 1998). This negative relation is mainly driven by large banks' participation in the short-term debt market. When we explore the contingent effect of large bank loans depending on market concentration, we find that large banks can significantly facilitate the growth of small businesses in concentrated markets (Petersen and Rajan, 1995).

As nearly all observed financial liberalization occurs in rural areas (Huang, 2008), we also examine the role of rural banking institutions in the regional entrepreneurial activities. We document a significantly positive relation between credit supplied by rural banking institutions and small business development. In addition, consistent with existing literature, our study confirms the positive impact of financial deepening, trained human capital,

and personal wealth level on nurturing entrepreneurship in local markets. Our results are robust to the fixed-effects estimation and instrumental variable panel data estimation.

This study further considers the joint effects of banking structures and marketization on small business growth. We provide evidence that better overall marketization, as well as development of the factor market and legal framework, mitigate the negative effect of large banks on small business development. Provinces with greater market development, more efficient factor markets, and favorable institutional settings, display a stronger positive effect of rural banking institutions on small business growth. Our analysis also indicates a relative large government has a detrimental effect on the growth of small businesses. Additionally, we show that both state banks and rural banks function well in facilitating small business growth in provinces that emphasize innovation and protection of intellectual property rights.

The remainder of this paper is organized as follows. Section 2 briefly discusses the banking system in China and reviews related literature. Section 3 details our data sample and measures. Section 4 presents our empirical results. Section 5 summarizes our findings and offers policy insights.

2 Related literature

2.1 China's banking system

The banking structure in China can be traced back to the late 1940s, when a socialist banking system was established following the model of the Soviet Union. The People's Bank of China was established in 1948 to handle currency issue and monetary control. Because banks lacked sufficient incentives to make profits out of real business lending, there was little competition in the banking sector. In the early 1990s, however, the central government launched fundamental reforms of the financial system. The 1995 Commercial Bank Law of China officially specified the role of state-owned banks as commercial banks in accordance with market principles rather than policy requirements. Additional changes were implemented after China's entry into the WTO in 2001, including the liberalization of interest rates and a relaxation of restrictions on equity ownership. In recent years, the Chinese government has taken cautious steps toward partial privatization of state banks by selling shares to domestic and foreign investors. Gradual reforms of China's banking sys-

tem and various regulatory changes have significantly increased competition among banks and bank efficiency.

The “Big Four” state-owned banks (i.e. China Construction Bank, Bank of China, Industrial and Commercial Bank of China, and Agricultural Bank of China) today dominate China’s banking sector. There are twelve joint-stock banks operating across the provinces and 143 city commercial banks. In addition, at the end of 2014, there were 303 rural commercial banks, 210 rural credit cooperatives, and 1,424 rural credit unions in China.

2.2 Banking structure and small business development

The large body of literature highlighting the influence of a country’s financial development on economic growth dates back to Schumpeter (1934). A fundamental theme is that banking institutions play a crucial role in screening potential borrowers and efficient allocation of financial and real resources. Small businesses, in turn, are extremely reliant on external financing to support their survival and long-term growth (Cole et al., 1996). The relation between the banking sector and small business financing has received great attention in developed countries, and a causal relationship has been well established in the literature (Berger et al., 1998; Peek and Rosengren, 1998; Strahan and Weston, 1998; Berger and Udell, 2002). While the role of China’s flourishing private sector in economic development is widely acknowledged (Anderson et al., 2003), the banking sector’s role in fostering small business growth has yet to receive clear explication (Chong et al., 2013). Thus, our goal is to explore significant aspects of banking structures of local markets and their effects on small business development.

China, given the size and importance of its banking sector, provides an ideal setting for such study. This is because banks are the main source of funding for small business owners in China (Aziz and Duenwald, 2002), given that underdeveloped capital markets largely preclude small firms from raising funds from public resources such as equity financing and public debt issuances. As small firms must compete for limited resources, credits extended to small businesses tend to be rationed and small businesses are heavily screened to establish their creditworthiness and future growth potential. Banks serve as both insider lenders and delegated monitors, so they enjoy access to information about the small firm from the onset of the loan application process (Diamond, 1984).

Moreover, banks may have an informational advantage in identifying qualified borrowers and nurturing lending relationships with the small businesses.

The key distinguishing characteristic of small business lending, as Stein (2002) points out, is the “softness” of the information used in the decision-making. Large banks may shy away from such relationship-based lending, preferring transaction-based lending. They are less likely to extend credit to small businesses, especially to small firms with almost no history (Berger and Udell, 2002; Berger et al., 2005). Empirical evidence also suggests that larger banks have a lower fraction of small business lending in their lending portfolio (Zarutskie, 2006). As a result, China’s four state-owned megabanks take the dominant role in providing banking services to large businesses and are the preferred lender to state-owned enterprises for policy reasons (Wei and Wang, 1997; Yeung, 2009). To date, the evidence is still scant regarding the role of large state-owned banks in small business development (Yueng, 2009), which motivates our empirical examination.

Unlike large banks, small banks may emphasize their expertise in using “soft” information to screen and monitor their small corporate customers (Petersen and Rajan, 1994; Hauswald and Marquez, 2006). Positioned on the “small-sized end” of the banking market, rural banking institutions in China (e.g., rural commercial banks, rural credit cooperatives and rural credit unions) serve the great rural areas. It is equally important to recognize that the success of the Chinese economy is built upon “the existence of two Chinas – an entrepreneurial rural China and a state-controlled urban China.” (Huang, 2008). The changing structure of traditional rural industries and its impact of on rural communities has been a driving force behind the revitalization of rural areas. The growth of small businesses in rural areas promotes local economic development by increasing employment, stabilizing the local environment, and transforming rural industries (Gladwin et al., 1989; Goetz et al., 2010). Rural banking institutions, in turn, can provide crucial financial support to rural small firms. As the importance of rural banking institutions in small business development has largely been neglected in the existing literature, we seek to provide new insight through formal testing to determine whether and how rural banking institutions contribute to small business growth.

In addition to different banking institutions shaping the banking structure, another notable aspect of banking sector is the competition or concentration of local banking markets (Bonaccorsi Di Patti and Dell’Ariccia, 2004; Hauswald and Marquez, 2006; Zarutskie, 2006; Martinez-Miera and Repullo, 2010; Chong et al., 2013). Traditional banking theory,

which treats borrowers as a homogenous group, suggests that all borrowers should be better off with increased banking competition, because survival of banks in a highly competitive environment requires them to pursue efficiency gains and do a good job at loan screening and monitoring (Pagano, 1993). However, increased bank competition tends to accentuate information asymmetry problems with small firms (Petersen and Rajan, 1995). Small firms may take advantage of a highly competitive banking market to engage in opportunistic switching among lenders. This behavior reduces the incentive of an average bank to make the costly efforts of acquiring information (Marquez, 2002; Hauswald and Marquez, 2006). As a result, in competitive markets, banks, especially those large banks lacking of expertise in processing “soft” information, make lending decisions on a period-by-period basis and are less likely to extend credits to small firms (Petersen and Rajan, 1995). Nonetheless, in a concentrated banking market, banks may have incentives to subsidize small firms in the first place and recoup their costs in subsequent loans because of the high switching cost faced by small firms. Thus, we posit that the lending strategy pursued by state banks (i.e. large banks) and rural banking institutions (i.e. small banks) with respect to small business depends on the degree of concentration of the local markets.

2.3 Interaction between banking structure and marketization

Allen et al. (2005) point out that China has grown by relying on unique, context-specific local institutional innovations and economic reforms. However, the progress of reforms and the distribution of regional endowments are uneven (Cai et al., 2002), resulting in varied paces of marketization and significant heterogeneity across different provinces in terms of openness, the development of capital, product and factor markets, and evolution of legal frameworks (Demurger, 2001; Yeung, 2009).

The acquisition of various forms of capital (financial, physical, and human) is extremely important for small businesses to prosper (Aldrich, 1990). Facing significant financial constraints entrepreneurs are most likely to thrive in an environment that helps them obtain low-cost external financing. The coevolution of the real and financial sectors suggests that the level of external financing (debt or equity) is also influenced by other factors in a market-oriented economy (Boyd and Smith, 1996). For example, the relative size of government reflects the efficiency in allocating resources among business sectors (Fan et al., 2011). Moreover, the development of product market and factor market has implica-

tions for the inter-regional and intra-regional trade barriers. Therefore, we posit that banking structure and the extent of marketization may jointly affect the development of small business in local markets.

Aron (2000) argues that institutions affect economic growth through their influence on the costs of transactions and the efficiency of production. The development of the legal framework including well-defined property rights, contract enforcement, and political institutions is important to the development of a private sector that consists primarily of small firms (Hasan et al., 2009). Without a favorable institutional and political environment, the probability of failure of small firms increases significantly due to their lack of organizational legitimacy. Yet at the same time, proper functioning of the banking sector depends largely on an institutional setting that defines the incentives and wealth-maximizing opportunities of entrepreneurs and fund providers (Hasan et al., 2009).

Small firms, founded by independent entrepreneurs, are typically the primary driver of technological innovation (Baumol, 1986; Baumol, 2002). Better enforcement of intellectual property rights can increase the expected payoff of conducting innovative activities and investing in research and development (Ang et al., 2014). Thus, we hypothesize that banking institutions that operate in innovative environments with better intellectual property rights protection are better able to channel financial resources to entrepreneurial firms and facilitate small business growth.

Thus, a second focus of this study is the interaction of banking structures, marketization development, and small business growth. Specifically, we explore several aspects of marketization in China, making use of variations among provinces in our empirical analysis.

3 Data and sample

3.1 Sample construction

Our examination of the role of bank financing and marketization in small business growth relies on Chinese provincial data. This subnational-level data allows us to avoid the data comparability issue in cross-nation studies and explore the cross-sectional and time-series variations in banking structure and marketization across provinces. Accordingly, we construct a panel of consisting of 27 provinces and four municipalities from 1997 to 2008.

3.2 Measures of small business development

The National Bureau of Statistics of China (NBSC) provides annual statistics on the number of firms in different size categories at the provincial level. Pre-1997 industrial statistics were based on types of ownership. Moreover, the calibration of industrial statistics was changed from type of ownership to size of enterprise after 1997. Thus, we can only obtain aggregate information at the provincial level with a consistent definition of small business starting from 1997 onward.

We define growth rate of small business as percentage change in the total number of small businesses (defined as firms with fewer than 300 employees):

$$\text{Growth rate of small business}_{it} = \frac{N_{it} - N_{it-1}}{N_{it-1}} \times 100\% \quad , \quad (1)$$

where N represents that number of small businesses, and we collect the information at the end of each year, denoted as t, for each province, denoted as *i*.

We construct an alternative output-based measure that emphasizes the contribution to gross domestic product (GDP) attributable to small businesses, which is calculated as the percentage change in total output of small businesses:

$$\text{Growth in output of small business}_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \times 100\% \quad , \quad (2)$$

where P represents the output of small businesses. Obviously, these measures are not perfect and subject to sample errors, but to our knowledge they are the best available proxies.

3.3 Measures of regional banking structure

We obtain the bank loan data from the annual issues of the *Almanac of China's Finance and Banking* (ACFB). Building on existing literature, we use several measures to capture regional banking structure. The “Big Four” state-owned banks control over 50 percent of total banking sector assets (Berger et al., 2009). They generally lend to state-owned enterprises and provide limited funds to small business. Therefore, we define *large bank loans* as the ratio of total loans made by the four state-owned banks to total lending of all banking institutions. We use this variable to capture the presence of state-owned banks in local

markets, where they are perceived to have informational disadvantages in making small business loans (Strahan and Weston, 1998; Stein, 2002).

Cassar and Holmes (2003) provide evidence that small firms seek short-term secured loans to satisfy their financing needs precisely because of information asymmetry and their inability to secure long-term debt at low cost. Thus, we distinguish between short-term debt (loan maturity less than one year) and long-term debt (loan maturity longer than one year) with two additional variables. *Large bank ST loans* is defined as the ratio of total short-term loans made by the four state-owned commercial banks to total short-term lending of all banking institutions. *Large bank LT loans* is defined as the ratio of total long-term loans made by the four state-owned commercial bank to total long-term lending of all banking institutions.

As China lacks a nationwide credit-scoring system, credit suppliers generally lend to small businesses in geographical proximity. More importantly, as rural small business development is a main driver of Chinese economic growth (Huang, 2008), rural banking institutions play a significant supportive role. This aspect of rural lending has largely been ignored in previous research (Chong et al., 2013). Therefore, we measure the ratio of loans made by all rural commercial banks, rural credit cooperatives and rural credit unions to total lending of all banking institutions (*rural banking institution loans*) as an additional explanatory variable capturing the regional banking structure.

It is noteworthy that city commercial banks also target at small business lending. However, city commercial banks are only allow to open branches in cities where they are headquartered and therefore cover small geographic regions. Moreover, Chong et al. (2013) investigate the presence of city commercial banks in alleviating credit constraints faced by small- and medium-sized firms (SME), and report a weak effect of reducing SME financial constraints in competitive markets. Therefore, in this study, we focus on large state banks and rural banking institutions.

We also construct a Herfindahl-Hirschman Index based on bank deposits (*bank concentration index*) to measure competition in local markets through summing up squared market share of deposits for each bank. When there is only a single bank in a particular province, the index is equal to one. For a perfectly atomistic market, the index will be close to zero. One would expect that large banks' presence is highly correlated with bank market concentration. However, our data reveal a negative correlation (-0.17 , $p < 0.05$) between

large bank loans and bank concentration index. It is plausible that regions with high level of large banks' presence are also regions with more competition among different banks.

3.4 Marketization indexes for China's provinces

We employ a set of indexes developed by NERI to capture various aspects of marketization across different provinces (Fan et al., 2011). NERI uses a weighting scheme to group 19 indicators of institutional arrangements and policies into five main areas related to market-oriented reforms and to construct a set of indexes using a 0 to 10 scale for each area. The indexes measure the position of a particular province in its progress toward a market economy relative to other provinces. For example, a value of 3 for Hubei Province is 50 percent less than Guangdong Province, which gets a score of 6 in the same category. The indexes are available annually from 1997 to 2009.

Here, we use a broad index to measure the overall marketization (*overall marketization index*) and five other indexes in five major areas of market development (Fan et al., 2011). These five areas are (1) size of the government in the regional economy; (2) the growth of non-state sector; (3) product market development; (4) factor market development; (5) service sector and legal framework development. Accordingly, we have five additional variables: *government-market relationship*, *non-state sector development*, *product market development*, *factor market development*, and *legal framework development*. In addition, we also retrieve information from NERI to construct two additional measures, namely *provincial innovation* and *intellectual property rights protection*.

3.5 Other control variables

We collect province-level information about GDP, education, and FDI data from the annual issues of the *Statistics Yearbook of China*. The ratio of total bank loans to GDP (termed as "total bank loans/GDP") is commonly used in the banking literature as a proxy for banking-sector depth, which measures the role and importance of financial intermediation in the economy. We define *GDP per capita* as the percentage change of real GDP per capita. Here, the price level is adjusted to 1990 and we use this variable at year $t-1$ to control for regional economic development momentum and local business environment. Real

GDP per capita also serves as an indicator of personal wealth level and the commitment of small business owners to their firms.

Foreign direct investment (FDI) can be a two-edged sword. It can encourage small business development or plausibly crowd out small domestic firms. Despite the ambiguous effect of FDI on small business growth, we measure the ratio of foreign direct investment to GDP (FDI/GDP) as an additional control variable.

Armington and Acs (2002) document the positive relationship between college graduates and the number of newly formed small firms. Therefore, we calculate the proportion of the population with college degrees (*college degree holders/population*) and use this as a proxy for the availability of trained human capital and potential pool of would-be entrepreneurs in a local market. The inclusion of these control variables is based on the natural link between broader economic development and small business growth discussed earlier.

4 Empirical results

To uncover the relationship through regression analysis, we control for a set of variables that capture economic, institutional, and demographic conditions in each province. Table 1 presents the summary statistics of variables used in our regression analysis. All independent variables are measured with one-year lag to ensure proper inferences of statistical results. During the sample period, we find that the average growth rate of the number of small businesses is seven percent with a standard deviation 15 percent, while the average growth rate in output of small businesses is 22 percent with a standard deviation of 20 percent. Notably, the two measures capturing small business growth in local markets are strongly correlated with a correlation coefficient of 0.64 ($p < 0.01$).

Table 1 Summary statistics

Variable name	N	Mean	SD	p50	Min	Max
<i>Panel A: Small business development</i>						
Growth in number of small businesses	310	0.07	0.15	0.06	-0.56	0.64
Growth in output of small businesses	310	0.22	0.20	0.22	-0.44	0.75
<i>Panel B: Banking structure</i>						
Large bank loans	360	0.59	0.11	0.59	0.30	0.96
Large bank ST loans	360	0.66	0.21	0.66	0.14	1.00
Large bank LT loans	360	0.59	0.18	0.55	0.27	1.00
Rural banking institution loans	360	0.11	0.05	0.11	0.01	0.29
Bank concentration index (deposits-based HHI)	360	0.21	0.04	0.20	0.15	0.39
<i>Panel C: Indexes of marketization</i>						
Overall marketization index	372	5.50	2.19	5.19	0.00	11.71
Government-market relationship	372	6.76	2.18	6.99	0.00	10.65
Non-state sector development	372	5.58	3.12	5.08	0.00	13.73
Product market development	372	6.94	2.08	6.98	0.00	10.61
Factor market development	372	3.82	2.27	3.30	0.00	11.93
Legal framework development	372	4.32	2.72	3.74	0.00	17.14
Provincial innovation	372	3.95	6.73	1.40	0.00	43.25
Intellectual property rights protection	372	3.61	6.27	1.27	0.00	41.12
<i>Panel D: Control variables</i>						
Bank loan/GDP	369	1.09	0.52	1.02	0.09	8.43
GDP per capita	341	0.10	0.05	0.10	0.07	0.33
FDI/GDP	328	0.03	0.03	0.01	0.00	0.17
College degree holders/population	341	0.05	0.04	0.04	0.00	0.30

4.1 Large state bank financing and small business development

Table 2 presents regression results relating the growth rate of small business to various measures of regional banking structure. It is plausible that unobserved characteristics in different provinces correlated to our variables of interest have been omitted from the regression model, resulting in a biased estimation in pooled ordinary least squares (OLS). Therefore, we include province fixed effects to control for time-invariant heterogeneity. Indeed, our F-test of the null hypothesis that the constant term is equal across units leads to a rejection of the null hypothesis ($p < 0.01$), suggesting that fixed-effects models are better specified than pooled OLS. Following Petersen (2009), we further employ clustered standard errors by province to address the possibility that estimated residuals may be correlated for the same province over time.

In column 1 of Table 2, we enter our measure of state-owned bank loans along with a set of control variables. The results indicate that the presence of large state banks in

local markets is negatively correlated with the growth rate of small business ($p < 0.05$). Notably, the technologies of lending to small firms differ fundamentally from those of lending to large mature firms (Stein, 2002). Large banks with multi-layer hierarchy find it difficult to pass on soft information thus rely on hard information in making lending decisions. Lending to small businesses in China also requires strict control and oversight because there is no nationwide credit-scoring system to assess the creditworthiness of small borrowers (Yeung, 2009). The complex hierarchy in large banks increases the cost of relationship lending, which results in organizational diseconomies associated with small business lending. This finding comports with evidence from developed economies (Peek and Rosengren, 1998; DeYoung et al., 1999; Stein, 2002).

In columns 2 and 3 of Table 2, we further distinguish between short-term and long-term loans made by large state-owned banks. An important characteristic of Chinese banking sector is that the majority of government-directed loans go to state-owned enterprises, and the lending process suffers from soft-budget constraints in the absence of efficient governance mechanisms. Furthermore, firms tend to treat long-term debt as the last resort in choosing how to raise capital because of the institutional setting of the banking sector in China (Chen, 2004). Indeed, our finding in column 2 reveals that the short-term loans of the four large state-owned banks are the driving force for the negative relationship reported in column 1.

There is a long-standing debate over the effects of bank competition and concentration on economic activity (Marquez, 2002; Hauswald and Marquez, 2006; Zarutskie, 2006). As discussed above in section 2, a competitive banking sector should benefit all borrowers, providing more loans at lower interest rates. However, fostering long-term relationships with small firms may not be easy in a competitive market due to low switching costs. A small firm can leave its current lender and switch to another bank once it has established a record of performing on its loans. As a result, banks in competitive markets are unwilling to extend credit to small firms in the first place. However, Petersen and Rajan (1995) argue that, in a concentrated market, banks may have incentives to subsidize small businesses in the short run because they are able to recoup the cost in the long run. Therefore, we control for local banking market concentration using a deposit-based HHI index, and interact our measures of large bank loans with bank concentration index (columns 1–3). Consistent with Chong et al. (2004), we find a negative relationship between banking

market concentration and small business development. Strikingly, bank market concentration mitigates the negative effect of large state banks on small business growth.

To test the robustness of our main findings, we use an alternative measure based on the GDP generated by small businesses, and we replicate our analysis. We document qualitatively similar results in columns 4–6 of Table 2. This additional analysis also further validates the main findings.

Next, we turn to other control variables. We find a significantly positive relationship between regional small business development and the ratio of total loans to GDP, a measure of financial deepening (Hasan et al., 2009). We also use real GDP per capita to capture the average personal wealth at the provincial level. It is common practice in small business lending that owners use their own assets as collateral and can be held personally liable for debts of their business (Berkowitz and White, 2004). Thus, personal wealth also serves as a commitment device in mitigating loan-loss exposure of lenders. A higher level of personal wealth allows small business owners to negotiate better terms and plays a key role in determining the allocation of credit to small firms (Avery et al., 1998). Given this background, it is hardly surprising that real GDP per capita is significantly and positively associated with the small business development across all model specifications.

Human capital is typically the greatest asset of a small business (Armington and Acs, 2002). Abundant theoretical and empirical studies have shown the importance of knowledge and experience in enabling firms to implement technology and adapt to the evolving technological environment. Moreover, better-educated individuals form a pool for potential entrepreneurs (Francis et al., 2008). The Chinese government had made great strides in eliminating adult illiteracy by promoting basic education, especially in rural areas (Huang, 2008). Consistent with the vital role of trained human capital, we find that small business growth is more prominent in areas where the average citizen is relatively more educated.

Table 2 Large bank financing and small business development

Independent variables	Dependent variables					
	Growth in number of small businesses			Growth in output of small businesses		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Large bank loans	-0.994** [-2.431]			-1.391** [-2.49]		
Large bank loans × Bank concentration index	4.058** [2.140]			6.239** [2.63]		
Large bank ST loans		-0.617** [-2.547]			-0.857** [-2.36]	
Large bank ST loans × Bank concentration index		2.549** [1.972]			3.609* [1.76]	
Large bank LT loans			-0.248 [-0.89]			-0.537 [-1.36]
Large bank LT loans × Bank concentration index			0.631 [0.53]			2.217 [1.17]
Bank concentration index (deposit-based HHI)	-1.662** [-2.266]	-0.752* [-1.908]	-0.213 [-0.23]	-2.865* [-1.97]	-1.342* [-1.75]	-0.874 [-0.68]
Total loans/GDP	0.020* [1.933]	0.019* [1.824]	0.017 [1.52]	0.006 [0.35]	0.001 [0.07]	0.001 [0.05]
GDP per capita	0.553*** [2.947]	0.512*** [2.767]	0.594*** [3.39]	1.314*** [4.85]	1.261*** [4.81]	1.346*** [5.57]
FDI/GDP	0.381 [0.705]	0.431 [0.857]	0.497 [0.94]	0.496 [0.53]	0.704 [0.73]	0.672 [0.72]
College degree holders/Population	2.223** [2.664]	2.048** [2.747]	1.683** [2.14]	3.479*** [2.77]	2.999** [2.31]	3.058** [2.42]
Constant	0.298 [1.097]	0.095 [0.583]	-0.087 [-0.46]	0.515 [1.49]	0.250 [1.44]	0.109 [0.45]
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Province	Province	Province	Province	Province	Province
Observation	296	296	296	296	296	296
F-statistic	12.41***	14.59***	14.07***	13.43***	13.51***	10.54***
R-squared	0.236	0.241	0.229	0.287	0.29	0.277

*, **, *** indicate significance levels of 10%, 5%, and 1%, respectively.

4.2 Rural banking institutions and small business development

A crucial component of Chinese economic development has been the evolution in the structure of traditional rural industries. Rural entrepreneurship, both the result and cause of marketization and economic growth, is the driving force revitalizing rural areas (Gladwin et al., 1989; Huang, 2008). The Chinese banking industry has also seen substantial financial reforms in rural areas since the 1990s, and rural financial reforms along with credit provisions to the private sector have helped alleviate capital constraints on small rural firms. Nonetheless, rural entrepreneurship and banking financing have largely been ignored in the existing literature (Chong et al., 2013).

The regression results in Table 3 reflect our attempt to focus on rural banking institutions, small business development, and measure the credit supplied by rural financial institutions (*rural commercial bank loans*). Note that in all model specifications, we control for large bank loans so that we are able to interpret the incremental effects of rural banking institutions conditional on the presence of large state-owned banks. We document a strongly and consistently positive effect of rural banking institutions on the growth rate of small businesses in terms of the numbers (columns 1 and 2) and outputs (columns 3 and 4). Our estimates show an insignificant coefficient for the interaction term between rural commercial bank loans and bank concentration index. These results suggest rural banking institutions play a strong supportive role in the growth of rural small firms, regardless of local bank concentration.

Table 3 Rural banking institutions and small business development

Independent variables	Dependent variables			
	Growth in number of small businesses		Growth in output of small businesses	
	Model 1	Model 2	Model 3	Model 4
Rural banking institution loans	0.021*** [2.96]	0.026** [1.98]	1.551*** [3.11]	1.678** [2.42]
Rural banking institution loans × Bank concentration index		-3.012 [-0.80]		6.971 [1.56]
Bank concentration index		-1.378* [-1.92]		-0.070 [-0.11]
Large bank loans	-0.239** [-2.18]	-0.177** [-2.05]	-1.184** [-2.02]	-1.12* [-1.88]
Total loans/GDP	0.021*** [2.96]	0.018*** [2.80]	0.004* [1.77]	0.012** [2.25]
GDP per capita	0.419*** [2.94]	0.443*** [3.14]	1.170*** [4.85]	1.179*** [4.88]
FDI	0.794 [1.19]	0.365 [0.64]	0.994 [0.98]	0.809 [0.90]
College degree holders/Population	1.687** [2.66]	1.184* [2.04]	2.610** [2.39]	2.255* [2.01]
Constant	-0.092 [-1.00]	-0.395** [-2.71]	-0.139 [-0.93]	-0.132 [-0.80]
Province fixed effects	Yes	Yes	Yes	Yes
Clustered standard errors	Province	Province	Province	Province
Observation	296	296	296	296
F-statistic	22.33***	26.67***	17.96***	20.25***
R-squared	0.266	0.283	0.305	0.316

*, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

4.3 Robustness check: instrument variable (IV) panel estimation

One potential issue in our empirical tests is the endogeneity of loan ratios. Specifically, it could be argued that unobservable provincial characteristics not included in our model specifications drive the relation between our measures of regional banking structure and small business development (i.e., omitted variable bias). It is also plausible that banking institutions adjust their lending focus in anticipating small business development (i.e. reverse causality). Panel data estimates with fixed effects can address the omitted variable

problem if the unobservables are time-invariant and correlated with endogenous regressors. However, time-variant unobservables or reverse causality issues may still result in biased estimates. Therefore, we use instrumental variable (IV) approach to address the endogeneity issue and obtain unbiased and consistent estimates of parameters.

It is well understood that the efficiency and consistency of an IV estimator crucially depend on the selection of the instrument(s). A good instrumental variable would correlate with the endogenous variables (*large bank loans* or *rural commercial bank loans*), but not directly affect small business growth. Thus, we propose the ratio of total insurance premiums to GDP as an instrument for two reasons. First, the ratio of insurance premiums to GDP measures the relative size of the insurance industry in an economy, which, in general, is highly correlated with our measures of banking structure as indicators of financial depth or development. Second, it is unlikely that insurance premiums would have a direct effect on the small business growth in China. In other words, insurance premiums only affect provincial small business development through our measures of banking structure. In equation-by-equation estimations, we use insurance premium to instrument our endogenous variables respectively.

Table 4 reports the two-step IV panel regressions (with fixed effects) of small business growth on various loan ratios and their interactions with bank concentration index, with various loan ratios being instrumented by the insurance premium to total GDP. Taken together, the IV estimations in Table 4 present qualitatively consistent results as reported in Table 2 and Table 3. We also perform some important specification tests for the IV panel estimators (Schaffer, 2010). In particular, we report an insignificant ($p > 0.05$) over-identification test (Hansen's J-statistic), so we cannot reject the null hypothesis that the instruments are valid. We also report a heteroskedasticity-robust Kleibergen-Paap Wald rk F-statistic for the weak identification hypothesis by comparing the F-statistic to the Stock-Yogo IV critical values at a 5 % significance level. The F-statistics across all regressions are larger than the 10 % maximal IV size bias critical value. Therefore, we reject the null hypothesis for weak identification and conclude that our IV estimators have a maximum relative size distortion of 10 %. In conjunction with fixed effect estimation, the analysis based on IV panel regression suggests the endogeneity issue is not the driver of our main findings. (For the sake of brevity, we only report our analysis using the growth in the number of small business as a dependent measure.)

Table 4 Robustness check: Instrumental panel data estimation

Independent variables	Dependent variable: Growth in number of small businesses							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Large bank loans (instrumented)	-3.607**	-9.388**						
	[-2.22]	[-2.06]						
Large bank loans (instrumented) × Bank concentration index		20.109*						
		[1.83]						
Large bank ST loans			-1.276***	-1.357***				
			[-2.85]	[-2.71]				
Large bank ST loans (instrumented) × Bank concentration index				4.670**				
				[2.32]				
Large bank LT loans					-0.334	-1.541		
					[-1.42]	[-1.15]		
Large bank LT loans (instrumented) × Bank concentration index						5.469		
						[1.08]		
Rural banking institution loans (instrumented)							5.249**	2.431*
							[2.36]	[1.86]
Rural banking institution loans (instrumented) × Bank concentration index								26.825
								[1.33]
Bank concentration index	-2.059**	-4.599*	-2.975	-3.672*	0.086	-2.987*	-1.712	-1.324**
	[-1.98]	[-1.73]	[-0.79]	[-1.86]	[0.18]	[-1.82]	[-0.37]	[-2.31]
Total loans/GDP	-0.272	-0.263	-0.098	0.017	-0.008	0.021	1.085	0.280*
	[-1.02]	[-0.59]	[-0.49]	[0.16]	[-0.15]	[0.42]	[0.37]	[1.74]
GDP per capita	0.034*	0.049**	0.028*	0.029*	0.507***	0.397***	-1.464	0.143
	[1.85]	[2.36]	[1.74]	[1.68]	[3.47]	[2.63]	[-0.24]	[0.37]
FDI	5.042	6.320	2.761	0.945	0.765	0.663	-4.015	1.301
	[1.19]	[0.79]	[0.92]	[0.63]	[1.21]	[1.09]	[-0.31]	[1.04]
College degree holders/Population	4.862**	5.447***	3.337**	1.292*	1.364**	0.994*	7.477**	0.944
	[2.34]	[2.75]	[2.42]	[1.67]	[2.35]	[1.93]	[2.31]	[0.96]
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Province	Province	Province	Province	Province	Province	Province	Province
Observation	296	296	296	296	296	296	296	296
F-statistic	12.17***	9.51***	13.40***	6.61***	8.56***	5.62***	7.31***	3.75***
R-squared	0.203	0.142	0.161	0.194	0.173	0.148	0.124	0.17
Hansen J statistic of overidentification (p-value)	0.12	0.09	0.15	0.08	0.06	0.07	0.13	0.09
Weak IV test (Kleibergen-Paap rk Wald F-statistic)	21.285	8.477	18.27	8.71	11.90	7.02	10.16	6.36

*, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

4.4 Interactive effect of bank financing and marketization

Starting the mid-1990s, China implemented a series of well-publicized financial reforms aimed at improving bank performance and efficiency. The regulatory changes in the banking industry were also part of introducing market mechanisms to China's planned economy. Because financial development, other institutions, and economic policies may jointly add extra explanatory power to the disparities among provinces regarding growth of small businesses (King and Levine, 1993), we interact bank financing with a set of indicators of marketization in China's provinces (Fan et al., 2011). The results are reported in Tables 5 and 6.

In Table 6, we interact large bank financing with an overall marketization indexes and five indicators in major areas related to market economy. We find a positive coefficient of interactions between state bank loans and the overall marketization index in column 1, which suggests that state banks appear more commercially oriented and respond more to economic fundamentals in a more market-oriented context with less government interference (Park and Sehart, 2001). Furthermore, the interaction terms with product market development (column 5) and legal framework development (column 6) are significantly positive. Factor market development concerns the development of mechanisms for allocating resources (e.g. financial capital or human capital) to the non-state sector (Fan et al., 2011). Legal framework development refers to the establishment of intermediate institutions such as law offices, accounting and auditing firms, as well as the institutional environment that ensures enforcement of contracts and protects property rights. Therefore, it is not surprising that when better factor market development and legal framework development create a conducive environment lowering the transaction costs, large bank financing facilitates the growth of small businesses (Gertler and Rose, 1994; Park and Sehart, 2001; Hasan et al., 2009).

We investigate three additional indicators of marketization that relate to local government control and interference. *Government-market relationship* is related to the size of government in local markets. *Non-state sector development* captures the ownership structure of the economy and the transition from public ownership to private ownership. *Product market development* concerns free price-setting and trade barriers stemming from government control. The insignificant coefficients of the three interaction terms indicate

banks with national government ownership do not fully respond to regulatory changes and policy reforms designed by local governments (Che and Qian, 1998).

Table 5 Interaction of large bank financing and indexes of marketization

Independent variables	Dependent variable: Growth in number of small businesses					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Large bank loans	-0.519** [-2.00]	-0.535** [-2.64]	-0.191* [-1.79]	-0.221* [-1.82]	-0.375* [-1.65]	-0.566*** [-3.20]
Overall marketization index	0.021 [0.69]					
Large bank loans × Overall market development	0.070** [2.60]					
Government-market relationship		0.021 [0.68]				
Large bank loans × Government-market relationship		0.050 [1.06]				
Non-state owned business			0.033** [2.43]			
Large bank loans × Non-state sector development			0.007 [0.21]			
Product market development				0.023 [0.89]		
Large bank loans × Product market development				0.011 [0.29]		
Factor market development					0.011** [2.37]	
Large bank loans × Factor market development					0.060** [2.17]	
Legal framework development						0.028 [1.29]
Large bank loans × Legal framework development						0.105*** [3.30]
Total loans/GDP	0.021* [1.84]	0.020** [2.41]	0.021* [1.88]	0.021** [2.38]	0.014 [0.91]	0.019 [1.67]
GDP per capita	0.180 [1.03]	0.230 [1.67]	0.161 [0.82]	0.344* [2.00]	0.453** [2.43]	0.394** [2.62]
FDI	0.748 [1.51]	1.141** [2.12]	0.754 [1.68]	0.744 [1.44]	0.471 [0.82]	0.559 [0.97]
College degree holders/Population	0.942** [2.15]	0.181 [0.27]	0.464* [1.78]	0.821** [1.99]	0.001 [0.00]	0.996** [2.31]
Constant	0.039 [0.23]	-0.039 [-0.20]	-0.048 [-0.32]	-0.133 [-0.70]	0.050 [0.38]	0.143 [1.19]
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Province	Province	Province	Province	Province	Province
Observation	296	296	296	296	296	296
F-statistic	19.16***	47.86***	17.18***	19.12***	14.16***	14.50***
R-squared	0.321	0.305	0.330	0.255	0.276	0.284

*, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

In Table 6, we interact our measure of credits provided by rural banking institutions with the set of marketization indexes to capture the possibly different response in terms of small business lending (Firth et al., 2009).

The estimate in column 1 shows that rural banking institutions have a stronger effect on small business growth in provinces with higher-level marketization. Interestingly, in column 2, we find that in the presence of a relatively large government, the coefficient of rural commercial bank loans is negative ($p < 0.05$). It is plausible that a large local government with strong control and interference reduces efficiency through tedious procedures in business registration or other administrative functions (Nyström, 2008). However, we do not find such an interactive effect in Table 5 for large state-owned banks. It may be that large banks do not target at small businesses as customers for their financial services (Chong et al., 2013). As in Table 5, coefficient estimates of rural commercial bank loans are positive and significant (columns 5 and 6) for provinces with the most advanced development of their factor markets and legal frameworks.

4.5 Additional tests: Do regional innovation and intellectual property protection matter?

Innovation is a common thread in the success of entrepreneurs and small businesses. Defined as commercializable invention (Audretsch, 1995), innovation alters the competitiveness of local markets through new firm formations. Innovation and firm creation are the consequence of deliberate investment, and fuel demand for related products and services (Kirchhoff et al., 2007). *Protection of intellectual property rights* strengthens the motive for small business owners to engage in research and development activities, when they are otherwise vulnerable to direct competition from large firms (Ang et al., 2014). Thus, we examine two important components of marketization: provincial innovation and intellectual property rights protection.

Table 6 Interaction between rural banking institutions and indexes of marketization

Independent variables	Dependent variable: Growth in number of small businesses					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Rural banking institution loans	0.087** [2.01]	0.481** [2.38]	0.414*** [2.68]	0.201* [1.72]	0.473* [1.78]	0.465*** [2.86]
Overall marketization index	0.033* [1.88]					
Rural banking institution loans × Overall market development	0.167** [2.38]					
Government-market relationship		-0.025 [-1.22]				
Rural banking institution loans × Government-market relationship		-0.187** [-2.02]				
Non-state owned economy			0.023** [2.75]			
Rural banking institution loans × Non-state sector development			0.090 [1.42]			
Product market development				0.010 [0.81]		
Rural banking institution loans × Product market development				0.109 [1.00]		
Factor market development					0.022** [2.09]	
Rural banking institution loans × Factor market development					0.167* [1.83]	
Legal framework development						0.010* [1.77]
Rural banking institution loan × Legal framework development						0.198** [2.02]
Large bank loans	-0.173* [-1.72]	-0.210* [-1.97]	-0.222** [-2.13]	-0.212* [-1.90]	-0.183** [-2.02]	-0.155* [-1.86]
Total loans/GDP	0.023*** [3.07]	0.022*** [2.97]	0.024*** [3.14]	0.023*** [3.32]	0.017* [2.04]	0.021*** [3.03]
GDP per capita	0.117 [0.74]	0.133 [0.96]	0.058 [0.32]	0.251 [1.64]	0.325** [2.35]	0.288** [2.15]
FDI	0.772** [2.25]	1.077** [2.38]	0.799** [2.52]	0.762 [1.43]	0.613 [1.18]	0.863** [2.29]
College degree holders/Population	0.405* [1.86]	0.457* [1.76]	0.190 [0.29]	1.020** [2.43]	0.238 [0.34]	0.594* [1.87]
Constant	-0.138 [-1.35]	-0.152 [-1.64]	-0.058 [-0.61]	-0.106 [-0.83]	-0.096 [-1.08]	-0.115 [-1.17]
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Province	Province	Province	Province	Province	Province
Observation	296	296	296	296	296	296
F-statistic	34.39***	44.01***	29.65***	31.19***	19.74***	30.80***
R-squared	0.321	0.305	0.363	0.255	0.320	0.331

*, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively

Table 7 Interaction of bank financing and other marketization indicators

Independent variables	Dependent variable: Growth in number of small businesses			
	Model 1	Model 2	Model 3	Model 4
Large bank loans	-0.244* [-1.71]	-0.245** [-2.07]	-0.183* [-1.73]	-0.16* [-1.86]
Rural banking institution loans			1.064** [2.23]	0.950** [2.08]
Provincial innovation	0.015* [1.71]		0.002 [0.44]	
Intellectual property protection		-0.016 [-1.45]		-0.004 [-0.79]
Large bank loans × Provincial innovation	0.043** [2.09]			
Large bank loans × Intellectual property rights protection		0.048** [1.97]		
Rural banking institution loans × Provincial Innovation			0.105*** [2.86]	
Rural banking institution loans × Intellectual property rights protection				0.162*** [2.92]
Total loans/GDP	0.017 [1.26]	0.016 [1.15]	0.020*** [3.05]	0.019*** [2.78]
GDP per capita	0.558*** [3.13]	0.577*** [3.23]	0.363** [2.58]	0.374** [2.63]
FDI	0.648 [1.05]	0.649 [1.05]	1.126** [2.58]	1.226*** [2.84]
College degree holders/Population	1.431 [1.42]	1.314 [1.33]	1.282* [1.90]	1.268* [1.97]
Constant	0.020 [0.18]	0.022 [0.21]	-0.117 [-1.34]	-0.132 [-1.57]
Province fixed effects	Yes	Yes	Yes	Yes
Clustered standard errors	Province	Province	Province	Province
Observation	296	296	296	296
F-statistic	9.62***	10.42***	35.47***	29.98***
R-squared	0.229	0.231	0.363	0.312

*, **, *** indicate significance levels of 10%, 5%, and 1%, respectively.

In Table 7, we report our results relating banking financing, innovation, intellectual property rights protection, and small business development. In column 1, we enter large bank loans, provincial innovation and their interaction term along with a set of control variables. In column 2, we replace the provincial innovation measure by an index of intellectual property rights protection. In line with the existing literature (Ang et al., 2014) and our expectation, we find that large bank financing is better able to promote growth of small businesses ($p < 0.05$) in provinces with a high level of innovation activity and good protection of intellectual property rights. In columns 3 and 4, we repeat our analysis by focusing on

rural banking institutions, controlling for the credits provided by large state-owned banks. Similarly, the coefficients on the interactions between rural bank loans and provincial innovation, as well as intellectual property rights protection, are all positive and significant ($p < 0.01$).

5 Conclusions

Banking institutions play an important role in channeling financial resources to small businesses. Building on the existing literature, we focus on China, the world's most important emerging economy, and use a panel of provincial-level data covering 27 provinces and four municipalities from 1997 to 2008 to investigate the effects of banking structure on provincial small business growth.

We find contrasting results for large state banks and rural banking institutions. The presence of large bank in loan markets, especially in short-term loan markets, negatively affect small business growth. At the same time, rural banking institutions appear to foster small business growth. The results are consistent with the relative expertise possessed by large banks and small banks in collecting and processing "soft" information to make small business lending decisions (Strahan and Weston, 1998; Stein, 2002). Moreover, we document that large banks in highly concentrated markets are able to help finance small firms. It is plausible that large banks may inter-temporally share surplus with small business in relationship lendings (Petersen and Rajan, 1995). Our results confirm the importance of financial deepening, the availability of trained human capital, and the overall personal wealth level to small business growth.

Another theme of this study is to investigate the interactive effect of banking structure and marketization in jointly determining small business development. For this purpose, we interact our measures of bank financing with a set of marketization indexes capturing the disparities in provinces along different dimensions. In the case of both large banks and small rural banks, our analysis suggests that progress in marketization, development of factor markets and institutional settings, regional innovation activity and strong protection of intellectual property rights protection are all helpful in promoting small business growth. Taken together, the evidence reported in this paper establishes a robust link among banking structure, marketization, and small business development.

These findings have strong implications for policymakers and small business owners in China and elsewhere. This paper establishes the crucial role of smaller financial intermediaries and argues that any future consolidation plans in favor of economies of scale or scope may be counterproductive in terms of small business growth. Moreover, regulatory changes and policy implementation that create a small-firm-friendly environment also affect the functioning of banking institutions, large and small, in nurturing regional entrepreneurship and economic growth. This paper focuses on the quantity side of bank financing, leaving the equally important issue of quality of bank financing on small business growth (Koetter and Wedow, 2010) to future research with new datasets

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