



Bank Presence and Rural Development

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ABSTRACT

Rural development is critical to raise rural living standards and reduce income differences between urban and rural areas. Much literature has explored factors that could affect rural development, and we investigate the effects of bank presence in rural areas on rural income. Using Chinese provincial-level data from 2005 to 2017, we quantify the effects of bank presence on rural income. Specifically, we use the number of banks per town to measure bank presence and use rural income per capita of each province to measure rural income. With the ordinal least square model and dynamic panel estimation, we find that bank presence increases rural income. Rural income increases the same year with banks appear in town, and the effects of bank presence last for years on rural income. However, we do not find significant evidence that bank presence in rural areas also contributes to the reduction of the income difference between urban and rural areas.

Keywords: Bank presence, Rural development, Rural income, Income difference, China

Introduction

Rural development has been one of the key issues for increasing rural income and reducing income differences between urban and rural areas. A large literature has explored the factors that affect rural development. For example, Ellis and Biggs (2001) found that the small-farm efficiency paradigm could promote rural development. Marsden, Banks, and Bristow (2000) showed that short food supply chains played a role in promoting rural development. Li et. al. (2019) and Zhong et. al. (2019) showed that efficient land use could be positive to rural economic growth, and Wang et. al. (2019) found that urban-biased land development policy could enlarge the urban-rural income gap. Moreover, urbanization and geographic factors also affect rural development (Gamso and Yuldashev, 2018; Verma and Raghubanshi, 2019; Diao et. al., 2019; Van den Broeck and Maertens, 2017; Deller et. al., 2019). Yuan et. al. (2018) argued that urbanization can benefit higher value agricultural enterprises. Li et. al. (2019) and Smith et. al. (2019) found that nearby urban demand, local entrepreneurship, and social capital could affect rural development, and Berdegue and Soloaga (2018) found that proximity to a city increase rural population growth and welfare, and larger cities have stronger positive effects. In addition, much literature found that government policies (Murdoch, 2000; Kvartiuk and Curtiss,

2019; Kiryluk-Dryjska and Beba, 2018; Koopmans et. al., 2018; Furmankiewicz et. al., 2016; Carter et. al., 2019) and agricultural programs such as electrification (Ding et. al., 2018; Gevelt, 2014) could also promote rural development.

The main goal of this paper is to investigate the effects of bank presence in rural areas on rural development. As the pillar of financial intermediaries for many countries, banks played a key role in supporting economic development. De Gregorio and Guidotti (1995) argued that bank credit to the private sector had a positive effect on the long-run growth. Kouretas and Tsoumas (2016) found that foreign bank presence exerts a positive effect on the efficiency of business regulations, and Gopalan (2016) also argued that foreign bank presence promotes local financial development. Arestis, Demetriades, and Luintel (2001) found that both banks and stock markets could promote growth, and banks have a more powerful effect on growth. However, Valickova et. al. (2015) argued that stock markets support faster economic growth than other financial intermediaries.

China has established many financial institutes such as Rural Credit Cooperative and Village Bank across the country since the 1980s to promote rural development. The data we use is from the WIND database, which includes the number of banks in each province, the number of towns, population, land



use, rural income, and urban income. Summary statistics show that there is at least one bank per town in each province by the end of 2005. Government and financial institutes did not select to establish banks in the richer provinces or towns. Therefore, endogeneity should not be a serious problem.

Using Chinese provincial-level data, we provide quantitative evidence of the effects of bank presence on rural income. We found that the presence of banks in rural areas increases rural income significantly, which one more bank that appears in a town can increase rural income by at least 1100 yuan in the same year. Our findings are consistent with many other papers that financial development could increase income, such as in Greenwood and Jovanovic, 1990; Guiso et. al., 2004; Arestis et. al., 2001. With a dynamic panel estimation, we found that the effects of bank presence on rural income still exist after 3 years. Moreover, we also examine the effects of bank presence on income difference between urban and rural areas as a robustness check, but we did not find significant results. Several other papers also linked bank presence and rural development. Beck et. al. (2015) found that access to external finance will affect the initial investment decisions of enterprises in rural areas. Abate et.al. (2016) found that banks could promote the adoption and extent of technology use in rural areas. However, Cyree and Spurlin (2012) argued that too much competition between banks will lower levels of profit efficiency.

Our paper also has a contribution to the literature about financial development and economic growth. A large literature has revealed the benefits of financial development. A positive relationship has been found between financial development and growth. For example, Greenwood and Jovanovic (1990) argued that financial intermediation allows a higher rate of return to be earned on capital, therefore, financial development promotes growth. Giuliano and Ruiz-Arranz (2009) found that remittances could promote growth because they can promote financial investment and overcome liquidity constraints in countries with less-developed financial systems. Guiso et. al. (2004) argued that financial development could promote family business, favor the entry of new firms, increases competition, and increase growth. Love and Zicchino (2006) found that financial development could increase investment especially in countries with less developed financial systems. Many others such as Arestis and Demetriades (2007) and Demetriades and Hussein (1996) also found evidence that financial development promotes economic growth.

Financial development could affect economic growth via many channels. Calderón and Liu (2003) found that financial deepening propels growth mainly by rapid capital accumulation and productivity growth. Wurgler (2000), Deidda (2006), and De Gregorio (1999) found that financial markets appear could improve the allocation of capital, and then affect economic growth. Chinn and Ito (2006) argued that financial openness could spur equity market development. Rajan and Zingales (2003) found that financial development

could bring competition. Ang (2011) argued that financial development could benefit innovation. However, Ductor and Grechyna (2015) warned that financial development could have negative effects on growth if private credit increases faster than real output.

The paper proceeds as follows. Section 2 details the background of bank presence in China. Section 3 shows how the data measures rural development and bank presence. Section 4 discusses the empirical strategy and results. Section 5 concludes.

1. Background

Rural banks in China include financial institutes such as Rural Credit Cooperatives, Rural Commercial Bank, Rural Cooperative Bank, Village Bank, Rural Mutual Fund, and Insurance Company. Rural Credit Cooperatives have been the most important financial institutes in rural areas since the Reform and Open Policy in the 1970s. The Chinese government established state-owned commercial banks to support financial needs for urban areas, and Rural Credit Cooperatives for rural areas across the country in the 1980s. The main functions of Rural Credit Cooperatives are to provide financial access to rural development, support agricultural programs, and meet farmers' financial needs. Some Rural Credit Cooperatives were reformed to be Rural Commercial Bank or Rural Cooperative Bank. For example, Rural Credit Cooperatives in urbanized rural areas were changed to be Rural Cooperative Banks since 1996. The financial functions of Rural Credit Cooperatives, Rural Commercial Bank, and Rural Cooperative Bank are very similar, and the main difference between them lies in the voting rights of stock shares. Other financial institutes also play important roles in supporting rural development. For example, the main function of Village Bank is to support farmers' financial needs.

The Chinese government has established multiple types of financial institutes in rural areas to support rural development, agricultural programs, and farmers' financial needs. The main reason to establish multiple financial institutes is that rural development is lagging behind urban development in China, which the government promotes rural financial development to support the modern agricultural system and new rural development programs, to increase rural income. The other reason is the unbalanced financial development in rural areas. For example, Rural Credit Cooperative focuses on financial support to rural industrial constructions, therefore, the government encourages the establishment of Village Banks to support farmers' financial needs.

An endogenous problem raises as banks are more likely to be established in more developed areas. However, we do not think it's a problem due to the following reasons. First, all the banks or cooperatives in rural areas are policy financial institutes, and the aim is to establish branches in every town. Second, instead of establishing banks or bank branches in more developed areas, the Chinese government urged to establish banks in poorer areas first. As poorer areas needed

financial support the most, financial institutes were established in border areas, mountain areas, and many other rural areas no late than more developed areas. Therefore, most villages and almost every town has the access to banks or credit cooperatives.

2. Data

2.1 Provincial level variables

The data used in this paper is from the WIND database, which includes information such as the number of banks and towns in each province in China, average rural and urban income in each province, and the population, agricultural land area, and construction land area in rural areas of each province from 2005 to 2017¹. The number of banks in rural areas is only available at the provincial level, therefore, we are unable to identify the accurate number of banks in each village or each town. We focus on the banks in rural areas because these banks have always been the main and only source of financial support for rural areas. The number of banks and towns is also available at the provincial level, so we compute the average number of banks per town for each province to measure the access to financial support for rural areas. Moreover, average rural income and average urban income at the provincial level are also available, and the difference between urban and rural income is used to measure the income gap.

We obtain the data of the number of banks and rural income for all 31 provinces. The number of banks of Henan province in 2016 and Hainan province in 2017 is missing, we use the number of banks of each province one year before to replace the missing values². The number of towns is also missing from 2005 to 2007 for each province, and the number of towns in 2008 is used to replace the missing values. We insist to do it because the total number of towns in China from 2005 to 2008 barely changed, and there was an even smaller variation in the number of towns for each province. Agricultural land area and construction land area from 2009 to 2012 and 2014 are also missing across provinces, and we use the values in 2008 to replace the missing values from 2009 to 2012, and 2013 to 2014, similar to the makeup of missing values of the number of towns.

However, the panel including all 31 provinces is still unable to be obtained, because the number of banks in rural areas of Beijing and Tibet provinces is missing. We do not yet think it will be a serious problem that will affect our measured effects because of the following reasons. First, Beijing and Tibet are among the provinces with the least population, and the number of population in rural areas is even less compared with other provinces. Second, similar to population, the production of rural areas in Beijing and Tibet is also at the outlier of the sample. Therefore, the data we use is panel data including variables such as the average number of banks per

town and income per capita in rural areas of 29 provinces from 2005 to 2017 in China.

2.2 Summary statistics

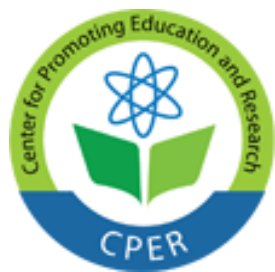
The data about income, the number of banks, and other covariates are summarized in Table 1. The average rural income across provinces in 2005 is about 3500 yuan and increases to 14000 yuan in 2017, with an annual growth rate of around 12%. The average urban income across provinces increases from 10196 yuan in 2005 to 34976 yuan in 2017, and the annual growth rate is around 11%. Both the urban and rural incomes increase substantially. However, the income difference between urban and rural areas also increases much, which the income difference increases from 6684 yuan in 2005 to 20976 yuan in 2017, with an annual growth rate of around 10%. We also report the average number of banks across provinces and the number of banks per town across provinces in Table 1. The average number of banks across provinces decreases slightly but the number of banks per town increases. Specifically, the number of banks per town increases at a growth rate of around .6% annually. Moreover, we also compute agricultural land per capita and construction land per capita in rural areas. Both the agricultural and construction lands per capita increase from 2005 to 2017.

Average rural income increases substantially across provinces, but there are large variations of rural income in different provinces. Figure 1 depicts the evolution of rural income across provinces. Rural income of all provinces in 2005 is low. Rural income of more developed provinces at the eastern coasts is over 5000 yuan, the rural income of most western provinces is lower than 2500 yuan, and rural income of provinces in the middle area is between the two. Rural income in each province in 2011 is larger than that in 2005, respectively. Rural income of the eastern provinces is still the highest, and rural income of the provinces in the western is relatively lower than that in the eastern and middle areas. It is the same situation in 2017, in which rural income of provinces in the eastern and the middle is higher than that in the western. Moreover, the rural income of each province in 2017 is much larger than that in 2005 and 2011, respectively. The rural income of Gansu province in 2017, which is one of the lowest in 2017, is larger than the rural income of Jiangsu and Zhejiang provinces in 2005, which are provinces with the highest rural income level in 2005. Therefore, the rural income of each province increases substantially.

Figure 2 shows the evolution of the number of banks per town. Provinces such as Guangdong, Shandong, and Inner Mongolia had the largest number of banks per town in 2005, provinces in the western areas had the lowest number of banks per town, and the number of banks per town of the other provinces is between the two groups. However, the difference in the number of banks per town between provinces is small. For example, besides a few provinces with more than 4 banks per town, most provinces in the west had more than 1 bank per town, and provinces in the middle had more than 2 banks per

¹ The data of the number of banks in rural areas is not available.

² We use the number of banks one year before to make up the missing values is because the number of banks does not change significantly before and after the year with missing values.



town. It is a similar situation in 2011 and 2017. Provinces such as Guangdong and Shandong still had the most banks per town, and provinces in the west had the least banks per town. However, there is also some slight difference, such as Jiangsu and Zhejiang provinces also had the most number of banks per town in 2017, and more provinces had more than 2 banks in 2017 than that in 2005 and 2011.

3. Empirical Strategy and Results

3.1 Method

The specification we used is as follows:

$$RuralInc_{it} = \alpha + A(L)Banks_{it} + \delta X_{it} + \lambda_i + \eta_t + \varepsilon_{it} \quad (1)$$

Where $RuralInc_{it}$ refers to income of rural areas in province i in year t . $A(L)$ is a polynomial lag operator, and $Banks_{it}$ is the number of banks divided by the number of towns in province i in year t . X_{it} is the control variable, which we include agricultural land per capita and construction land per capita in province i in year t . λ_i and η_t are the province and year fixed effects, respectively. δ is the coefficient for control variable, and α is the constant. ε_{it} is the error term. We cluster the standard errors at provincial level.

3.2 Results

We first examine the effects of the bank's presence on rural income without including the lagging variables, and the results are shown in Table 2. We provide empirical evidence that the presence of banks has positive effects on rural income without including the control variables in columns (1) and (2). The coefficient in column (1) shows that one more bank per town appear, the average income of rural area will increase by around 1240 yuan. The conclusion holds after clustering the standard errors in column (2). We include the control variables and the results are shown across columns (3) to (5). We do not control the fixed effects in column (3) and only control year fixed effects in column (4), and the results are still consistent with those in columns (1) and (2), in which the presence of banks in rural areas increase rural income. Moreover, after including all the control variables and fixed effects, the effects of the presence of banks on rural income are still significantly positive. However, the coefficient of the number of banks per town drops slightly to around 1100, which means one more bank per town present in rural areas, average rural income increases by around 1100 yuan.

As is shown the presence of banks in rural areas increases rural income immediately, the following concern is what are the effects of bank presence on rural income in the following years? We examine the effects of bank presence in rural areas on rural income in the following years by including the lagging variables of bank presence. Table 3 shows the results of bank presence in rural areas on future rural income. We use the variables of 1 lag through 5 lags to indicate the 1-year lagging through 5-year lagging of bank presence, respectively. Columns (1) to (5) show the effects of bank presence on rural income after 1 year through 5 years of the

bank's establishment. Coefficients in columns (1) to (3) are significantly positive, which indicates that the presence of banks increases rural income after one to three years. The scale of the coefficients across columns (1) to (3) is similar, and the effect after two years of bank establishment is slightly larger than the first and third years. However, the coefficients of the 4 and 5 lags of bank presence are not significant, which means bank presence has no significant effects on increasing rural income after 4 and 5 years. In addition, the coefficients are smaller and smaller over the years after bank presence.

We include all the five lags together with the non-lag term in the regression and the results are shown in columns (6) and (7) in Table 3. The results in column (7) include the control variables while column (6) does not. The coefficients of the lags are similar in columns (6) and (7). After controlling for the lagging variables, the non-lag term is no longer significant. The coefficients for the 1-year lag, 2-year lag, and 3-year lag are significant and positive, which indicates that the bank presence increases rural income in the following 3 years. The coefficients of the 4-year and 5-year lags are still positive but no longer significant, which means the effects of bank presence on rural income fade after four and five years. The accumulative effects of bank presence on rural income are also reported in columns (6) and (7). The sum of lags is significant and positive, indicating that bank presence has positive accumulative effects on rural income.

The presence of banks may affect other outcomes as well. As the presence of banks increases average rural income, the natural question to ask is what is the effect of bank presence on income difference between urban and rural areas? Table 1 shows that average income in both rural and urban areas increases substantially from 2005 to 2017, and the difference between rural and urban areas (measured by the gap between urban and rural average income in each province) increases enormously as well.

To examine the effects of the presence of banks in rural areas on the difference between urban and rural incomes, Table 4 shows several variations of the income difference regressions. Instead of rural income, we use the difference between average urban income and average rural income in each province as the dependent variable. Column (1) shows that the presence of banks enlarges income difference between urban and rural areas, but the coefficients are not significant after clustering the standard errors at the provincial level and including control variables in columns (2) and (3). To examine the subsequent effects of bank presence on income difference between urban and rural areas, we contain the lagging terms of the number of banks per town into the model, as the results are shown in columns (4) to (6). The coefficients of the first and second lags are positive but not significant, and the coefficients of the other lags are negative and insignificant. The cumulative effects of the lags are also reported in columns (4) to (6), in which the effects are positive, but not significant. Therefore, we do not find evidence that the presence of banks

in rural areas increases or decreases income difference between urban and rural areas.

4. Conclusions

Rural development contributes to rural living standards increase and poverty reduction. Using Chinese provincial-level data, we investigate the effects of bank presence in rural areas on rural income. China has established financial institutes such as Rural Credit Cooperative in rural areas after the Reform and Opening Policy in the 1980s, to support rural development. As most of the financial institutes in China are state-owned, the government established banks in most towns in each province. By the end of 2005, there are more than two banks in each town on average across provinces.

As to quantify the effects of bank presence on rural income, we measure the effects with OLS and dynamic panel estimation models. We find positive and significant effects of the number of banks per town on rural income, which means when banks appear in a town, it could increase rural income. The results of the dynamic panel estimation show that the effects of bank presence in rural areas on rural income could last for years after bank presence. However, we do not find evidence that bank presence in rural areas decreases income difference between urban and rural income. Financial development in rural areas could increase rural income and reduce poverty. If financial institutes work more efficiently or multiple financial institutes are established in rural areas, it will increase rural living standards and reduce poverty more significantly.

Table 1 Summary Statistics

Year		2005	2011	2017
Rural Income	Mean	3511.6	7480.3	13999.7
	S.D.	1601.4	3036.2	4807.4
Urban Income	Mean	10195.8	20607.3	34975.6
	S.D.	2931.2	5362.8	9023.5
Income Difference	Mean	6684.3	13127.1	20975.9
	S.D.	1521.3	2676.8	4887.3
No. of Banks	Mean	2754.3	2610.0	2654.4
	S.D.	1894.4	1627.2	1642.7
No. of Banks per Town	Mean	2.473	2.501	2.655
	S.D.	1.013	0.987	1.022
Rural Population	Mean	2339.9	2088.1	1834.3
	S.D.	1678.4	1462.7	1250.7
No. of Town	Mean	1115.8	1073.2	1020.8
	S.D.	818.03	804.67	757.89
Agricultural Land per capita	Mean	2.613	2.571	2.799
	S.D.	7.158	6.374	7.144
Construction Land per capita	Mean	0.058	.064	.083
	S.D.	0.033	.032	.034

Table 2 Effects of presence of banks on rural income

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Rural Income				
No. of Banks per Town	1,239*** (189.2)	1,239* (620.7)	1,239** (576.7) -476.7*	1,322** (482.2) -320.4	1,116* (634.5) -733.4**
Agricultural Land per capita			(233.8)	(189.3)	(322.6)
Construction Land per capita			66,500*** (15,087)	34,592** (16,695)	-23,303 (47,918)
Constant	2,967*** (863.6)	2,967 (2,802)	1,043 (1,326)	-1,339 (1,007)	6,707 (7,060)
Observations	377	377	377	377	377
R-squared	0.959	0.959	0.374	0.785	0.961
Year Effects	Yes	Yes	No	Yes	Yes
Province Effects	Yes	Yes	No	No	Yes
Clustering	No	Yes	Yes	Yes	Yes

Notes: No. of Banks per Town refers to the average number of banks divided by the number of towns across provinces. The number of province is 29, which the data of the number of banks of Beijing and Xizang is missing. Standard errors are clustered at province level if clustered. Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3 Lagging effects of the presence of banks on rural income

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Rural Income						
No. of Banks						-204.5 (381.6)	-223.2 (393.9)
1-period lag	1,240* (643.4)					554.0**	594.3**
2-period lag		1,292* (668.0)				(230.5) 819.4**	(220.7) 799.0**
3-period lag			1,258* (679.9)			(354.3) 971.3*	(322.4) 957.8*
4-period lag				1,037 (639.9)		(503.8) 273.1	(492.6) 277.7
5-period lag					872.0 (589.9)	146.0 (233.5)	172.9 (227.6)
Agricultural Land per capita	-758.5** (294.9)	-752.4** (296.0)	-767.3** (318.2)	-761.0** (369.8)	-712.0 (438.4)		-708.6* (377.5)
Construction Land per capita	-21,483 (44,436)	-22,140 (41,998)	-21,415 (39,492)	-19,216 (38,266)	-18,657 (35,891)		-5,185 (31,034)
Constant	6,505 (6,537)	7,200 (6,301)	8,196 (6,127)	9,567 (6,030)	11,369* (5,578)	1,304 (4,221)	2,090 (5,129)
Observations	348	319	290	261	232	232	232
R-squared	0.965	0.968	0.972	0.973	0.976	0.982	0.983
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sum of Lags						2559.3**	2578.5***
P-value sum=0						0.0134	0.0079

Notes: No. of Banks per Town refers to the average number of banks divided by the number of towns across provinces. The number of provinces is 29, which the data of the number of banks of Beijing and Xizang is missing. Standard errors are clustered at province level if clustered. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4 Effects of the presence of banks on income difference between urban and rural areas

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Income Difference between Urban and Rural Areas					
No. of Banks	596.4*** (202.5)	596.4 (530.3)	544.4 (459.8)	261.5 (410.1)	261.5 (308.8)	250.3 (316.2)
1-period lag				478.4 (426.9)	478.4 (371.1)	513.4 (361.2)
2-period lag				617.0 (426.4)	617.0 (518.6)	607.2 (471.5)
3-period lag				-155.1 (391.5)	-155.1 (373.9)	-157.7 (346.2)
4-period lag				-271.8 (317.3)	-271.8 (252.9)	-267.1 (255.1)
5-period lag				-210.1 (286.3)	-210.1 (353.9)	-190.6 (352.3)
Agricultural Land per capita			-210.5 (352.1)			-558.6 (1,041)
Construction Land per capita			-13,144 (63,240)			736.3 (40,680)
Constant	4,167*** (923.9)	4,167* (2,334)	6,172 (7,797)	7,958*** (1,913)	7,958 (4,883)	7,821* (4,582)
Observations	377	377	377	232	232	232
R-squared	0.962	0.962	0.962	0.961	0.961	0.961
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Province effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	No	Yes	Yes	Yes	Yes	Yes
Sum of lags				719.9	719.9	755.5
p-value sum=0				0.1028	0.5250	0.4524

Notes: No. of Banks per Town refers to the average number of banks divided by the number of towns across provinces. The number of provinces is 29, which the data of the number of banks of Beijing and Xizang is missing. Standard errors are clustered at province level if clustered. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1



Figure 1 Rural Income across Provinces

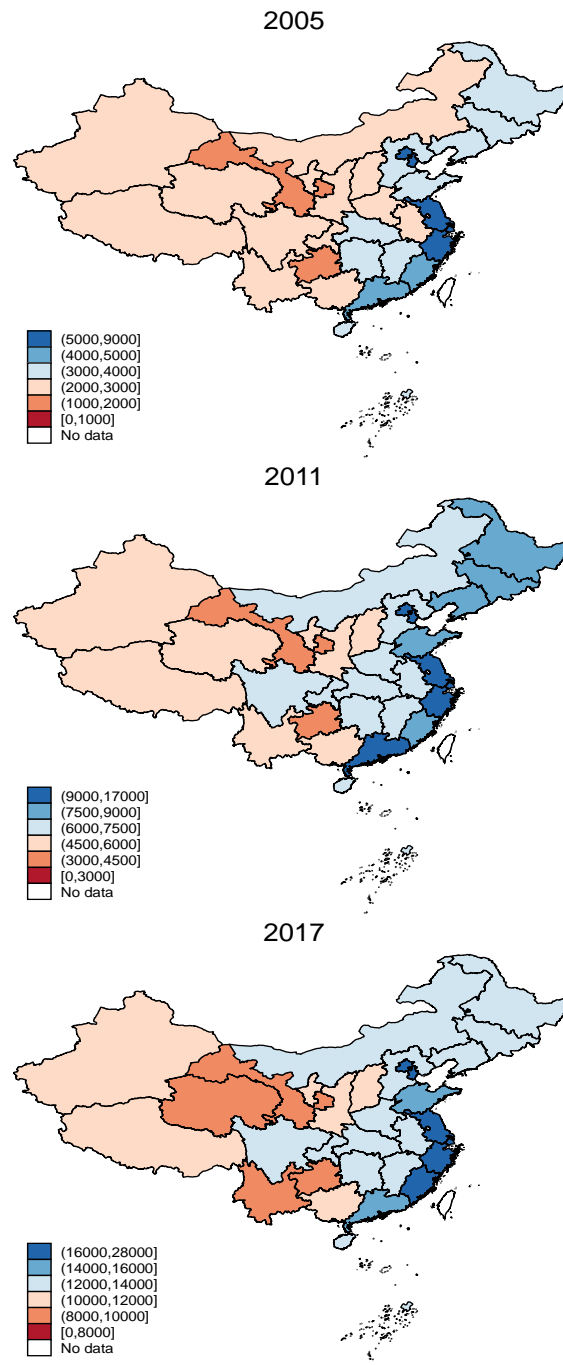
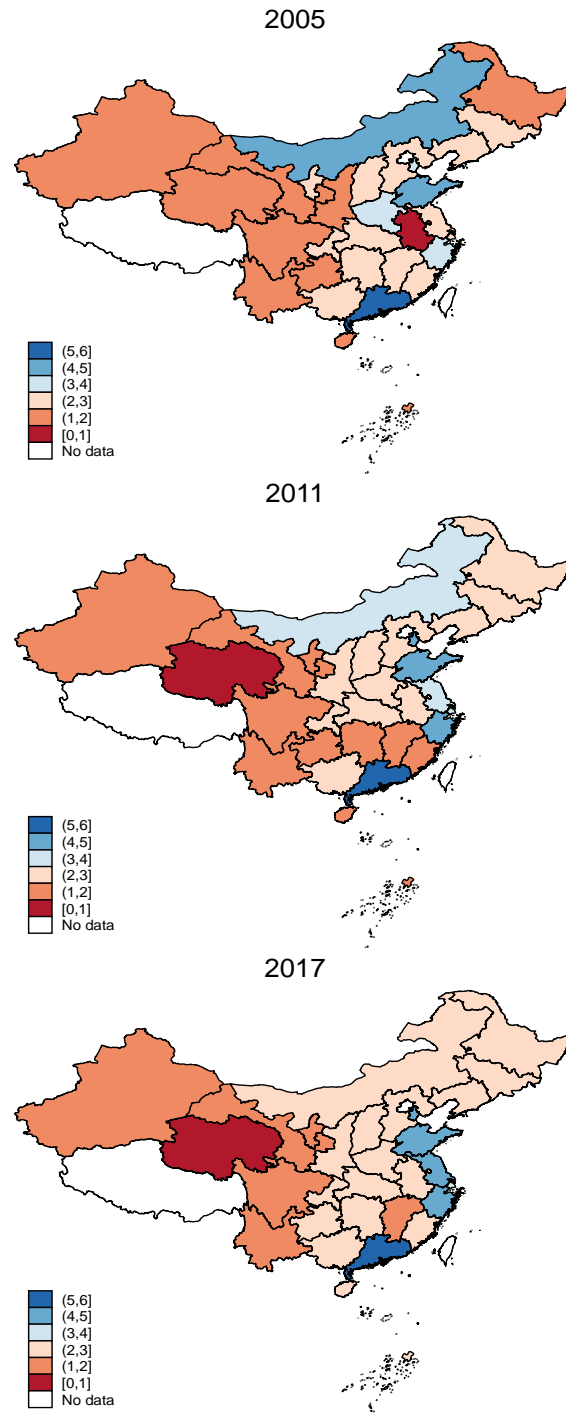


Figure 2 Number of Banks per Town across Provinces



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