Geographical Diversification and Bank Performance: Evidence from China

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Abstract: This study examines the impact of geographical diversification on financial performance of Chinese banks. The results show that, while geographical expansion improves the banks' market share, net interest margin and non-interest income, it also increases operating costs.

Keywords: Geographical diversification; Bank performance; China

JEL Codes: *G1, G2, K2*

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1. INTRODUCTION

The banking industry has experienced a tremendously geographic expansion in recent decades. Despite some studies linking geographical diversification with financial performance of banks, no consensus has been reached so far. Some argue that diversified banks can benefit from the economies of scope (e.g., Deng and Elyasiani, 2008) and the coinsurance effect (e.g., Akhigbe and Whyte, 2003). On the other hand, some suggest that diversified banks suffer from value decrease due to the lack of managerial skills (e.g., Klein and Saidenberg, 1998), more complex organizational structure (e.g., Berger and De Young, 2006), and more intensive competition (e.g., Demsetz and Strahan, 1997).[1]

China offers an ideal setting to study the relation between geographical diversification and bank performance for the following reasons: First, in the presence of underdeveloped capital markets, Chinese banks have been playing a crucial role in channeling financial resources towards firms with financing needs (Allen et al., 2005; Berger et al., 2010). According to *The Banker*, an influential financial publication, China has the largest bank market since 2013, contributing to more than 30% of the profit of the global banking industry. Second, Chinese banking industry is highly regulated. Most commercial banks, except for the Big-Five,[2] faced strict restrictions on geographical expansion. However, in 2009, China Banking Regulatory Commission (CBRC), the leading regulatory body of Chinese banking industry, announced a policy that aimed at relaxing the geographical branching restrictions

[1] Our paper also adds to the existing literature on bank branching, e.g., Cohen and Mazzeo (2010) and Deller and Sundaram-Stukel (2012).

[2] They include: Industrial and Commercial Bank of China, China Construction Bank, Agricultural Bank of China, Bank of China and Bank of Communications.

(Circular No. 143 of CBRC). Specifically, the joint-stock and city commercial banks are allowed to operate in other cities, particularly for those with prior experiences in cross-region operation. In addition, the requirements on working capital are also abolished, lowering the entry threshold of small and medium-sized banks. Consequently, the level of geographical expansion of Chinese banks has been considerably influenced by the deregulation policy.

2. DATA AND METHODOLOGY

To begin with, we perform an ordinary least squares (OLS) regression. Nevertheless, identifying the causal effect of geographical diversification on bank performance poses challenges because banks may select the level of diversification based on unobserved characteristics, which could bias the OLS estimates in a way that is hard to predict. To mitigate the concern, we also employ a two-stage least squares (2SLS) regression, using the bank deregulation policy to instrument for the level of diversification. In the first stage, we examine the following equation:

$$branch_{i,t} = \alpha_0 + \alpha_1 \times policy_t + \alpha_i \times policy_t \times characteristics_{i,t} + \alpha_c \times control_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Branch_{i,t}$ is the number of cities in which bank *i* operates in year *t* (excluding the city where it is headquartered). *Policy* is a dummy variable that equals 1 for the years after 2009, and otherwise 0. *Policy*characteristics* are the interaction terms of the *Policy* dummy variable and bank characteristics. Based on the Circular No.143, we focus on three characteristics: (1) *J&C*, a dummy variable that equals 1 for a joint-stock bank or a city commercial bank, and otherwise 0. These two types of banks are especially encouraged to

expand their branches; (2) *Experience*, measured as the number of cities in which bank *i* operated (except the headquarter city) prior to 2009, because banks with previous experiences in cross-region operation are prioritized to expand; (3) *CAR* is measured as the capital adequacy ratio prior to 2009, as the Circular No.143 abolishes using capital adequacy ratio as a requirement for expansion. We also control for other factors that may affect geographical diversification: *Loanratio* (total loan/total asset), *Size* (the natural logarithm of total assets), *ROA* (net income/total assets), and *Age* (the number of year since the bank's inception).

In the second stage, we test the following equation:

$$performance_{i,t} = \alpha_0 + \alpha_1 \times branch_{i,t} + \alpha_c \times control_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $Performance_{i,t}$ is measured as follows: the market share (*MS*, bank *i*'s share in total deposits in year *t*), the net interest margin (*NIM*, net interest income scaled by total deposits), the cost-to-income ratio (*COST*, operating costs scaled by total assets), the net income to total assets ratio (*ROA*), and the non-interest income share (*NII*, non-interest income scaled by total income). In addition to the control variables used in Eq. (1), we also control for *Growth* (the growth rate of asset) and *DEPO* (the deposit-to-asset ratio), which may also affect bank performance.

Our main data source is BankScope database, supplemented by geographical diversification data that is manually collected from the websites and annual reports of the banks. Our sample covers the period 2006-2012. We exclude Big-Five banks because they had branches

in every city even before the deregulation. Finally, we obtain 568 bank-year observations. Table 1 presents summary statistics of the main variables.

Table 1: Summary Statistics

Variable	Mean	SD	Min	Median	Max
MS	0.003	0.006	0.000	0.001	0.032
NIM	0.063	0.053	0.010	0.056	0.551
COST	0.010	0.004	0.001	0.010	0.020
ROA	1.240	0.450	-0.100	1.220	2.670
NII	0.050	0.040	0.000	0.040	0.220
Branch	6.770	14.640	0.000	1.000	110.000

3. EMPIRICAL RESULTS

Table 2 presents the results of Tobit regression examining the determinants of geographical expansion. As reported in column (1), the coefficient on *Policy* is significantly positive, suggesting that banks' geographical diversification increased significantly following the deregulation policy. Column (2) shows that the coefficient on *J&C*Policy* is significantly positive, indicating that joint-stock or city commercial banks experienced more geographical expansions after deregulation. Column (3) shows that *Experience*Policy* also has a significantly positive coefficient, suggesting that banks with prior experiences in geographical expansion tend to open more branches following deregulation. Column (4) shows that the coefficient on *CAR * Policy* is significantly negative, implying that the importance of capital adequacy ratio in geographical expansion is weakened after deregulation.

Table 2: The Determinants of Geographical Expansion

	Branch			
	(1)	(2)	(3)	(4)
J&C	9.708**	5.371**	2.346***	3.283***

	(2.222)	(2.019)	(9.781)	(7.230)
Policy	1.326***	-3.782***	-1.238***	0.528
	(2.780)	(-4.855)	(-9.792)	(0.649)
J&C * Policy		6.033***	2.576**	2.213***
		(2.991)	(2.426)	(4.904)
Experience			0.960***	0.958***
			(8.222)	(18.392)
Experience * Policy			0.475***	0.466***
			(13.079)	(14.302)
CAR				33.418
				(1.566)
CAR * Policy				-13.391**
				(-2.421)
Loanratio	29.502**	30.222**	5.851	7.023
	(2.074)	(2.041)	(1.340)	(1.251)
Size	10.562***	10.567***	2.617**	2.867***
	(12.893)	(13.767)	(2.093)	(5.561)
ROA	-1.395	-1.495	-1.089	-0.663
	(-0.454)	(-0.466)	(-0.674)	(-0.829)
Age	1.779***	2.066***	0.494*	1.045
	(5.368)	(3.153)	(1.661)	(1.385)
Observations	568	568	568	568
Pseudo R^2	0.1738	0.1749	0.2886	0.2968

Constants not reported. The numbers reported in the parentheses are robust standard errors that are clustered by banks. Tobit regressions are employed because the dependent variable branch is a censored data. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 3 presents the regression results regarding the impact of geographical diversification on bank performance. As aforementioned, we use five measures to proxy for bank performance. Columns (1) and (2) present the results using market share as the performance measure. The OLS results show that the coefficient on *Branch* is positive and significant at the 1% level, consistent with geographical expansion increasing market share. The economic significance is also sizable: if the bank establishes 10 more branches, its market share will increase by 0.28%. The results remain unaffected using 2SLS estimation. Similarly, the results reported in columns (3) and (4) suggest that banks gain higher net interest margins after expansion. Overall, our results are consistent with branch banking stabilizing banking

systems by increasing diversification opportunities.

However, the results reported in columns (5) and (6) show a negative side of geographical expansion: banks bear higher operating costs as the level of diversification increases. These results suggest a potential tradeoff between economic gains (market shares or interest margins) and operating costs due to banks' expansion. Moreover, geographical diversification has a positive but insignificant impact on ROA as shown in columns (7) and (8), whereas it increases non-interest income as seen in columns (9) and (10). The Cragg-Donald Wald F-statistics suggest that our study is relatively free of the weak instruments problem.

One potential drawback of the independent variable, *Branch*, is that it does not well capture the geographical footprint of banks' expansion. Thus, we use an alternative proxy for diversification that is measured based on the surface areas spanned by branches: the average distance between the city where the bank is headquartered and each prefecture in which the bank sets up at least one branch. Our results remain robust to this alternative measure.[3]

4. CONCLUSION

This study finds that geographical expansion of banks increases market share, net interest margin and non-interest income, but it is also associated with rising operating costs. Overall, our results suggest both bright and dark sides of geographical expansion of Chinese banks.

[3] We appreciate the reviewer for suggesting this test. To preserve space, the results are not tabulated but available upon request.

Table 3: Geographical Diversification and Bank Performance

	MS		NIM		COST		ROA		NII	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch	0.028***	0.022***	0.072***	0.065*	0.008***	0.006***	0.005	0.006	0.107***	0.102***
	(9.829)	(4.222)	(3.019)	(1.934)	(3.850)	(2.775)	(1.428)	(1.297)	(5.727)	(3.871)
Loanratio	0.599***	0.728***	-24.296***	-21.287***	0.561**	0.672**	0.003	-0.076	-3.364*	-3.514*
	(2.728)	(2.789)	(-3.264)	(-2.919)	(2.268)	(2.540)	(0.006)	(-0.120)	(-1.963)	(-1.933)
Size	0.124***	0.173***	-1.453***	-1.317***	-0.114***	-0.102***	-0.170***	-0.169***	0.965***	0.993***
	(3.495)	(3.404)	(-3.879)	(-2.989)	(-3.611)	(-3.087)	(-3.111)	(-2.868)	(5.547)	(3.933)
Age	-0.044	-0.043	-0.536	-0.578	-0.036	-0.033	-0.105	-0.112	0.736***	0.744***
	(-1.407)	(-1.258)	(-1.314)	(-1.491)	(-0.809)	(-0.745)	(-1.170)	(-1.253)	(2.992)	(3.045)
Growth	-0.028	-0.012	-2.246*	-1.829	0.015	0.024	-0.124	-0.123	0.679	0.652
	(-0.598)	(-0.224)	(-1.848)	(-1.490)	(0.238)	(0.376)	(-0.534)	(-0.527)	(1.187)	(1.119)
DEPO	-0.005	-0.002	-7.003*	-6.930*	0.429*	0.372	-0.533	-0.422	-2.905**	-2.957**
	(-0.045)	(-0.013)	(-1.757)	(-1.704)	(1.761)	(1.579)	(-1.082)	(-0.870)	(-2.083)	(-2.102)
CAR	-0.578**	-0.608**	-16.159**	-13.680*	0.516	0.472	-1.037	-0.910	7.002	6.678
	(-2.276)	(-2.140)	(-2.096)	(-1.756)	(1.043)	(0.960)	(-0.761)	(-0.675)	(1.458)	(1.383)
N	470	470	470	470	455	455	470	470	470	470
R^2	0.800	0.792	0.363	0.344	0.184	0.189	0.102	0.097	0.587	0.587
Cragg-Donald Wald F statistic		121.30		121.296		25.680		121.296		19.452
5% maximal IV relative bias		13.91		13.91		13.91		13.91		13.91
10% maximal IV relative bias		9.08		9.08		9.08		9.08		9.08

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