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Bank profitability and GDP growth in China: A Note

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ABSTRACT

This article examines the effect of GDP growth on bank profitability in China over the period 2003-2009. The one-step system GMM estimator is used to test the persistence of profitability in Chinese banking industry. The empirical findings suggest that cost efficiency is positively related to bank profitability, while lower profitability can also be explained by higher taxes paid by banks. In addition, there is a negative relationship between GDP growth and bank profitability. Furthermore, the results show that (1) the profitability in Chinese banking industry is significantly affected by the level of non-performing loans, and (2) Chinese banks with higher level of capital have lower profitability. Finally, we find that the departure from a perfect competitive market structure in Chinese banking industry is relatively small.

Key words: bank profitability, GDP, GMM, China

JEL Classifications: G21, E00, C23.

1. Introduction

China's banking sector is very important in the development of financial system as it provides support to the economic growth in China [1]. However, the problems of undercapitalization and large volume of non-performing loans (NPL) need to be solved in order to improve the stability of the banking sector. The performance of banks, and therefore their profitability, can be assessed by looking at the NPL as well as other key variables (Beck et al., 2005). According to Goodhart and Zeng (2006), the NPL balance of state-owned Chineses banks was RMB1013.5 billion in June 2005, which is lower than the volume of NPL at the end of 2003 (RMB1916.8 billion). However, after adjusting for transfer of NPL, the NPL balance of state-owned banks is not significantly lower than 2003. Furthermore, the highest capital adequacy ratio of Chinese banks is no more than 12%, which is much lower than the average ratio of listed banks in Hong Kong (18%). This paper examines the relationship between bank profitability of Chinese banks and GDP using recent data; we also test (1) if poor profitability is explained by the large volume of NPL, and (2) if banks with higher capital levels show high probability (Garcia-Herrero et al., 2009).

There are few studies investigating the determinants of Chinese banking profitability. A principle component approach is used by Shih et al. (2007); they compare the performance of Chinese banks using several bank-specific factors [2]. The results show that there is no relationship between bank size and bank profitability. The linear regression model is used by Fadzlan and Khazanah (2009) to examine the effects of bank-specific and macroeconomic determinants of state-owned and joint-stock commercial banks in China during 2000-2007. The findings suggest that banks with larger assets, higher credit risk and higher level of capital normally have higher profitability, while the lower profitability can be explained by higher overhead cost. Furthermore, the study shows that there are positive impacts of economic growth [3] and inflation on bank profitability. The system GMM estimation is used by Heffernan and Fu (2008) to investigate the effects of bank-specific and macroeconomic determinants [4] of profitability in China. The results show that GDP growth and unemployment rate are significantly related to bank profitability in China, while the effects of non-traditional activity and bank size on bank profitability are insignificant. Garcia-Herrero et al. (2009) use system GMM method to examine the determinant of bank profitability in China over the period 1997-2004 [5]. The results show that banks with higher technical efficiency and higher capital level typically have higher profitability, while the impact of concentration on bank profitability is negative.

To the best of our knowledge, there is no empirical investigation on the effect of GDP growth on bank profitability in China while controlling for comprehensive bank-specific and industry specific variables. Our aim is to investigate three different kinds of determinants affecting Chinese banking profitability, namely the bank-specific, industry specific and macroeconomic variables (GDP growth). The first group of bank-specific determinants of profitability involves bank size, credit risk, liquidity, taxation, capitalization, cost efficiency, non-traditional activity and labour productivity. The second group of determinants describes industry-structure factors that affect bank profitability - which are concentration ratio, banking sector development and stock market development. The third group relates

profitability to the macroeconomic environment within which the banking system operates; in this context, we include GDP growth among the explanatory variables.

The rest of this article is organized as follows: section 2 describes the empirical model and data, section 3 reports the empirical results and section 4 concludes the paper and suggests future research.

2. Data and methodology

We use a sample of 101 banks from China over the period 2003-2009. Because not all banks have all the information available for each year, our study opts for unbalance panel dataset. There are mainly three data sources, as follows: 1. Bankscope maintained by Fitch/IBCA/BUREAU Van Dijk (source for bank specific variables), 2. the World Bank database and 3. the China Banking Regulatory Commission (sources for industry-specific and macroeconomic variables).

With regards to the methodology, endogeneity, unobserved heterogeneity and profit persistence are the three main problems which make the OLS improper in estimating bank profitability in our case. Fixed or random effects are used by Maudos and Fernandez de Guerara (2004) and Claeys and Vennet (2005); however, their suggested method cannot solve the above problems. Arellano and Bond (1991) derive a consistent GMM estimation which accounts for endogeneity. The GMM estimator uses as instruments lagged values of the dependent variable in levels and in differences, as well as lagged values of other regressors which could potentially suffer from endogeneity; therefore, it is called difference GMM. This method is inefficient when the instruments are weak as argued by Arellano and Bover (1995) and Blundell and Bond (1998). Hence, another system GMM estimator is developed which includes lagged levels as well as lagged differences. Roodman (2006) argues that the problems of endogeneity, unobserved heterogeneity, autocorrelation and profit persistence can be solved by difference and system GMM estimation. Bond (2002), however, argues that difference GMM estimator will be biased if unit root exists while the system GMM estimator yields a greater precision result. Hence, in our paper, the one-step GMM estimator proposed by Athanasoglou *et al*. (2008) is used to conduct the empirical analysis. Our GMM is given below:

$$\Pi_{it} = C + \delta \Pi_{i,t-1} + \sum_{j=1}^{j} \beta_j X_{it}^j + \sum_{l=1}^{l} \beta_l X_{it}^l + \sum_{m=1}^{m} \beta_m X_{it}^m + \varepsilon_{it}$$

Where Π_{it} is the profitability of bank *i* at time t, which i=1,…..,N, t=1,…..,T, C is the constant term. $\Pi_{i,t-1}$ is the lag value of the dependent variable, X_{it} are the explanatory variables and ε_{it} the disturbance term, with v_{it} the unobserved bank-specific effect and u_{it} the idiosyncratic error. This is a one-way component regression model, where $v_{it} \sim$ IIN(0, σ_v^2) and independent of $u_{it} \sim (0, \sigma_u^2)$. The X_{it}'s are grouped into bank-specific X_{it}^j, industry-specific X_{it}^l and macroeconomic variable X_{it}^m.

3. Empirical results

Table 1 reports the summary statistics for variables used in this study. The reported values suggest that the differences of liquidity and cost efficiency among banks are not as big as the differences of non-traditional activity and labour productivity. Looking at the values of banking sector development, concentration, GDP growth and stock market development, we suggest that the banking sector and macroeconomic environment are more stable in China.

The empirical results [6] from the GMM method are presented in Table 2. The results show that taxation is significantly and negatively related to bank profitability in terms of ROA and NIM, suggesting higher cost incurred through higher taxes paid by banks which decreases the profitability. The cost efficiency has significant and positive impact on ROA and NIM, indicating that efficient expense management is helpful in increasing the profitability in Chinese banking industry. With respect to the industry specific variables, the signs of concentration are positive and the coefficients are significant which reflect the oligopolistic structure and supported by the structure-conduct-performance (SCP) hypothesis. The banking sector development affects the NIM and ROA significantly and positively, suggesting that banks in more concentrated market are more profitable. The stock market development is positively and significantly related to ROA and NIM. This positive relationship shows that there are complementaries between stock market and banking development in China. The GDP growth is found to be significantly and negatively related to bank profitability in China. This result partially supports the view that high economic growth improves business environment and lowers bank entry barriers. The consequently increased competition dampens bank's profitability.

The significant and negative relationship between capitalization and NIM suggests that lower level of capital increase the net interest margin of Chinese banks, which is indirect contrast to the findings by Ben Khediri and Ben-Khedhiri (2011) for the Tunisian banking industry. Although credit risk is significant, the signs are different than expected; we report a positive sign for ROA and negative sign for NIM. We also find that big bank size can translate into lower NIM in Chinese banking industry possibly due to bureaucratic reasons.

The positive and significant impact of labour productivity on ROA indicates that higher labour productivity increases ROA in our case. The negative and significant impact of non-traditional activity on NIM implies that financial institutions that derive a higher proportion of their income from non-interest sources such as fee-based services typically have a lower level of profitability. Finally, a significant and positive relationship between liquidity and profitability in terms of NIM is reported; this implies that more interest revenue will be generated from the larger share of loans to total assets. This finding is also supported by Bourke (1989) for several banks.

<< Table 1 – here >>

<< Table 2 – here >>

4. Conclusion

This article uses an unbalanced panel data to investigate the determinants of 101 Chinese banks for the period 2003-2009. The results indicate that banks with lower taxation and higher cost efficiency tend to have higher profitability in China. In addition, higher profitability of Chinese banks can be explained by higher banking and stock market development. We show that higher GDP growth leads to lower bank profitability in China. Furthermore, we find that the profitability in Chinese banking industry is significantly affected by the level of NPL; this supports the literature. In addition, we report that Chinese banks with higher level of capital have lower profitability (this applies to NIM only). Finally, we argue that the departure from a perfect competitive market structure in China banking industry is relatively small. Future research should examine the relationship between risk, profitability and competition under different measures in Chinese banking industry.

The empirical results have several practical and policy implications which are as follows: 1) the overhead cost should be better controlled in order to increase efficiency (bank efficiency has a positive impact on bank profitability); 2) the decision on making loans to high risk project/business should be better considered by bank managers as it may decrease the ROA of bank and increase the NIM; 3) relevant policy should be made by the Government to lower the speed of economic development as high GDP growth may decrease the profitability of Chinese banks; 4) banking regulatory authority should further push down the capital of banks to increase the NIM; and 5) the financial reform needs to ensure that the Government intervention and repression in the banking system is reduced by lowering the tax burden of banks and liberalizing the financial system as high profitability of Chinese banks is explained by well-developed banking and stock market systems.

Notes:

[1] It accounts for 66% of total financial assets and 17.5% of GDP (as of 2006).

[2] The factors include asset turnover ratio, ratio of long-term debt to short-term debt, overdue loan ratio, stagnant loan ratio, lost loan ratio, core capital ratio, capital adequacy ratio, capital risk ratio, asset profitability ratio, and capital profitability ratio.

[3] Logarithm of GDP is used as the indicator of economic growth.

[4] The bank-specific variables include size, capitalization, liquidity, cost efficiency, credit risk, non-traditional activity. The inflation, unemployment rate and GDP growth rate are used as the macroeconomic determinants.

[5] The bank-specific variables mainly include technical efficiency, liquidity, capitalization, etc. while the macroeconomic variables include concentration, GDP growth, inflation, volatility of interest rate, etc.

[6] Correlation among variables is tested through the correlation matrix and shows that there is no multicollinearity problem in our sample; these results are available upon request.

References

Arellano, M., & Bond, S.R. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies 58*, 277–297.

Arellano, M., & Bover, O. 1995. Another look at the instrumental-variable estimation of error-components models. *Journal of Econometrics* 68, 29–52.

Athanasoglou, P.P., Brissimis, S.N., & Delis, M.D. 2005. Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability. Working Paper(No. 25), Bank of Greece, Greece, June.

Athanasoglou, P. P., Brissmis, S. N., and Delis, M. D. 2008. Bank-specific, Industry-specific and Macroeconomic determinants of bank profitability. *Journal of International financial Markets, Institutions and Money* 18, No. 2: 121-136.

Beck, T., Cull, R., and Jerome, A. 2005. Bank privatization and performance: Empirical evidence from Nigeria. *Journal of Banking and Finance* 29, 2355-2379.

Ben Khediri, K. and Ben-Khedhiri, H. 2011. Determinants of bank net interest margin in Tunisia: a panel data model. *Applied Economics Letters* First published on: 04 March 2011

Blundell, R., and Bond, S. 1998. Initial conditions and moment restrictions in dynamic panel data model. *Journal of Econometrics* 87, 115-143.

Bond, S. 2002. Dynamic panel data models: a guide to micro data methods and practice. *Portuguese Economic Journal* 1, No.2: 141-62.

Bourke, P. 1989. Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance* 13, 65–79.

Claeys, S., and Vennet, R. V. 2005. Determinants of bank interest margin in Central and Eastern Europe: a comparison with the west. working paper, Ghent University, Ghent.

Fadzlan, S & Kahazanah, N. B. 2009. Determinants of Bank profitability in a Developing Economy: Empirical evidence from the China Banking Sector. *Journal of Asia-Pacific Business* 10, No 4: 201-307.

Goodhart, C., and Zeng, X. S. 2006. China's Banking Reform: Problems and Potential Solutions. *Journal of Chinese Economic and Business Studies* 4, No:3, 185-198.

Heffernan, S., and Fu, M. 2008. The Determinants of Bank Performance in China. working paper series(WP-EMG-03-2008), Cass Business School, City University ,UK, Available at SSRN: http://ssrn.com/abstract=1247713

Garcia-Herrero, A., Gavila, S., and Santabarbara, D 2009. What explains the low profitability of Chinese banks?. *Journal of Banking and Finance* 33, 2080-2092.

Maudos and Fernandez de Guevava. 2004. Factors explaining the evolution of the interest margin in the banking sectors of the European Union. *Journal of Banking and Finance* 28,No 9:2259-2281.

Roodman, D. 2006. How to do xtabond2: an introduction to difference and system GMM in Stata, Working Paper No.103, Center for Global Development.

Shih, V., Zhang, Q., & Liu, M. 2007. Comparing the performance of Chinese banks: a principle component approach. *China Economic Review* 18, 15–34.

Table1. Summary statistics of variables

Name	Mean	Standard deviation	Min	Max
ROA	0.007	0.006	-0.003	0.11
NIM	2.85	1.11	1.89	3.76

Bank size	4.67	0.95	0.71	7.07
Credit risk	0.009	0.007	-0.002	0.042
liquidity	53.39	9.35	17.97	83.25
taxation	0.41	0.37	-4.56	3.18
capitalization	5.1	2.97	-14	31
Cost efficiency	0.012	0.004	0.004	0.04
Non-traditional activity	13.91	15.2	-34.22	128.42
Labour productivity	0.008	0.004	3.50e-06	0.019
Concentration(C3)	14.54	1.95	10.19	16.29
Concentration(C5)	20.61	2.5	14.66	22.12
Banking sector development	51.98	15.49	16.86	63
Stock market development	77	49.47	31.9	184.1
GDP Growth	11	1.72	9.1	14.2

Table 2. One-step GMM system estimation (Results)

	ROA		NIM	
Independent	coefficient	T statistic	coefficient	T statistic

variables				
Lag of dependent variable	-0.12***	-3.39	0.39***	10.16
LTA	-0.0001	-0.56	-0.16***	-11.59
LLPTA	-0.19***	-3.35	12.75***	2.77
LA	0.00001	0.66	0.004***	2.1
TOPBT	-0.005***	-5.64	-0.31***	-4.87
ETA	-0.0001	-0.95	-0.03***	-4.62
CE	0.52***	6.9	122.45***	16.14
NTA	7.01e-06	0.49	-0.02***	-14.25
LP	0.13***	2.98	4.89	1.35
C(3)	0.001***	7.00		
C(5)			0.1***	11.75
BSD	0.0001***	4.79	0.008***	6.38
SMD	0.0001***	11.37	0.007***	10.83
GDP growth	-0.002***	-7.77	-0.15***	-7.61
F test	250.26***		5241.26***	
Sargan test	145.47***		116.8***	
AR(1) test	Z=-2.86	P=0.004	Z=-3.90	P=0.000
AR(2) test	Z=-0.47	P=-0.639	Z=-1.21	P=0.225