

Factors Influencing the Profitability of the Banks in India and China

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Abstract

The study investigates the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of commercial banks in India and China. Our sample comprises 1667 bank-year observations of 217 banks from both countries for the period 2004-2014. Our results suggest that credit quality, capital adequacy and cost management are the key factors behind the profitability of banks in India and China. The size of the bank is also important in determining profitability. It has a positive impact on the profitability of banks in India but a less expected negative impact on the profitability of banks in China. Although the bank-specific variables prove more important in explaining bank profitability than the industry-specific and macroeconomic variables, variables such as inflation and financial inclusion also prove to have significant explanatory power. There is strong evidence to suggest that privately-owned banks outperform state-owned banks in India and that the profitability of the banks in neither country were significantly impacted by the GFC.

Keywords: Commercial banks; profitability; India and China, bank-specific variables; industry and macroeconomic variables

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1. Introduction

The existing literature provides evidence on the contribution made by a well-developed financial sector to economic growth (King & Levine, 1993; Levine, 1997; Levine, Loayza, & Beck, 2000). Both Cole, Moshirian & Wu (2008) and Ajibike (2016) have focused on the relationship between profitable banks and economic growth. Their findings of a positive relationship between bank profitability and economic growth have highlighted the importance of profitable banking sector and motivated a number of researchers to investigate the determinants of the profitability of the banks.

The banking sector is particularly important for countries that are experiencing rapid economic growth such as India and China which have both shown an average growth in excess of 7% during the last five years. The economies in both the countries are largely dependent of the profitable and well-functioning banking sector. However, to our knowledge, there is no study to date that has conducted a comprehensive comparative study in India and China. These two countries are the largest emerging economies in Asia and operate in a similar banking environment, therefore, it is important to explore what contributes to the profitability of the banking sector. The Chinese banking sector is larger in terms of size with total bank assets of US\$ 24.5 trillion which equates to 292% of Chinese GDP as compared to US\$ 1.8 trillion assets of Indian banks which represents 95% of Indian GDP. The banks in both the countries operate in a similar regulatory environment with all the banks being required to maintain minimum capital adequacy ratios and cash reserve requirements which are varied through time. Currently, the banks in both countries are facing problems related to funding shortfalls and growing non-performing loans that negatively impact on their profitability. The non-performing loan ratio of Indian banks (4.35%) and Chinese banks (1.1%) is higher than many countries such as Hong Kong (0.5%), Singapore (0.75%) and Australia (0.96%).

The purpose of our study is to investigate the determinants of the profitability of the commercial banks in India and China over the period 2004-2014. This research will make three important contributions. First, this is the first study that has conducted a comprehensive comparative study on the determinants of the profitability of the banks in India and China using a large dataset. Second, the study aims to identify the difference between the determinants of profitability in Indian and Chinese banks for our total data sample and for subsets of our sample

(i.e. foreign versus local banks, state-owned versus private banks, and during the Global Financial Crisis (GFC) versus non-GFC periods). Third, the study widens the scope of explanatory variables beyond bank-specific variables to include a wider range of industry-specific and macroeconomic variables. The insights provided of this study will assist central banks and governments in India and China in making important decisions pertaining to monetary policy and bank regulations.

Our results suggest that well capitalized banks are the better performers as are banks with superior credit quality on their books. Furthermore, cost management appears to be an important determinant of the profitability. The banks with high cost to income ratio are underperformers. We also find strong evidence to suggest that state-owned banks are the inferior performers in India. Of the macroeconomic variables, our results show that the banks in India perform poorly during inflationary periods while banks in China perform better when inflation is high. Many of these findings are consistent with our expectations.

Our results suggest that the profitability of Indian and Chinese banks are driven by the some different factors, notably size and loan to deposit ratio. The larger banks are more profitable in India but size has a negative impact on the profitability of banks in China. The banks with high loan to deposit ratio are more profitable in China whereas the loan to deposit ratio does not affect the profitability of the banks in India. Furthermore, our findings suggest that the impact of several bank-specific variables differs across local banks and foreign banks, across GFC and non-GFC periods, and across state-owned and private banks. For example, loan to deposit ratio has a positive and significant impact on the profitability of foreign banks in India but the effect is insignificant in case of local banks. Similarly, the loan to deposit ratio has a positive and significant impact on the profitability of the private banks in China but the effect is insignificant in the case of state-owned banks.

The remainder of this paper is structured in the following manner: In Section 2 we provide a brief overview of Indian and Chinese banking sectors. Section 3 discusses the existing literature on the determinants of the profitability. Section 4 highlights data sources and method. In Section 5 we present and discuss our empirical results. Section 6 provides us with an opportunity to provide a summary of our findings.

2. Overview of the Banking Sectors

This study focuses on commercial banks which are the most important part of any financial system. The banks are the key suppliers of credit in the economy (World Bank, 2005). They

are also responsible for the exchange of domestic and international payments between various parties; therefore, the economic activities cannot run smoothly without an efficient banking system.

The banking sector in both India and China has undergone a series of reforms to improve their performance and to bring their operations more on a par with international standards. The following section provides a brief overview of the banking system of India and China.

2.1. India

India is one of the fastest growing economies in the world with an average growth of 7.2% over the last five years. At the end of 2013, Indian banking sector comprised of 89 banks with total assets of US\$ 1.8 trillion (Reserve Bank of India, 2013) which is equivalent to 95% of total GDP of India. The commercial banks in India are broadly divided into public sector banks, private banks and foreign banks. In comparison with the countries like Australia and Japan, banking industry in India is highly regulated with stringent capital requirements (9%) and cash reserves requirements (4%). It is important to note that banks in Australia and Japan are not required to maintain cash reserves and their capital requirement (8%) is also lower than the banks in India. Financial inclusion in India is low with 12 branches per 100,000 adults.

2.2. China

China is the second largest economy of the world after the United States and the GDP growth rate of China has remained over 7.5% during the last five years (World Bank, 2014). At the end of 2013, the banking sector of China comprised of 672 commercial banks¹ with total assets of US\$ 24.5 trillion (China Banking Regulation Commission, 2013) which equals to 292% of Chinese GDP. The commercial banks in China are broadly divided into large commercial banks, joint-stock commercial banks, city commercial banks, rural commercial banks and foreign banks (Tan, 2015). Chinese banking system is highly concentrated with the five largest state-owned banks holding more than 50% of total bank assets (Elliott & Yan, 2013). The banking industry in China is also highly regulated compared to the countries such as Australia and Japan with both capital requirements (8.5%) and stringent cash reserves requirements (19%). Financial inclusion in China is lower than India with 8 branches per 100,000 adults.

¹ Five large commercial banks, 12 joint-stock commercial banks, 145 city commercial banks, 468 rural commercial banks and 42 foreign banks.

Table 1: Regulatory and institutional differences across the Indian and Chinese banking sector.

Country Name	India	China
Total assets (USD)	1.8 trillion	24.5 trillion
Number of banks	89	672
Minimum capital adequacy ratio requirement (%)	9.0 %	8.5%
Cash reserve requirement (%)	4%	19%
Non-Performing Loan (NPL) criteria	+ 90 days	+ 90 days
Financial Inclusion (branches/100,000)	12	8
Bank assets to GDP ratio	95%	292%

Note: Data related to total assets and number of banks in India are obtained from Reserve Bank of India. Data related to total assets and number of banks in China are obtained from annual report of Chinese Banking Regulation Commission. Information about capital adequacy ratio requirement and cash reserve requirement is collected from websites of central banks of India and China. Data related to financial inclusion and bank assets to GDP ratio is collected from World Bank database.

3. Literature Review

Dietrich and Wanzenried (2011) suggest that economic activities in the country can be badly affected if the banks are unable to perform their functions effectively, therefore, a well-functioning banking sector is necessary to overcome negative economic shocks (Athanasoglou, Brissimis, & Delis, 2008). The banking sector is particularly important in India and China which are developing economies and are seeking to maintain high economic growth. The banks in both the countries are facing a challenge of high volume of non-performing loans due to their poor credit quality. Poor credit quality and strict regulations may have a significant effect on the profitability of the banks in India and China. Although there have been a handful of studies that have investigated the profitability of banks in either India or China, this is the first study to our knowledge that has conducted a comprehensive comparative analysis of the determinants of the profitability of the banks in India and China.

3.1. Studies in India

Seenaiah, Rath, and Samantaraya (2015) investigated the determinants of the profitability of the banks in India using the fixed-effect estimator over a period from 1995 to 2012. The findings suggest that the banks with higher levels of wages have a positive impact on the profitability of the banks in India. On the other hand, they found a negative impact of non-performing loans and cost of deposits on the profitability of the banks. Shanmugam and Das (2004) measured the efficiency of Indian commercial banks using a stochastic frontier production function over a period 1992 to 1999. Their results suggest that the bank deposits have a positive and statistically significant effect on the profitability of the banks. Kaur (2013) investigated the determinants of the profitability of Indian banks using multiple regression analysis over the period from 1991 to 2012. Their findings suggest that higher level of non-performing loans and higher level of operating costs deteriorate the profitability of the banks

in India. On the other hand, they found that the interest spread and non-interest income both had a significant and positive impact on the profitability of Indian banks.

3.2. *Studies in China*

Shih, Zhang, and Liu (2007) analysed the performance of Chinese state-owned banks, joint-stock banks and city commercial banks with a survey data of 112 banks using principal component analysis. They suggest that joint-stock banks perform better than state-owned banks and city commercial banks in China. Further, they argue that the size does not have any significant effect on the profitability of the banks in China. Sufian (2009) analysed the factors that affect the profitability of state-owned and joint-stock commercial banks in China using the fixed-effect estimator over a period 2000 to 2007. Their results suggest that the large banks, the banks with higher levels of capital and the banks with higher levels of non-performing loans are more profitable. On the other hand, their findings suggest that the operating cost and liquidity have a negative and statistically significant impact on the profitability of the banks. Finally, their results show that the banks in China perform better during high growth and inflationary periods. García-Herrero, Gavilá, and Santabárbara (2009) used Generalized Method of Moment (GMM) estimator to investigate the factors that explain the low profitability of Chinese banks over a period 1997 to 2004. Their findings suggest that higher level of capital and higher level of deposits lead to higher profitability. On the other hand, they suggest that asset concentration in few large state-owned banks is a major reason behind the low profitability of Chinese banks. Furthermore, they argue that the joint-stock commercial banks (JSCBs) are more profitable than state-owned commercial banks (SOCBs). Tan (2016) also used GMM estimator to investigate the impact of risk and competition on the profitability of Chinese banks over the period 2003-2011. The findings suggest that the banks with higher levels of taxes are less profitable while labour productivity has a positive impact on the profitability. Surprisingly, they found a positive and significant relationship between overhead cost and the profitability. In terms of industry specific variables, they suggest that banking sector development (measured with bank assets/GDP) has a positive impact on the profitability of Chinese banks. Tan and Floros (2012b) investigated the effect of inflation on the profitability of Chinese banks using GMM estimator that covers the period 2003 to 2009. Their findings suggest that it is the less concentrated banks that achieve the best performance, especially during periods of high inflation when the stock market is performing well.

The existing literature on India and China provides evidence on the effect of bank-specific, industry-specific and macroeconomic factors on the profitability of the banks. These studies

have highlighted that certain variables have a different impact on the profitability of banks in India and China, thus motivating this comprehensive comparative study where we seek to identify the extent to which bank profits are driven by different factors across the two countries. We will examine the determinants of profitability in Indian and Chinese banks both in aggregate and where our sample is separated on the basis of whether a bank is local or foreign, state-owned or private, and whether the period being studied lies inside or outside the GFC. Furthermore, this study introduces two new variables, i.e., cash reserve requirement and financial inclusion that have not previously been considered when seeking to identify the factors that impact on bank profitability.

4. Data and Method

4.1. Description and Sources of Data

We used three sources to collect data: the Bankscope database, the World Bank database and the websites of central banks of India and China. Data for all bank-specific and ownership variables were collected from the Bureau van Dijk's Bankscope database². We gathered data of cash reserve requirement and interest rates from the official websites of central banks of the India and China. Data of inflation, gross domestic product and financial inclusion were retrieved from the World Bank database.

Our database consists of all active commercial banks in China and India. In some cases there was duplicate information on a bank where both consolidated and unconsolidated information was maintained in the database. In these cases we included only the consolidated statements to avoid duplication. There were some instances where we found statements covering only part of a year (three months or six months). In these cases, we excluded all those observations where Bankscope did not provide data for a complete year (12 months). Finally we winsorised the bank-specific variables at 2.5% to remove outliers. As shown in Table 2, after making all the adjustments, our final sample comprises of an unbalanced dataset of 1,667 bank-year observations from 217 commercial banks over a period 2004-2014.

² It is a comprehensive database with over 12,000 banks around the world and covers around 90% of the banks in every country.

Table 2: Number of banks and observations by country and type of banks.

Country	Local banks		Foreign banks		Total	
	Number of banks	Observations	Number of banks	Observations	Number of banks	Observations
India	50	505	8	72	58	577
China	130	903	29	187	159	1,090
Total	180	1,408	37	259	217	1,667

Note: We also omitted the year-observations of banks where data was missing for variable(s). Therefore, our final sample is an unbalanced dataset.

4.2. Method

In most of the existing literature, OLS is applied on fixed-effects or random-effects to deal with simultaneous causality and unobserved heterogeneity in the static relationships. The fixed-effects model estimates parameters for each unit that not only reduces the power of model but also results an increase in the standard errors of the coefficient estimates. It creates more problems when the sample size is small because variation in the dependent variable may be caused by these unit effects (Clark and Linzer, 2015). Given this problem, we used random-effects model that lowers the variability within sample by partially pooling the data³.

We run the regression on India and China separately. We have used a dummy variable for GFC. The dummy variable will take value 1 if the year is 2008 or 2009 and 0 otherwise. We have selected year 2008 and 2009 as GFC period because GDP of India and China witnessed a decline in these two years.

The functional form of the model is:

$$\pi_{it} = \alpha + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \sum_{n=1}^N \beta_n X_i^n + \epsilon_{it} \quad (1)$$

Where π_{it} refers to a measure of the profitability of bank i at time t with $i=1, \dots, N$ and $t=1, \dots, T$, α is a constant term, X_{it}^j indicates bank-specific explanatory variables, X_{it}^l refers to industry-specific variables, X_{it}^m indicates macroeconomic variables and X_i^n refers to a dummy variable for GFC.

In all the specifications, we will run regression on bank-specific variables first, next we will add industry-specific variables and finally we will add macroeconomic variables to check the extent to which the explanatory power of model increases with addition of industry-specific and macroeconomic variables.

³ In order to confirm the results we also used fixed-effects model and pooled regression method and found consistent results across all three. Hence for ease of exposition, we include in the paper the one set of results.

In order to examine the difference between the determinants of profitability across Indian and Chinese banks both in aggregate and where the banks are separated on the basis of whether they are local or foreign banks, state-owned or private banks, and whether the period being studied lay inside or outside the GFC, we use the following equation.

$$\pi_{it} = \alpha + \sum_j \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 D_1 X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \epsilon_{it} \quad (2)$$

Where X_{it}^j refers to bank-specific explanatory variables, X_{it}^l refers to industry-specific variables and X_{it}^m indicates macroeconomic variables.

We use Equation 2 to analyse the differing impact of the bank-specific explanatory variables on bank profitability in India and China. The dummy variable, D_1 , will take the value of zero if the bank is Indian and a value of 1 if the bank is Chinese. The coefficient β_1 is the coefficient for Indian banks and the coefficient β_2 is the coefficient for the difference of the profitability of Indian and Chinese banks. Hence, in order to obtain the coefficient for Chinese banks we will add β_1 and β_2 and use the Wald test to determine their significance.

The same approach is used when we examine the impact of bank-specific variables on bank profitability for three sets of sub-samples within each of India and China:

1. Local banks and foreign banks: In this case D_1 takes on the value of zero for a local bank and a value of 1 if it is a foreign bank. The coefficient β_1 measures the impact of the variable on local banks and β_1 plus β_2 measure the impact on foreign banks.
2. State-owned banks and private banks: In this case D_1 takes on the value of zero for a state-owned bank and a value of 1 if it is a private bank. The coefficient β_1 measures the impact of the variable on state-owned banks and β_1 plus β_2 impact on private banks.
3. Performance during the GFC (2008 and 2009) and non-GFC periods: In this case D_1 will take on the value of zero if the year is 2008 and 2009 and a value of 1 for the other years. The coefficient β_1 measures the impact of the variable in the GFC period and β_1 plus β_2 the impact during the GFC years.

4.3. *Dependent and Explanatory Variables*

Table 3 provides a summary of the dependent and independent variables that includes notation, measurement and expected effect obtained by intuition and the findings of other studies. We have used return on assets as a key measure of bank profitability. Return on assets is the most widely used measure in the literature. We have also used another profitability measure, i.e.,

return on deposits for the robustness purpose. The explanation of all dependent and independent variables and the rationale behind the expected effect are provided Appendix A.

Table 3: Definition of variables, notation and expected effect.

Variables	Notation	Measure	Expected Sign
<i>Dependent Variable</i>			
Return on Assets	ROA	Profit before tax/Total Assets (%)	
Return on Deposits	ROD	Profit before tax/Total Deposits (%)	
<i>Independent Variables</i>			
<i>Bank-specific Determinants</i>			
Non-Performing Loan Ratio	NPLR	Non-performing Loans/Total Loans (%)	-
Capital Adequacy Ratio	CAR	Tier 1 Capital + Tier 2 Capital / Risk-Weighted Assets (%)	+/-
Total Assets (Bank Size)	SIZE	Natural log of total assets of bank	+
Loans to Deposit Ratio	LDR	Total Loans / Total Deposits (%)	+/-
Off-balance Sheet Activities Ratio	OFFBS	Off-balance sheets Items/Total Assets (%)	+/-
Cost to income ratio	COST	Operating Cost / Total Income (%)	-
<i>Industry-specific Determinants</i>			
Bank Ownership (Dummy)	GOVT	1 for state-owned bank and zero otherwise	-
Cash Reserve Requirement	CRR	Yearly percentage of deposits maintained by banks (%)	+/-
Financial Inclusion	FININC	Number of branches/100,000 adults	+/-
<i>Macroeconomic Determinants</i>			
Inflation	INF	Yearly percentage change in CPI (%)	+
Interest Rate	INT	Discount rate of last quarter of calendar year (%)	+
Gross Domestic Product	GDP	Yearly GDP growth rate (%)	+

Note: “+” sign shows that we expect a positive relationship between dependent variable and independent variable. “-” sign shows that we expect a negative relationship between dependent variable and independent variable. “+/-” sign shows that there is reason to believe that the relationship could go in either direction.

Table 4 reports the descriptive statistics of the dependent and independent variables for the banks in India and China. The results show that there is little difference between the descriptive statistics of India and China in terms of ROA and ROD. However, there is significant difference between the some of the bank-specific, industry-specific and macroeconomic variables in both countries.

The average ROA (1.41%) and ROD (1.79%) of Indian banks is only slightly higher than the average ROA (1.34%) and ROD (1.56%) of Chinese banks. NPLR is relatively low in Chinese banks reflecting that the credit quality of Chinese banks is better than the banks in India. LDR of Indian banks is 66.83% compared to 56.36% of the banks in China. The higher LDR of Indian banks suggests that the banks in India are following a more aggressive lending strategy which may be one the reasons for their high NPLR. In terms of cost, Indian banks appear to be at a disadvantage with COST 47.47% compared to 40.79% in China.

Our results show that 50% of banks are owned by state in India while only 7% banks are owned by state in China. The banks in India maintain cash reserves of 5.62% which is significantly lower than 16.06% in China. FININC reflects that there are more branches (10.25) per 100,000 people in India compared to 7.57 per 100,000 in China.

There is large variation in both countries in terms of macroeconomic indicators. India has, on average, a high level of INF (8%) compared to 3% in China. Similarly, the average INT (6.79%) in India is higher than in China (6.03%). However, the average GDP growth in China is 9.59% which is significantly higher than GDP growth of 7.68% in India.

Table 4: Descriptive statistics of variables over the period 2004-2014.

Variable	India (Obs: 577)		China (Obs: 1,090)		Total banks (Obs: 1,667)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<i>Bank profitability</i>						
Return on Assets (%)	1.41	0.90	1.34	0.61	1.37	0.69
Return of Deposits (%)	1.79	1.36	1.56	0.78	1.65	0.99
<i>Bank-specific variables</i>						
Non-performing loan ratio (%)	3.53	2.75	1.71	1.88	2.35	2.42
Capital adequacy ratio (%)	14.04	3.42	15.04	8.40	14.70	6.89
Total assets (bank size)	3.90	0.71	4.06	0.99	4.00	0.90
Loan to deposit ratio (%)	66.83	9.29	56.36	13.93	59.92	13.72
Off-balance sheet activities ratio (%)	21.79	10.94	20.40	12.52	20.89	12.02
Cost to income ratio (%)	47.47	8.04	40.79	12.76	43.08	11.82
<i>Industry-specific variables</i>						
State-owned banks (dummy)	0.50	0.50	0.07	0.25	0.22	0.41
Cash reserve requirement (%)	5.62	1.13	16.06	3.88	12.45	5.91
Financial Inclusion	10.25	1.33	7.57	0.37	8.50	1.53
<i>Macroeconomic variables</i>						
Inflation (%)	8.00	2.61	3.00	1.79	4.73	3.18
Interest rate (%)	6.79	1.10	6.03	0.57	6.29	0.87
GDP growth (%)	7.68	1.91	9.59	2.02	8.93	2.17
<i>Dummy Variables</i>						
Foreign banks	0.12	0.33	0.17	0.38	0.16	0.36
During GFC	0.18	0.39	0.17	0.38	0.18	0.38

Note: These variables are selected from a number of available variables. We measured correlation between explanatory variables and conducted VIF tests for individual countries and for aggregate data, the explanatory variables with correlation of more than 0.8 or VIF value greater than 10 were omitted from the regressions.

5. Empirical Results

5.1. Results based on the profitability measure ROA and ROD

Table 5 and Table 6 report regression results for India and China⁴, respectively. These results are obtained through a regression as set out in equation 1. Panel A reports the results for the profitability measure ROA and Panel B reports the results for profitability measure ROD. Column 1 and Column 4 show the results with the bank-specific explanatory variables only, to which we next add the industry-specific variables (Column 2 and Column 5) and we then further added the macroeconomic variables (Column 3 and Column 6). Overall, the results show that the explanatory power of the model slightly increases when we add industry-specific

⁴ We also ran regression by pooling the data of both countries. We used country dummy in that regression and found that Indian banks are more profitable than the banks in China. These results are not reported as the coefficients attached to the explanatory variables represent some kind of average of the coefficients already discussed for the individual countries.

and macroeconomic variables. In case of ROA, the adjusted r-squared for the model with all variables included is 68.12% for India and 57.76% for China; and in case of ROD, the adjusted r-squared for the model with all variables included is 70.5% for India and 48.56% for China.

5.1.1. India (Table 5)

As predicted we find for Indian banks, a strong negative relationship between both NPLR and COST with bank profitability. In contrast, we find that a bank's CAR and its SIZE have a significant positive relationship with bank profitability. The finding related to SIZE is as expected but in the case of the CAR, there was uncertainty as to the direction of its impact on profits. One possible explanation for a positive relationship is that the banks with high capital holdings are considered safe as it helps them to absorb shocks caused by adverse movements in the economy (Athanasoglou et al., 2008). There is weak evidence that a high LDR reduces the profitability of the banks which is suggestive of Indian banks extending loans to a point where they are compromising their credit quality.

In terms of industry-specific variables, our findings support previous findings in the literature that suggest Indian state-owned banks are less profitable than the private banks. Given FININC is not used in previous studies it was uncertain as to the effect that more FININC would have on banking profits. We find strong evidence to suggest that the impact is negative. There are two possible explanations for this finding. First, extending banking services to a greater portion of the population may result an increase in the default rates which lowers their profitability. This proposition gains some support from a positive correlation between FININC and the NPLR. Second, an increase in the number of branches may also increase the operating cost of the banks which reduces their profitability. Again this gains some support from the positive correlation between FININC and COST.

Of the macroeconomic variables, the only one that has a strong impact is INF which has a strong negative relationship with bank profitability. Although we predicted a positive relationship, Mirzaei, Moore, and Liu (2013) also found a negative relationship which they put down to Indian banks being poor forecasters of future rates of inflation. We learn from our dummy variables that the foreign banks in India are more profitable than their counterparts. This is consistent with the findings of Shanmugam and Das (2004) who suggest that foreign banks in India are more efficient than nationalized banks and domestic private banks. Finally, our findings suggest that the performance of Indian banks was largely unaffected by global financial crisis in 2008-2009.

Column 4, Column 5 and Column 5 report the results of ROD. These results largely confirm the results of ROA. The bank-specific variables NPLR and COST have same negative impact on ROD as in case of ROA. Similarly, CAR has positive impact on both type of profitability measures. SIZE had a positive and statistically significant impact when we used ROA, however, in case of ROD, the coefficient of size is insignificant which shows that SIZE does not explain the profitability when it is measured with ROD. The results of all the industry-specific and macroeconomic variables are consistent with the results of ROA.

5.1.2. China (Table 6)

Our findings for China show that all the bank-specific variables have a significant impact on the profitability of the banks except for the banks' OFFBS. There is strong evidence of a negative relationship between a bank's NPLR, its SIZE and its COST with the profitability of the banks in China. The only one of these that is obviously at variance with expectations is SIZE which one might think would have a positive impact on profits. However, there are two recent studies on Chinese banks that have also found a negative relationship between SIZE and the bank profitability. Tan and Floros (2012a) and Tan (2016) both found a negative relationship, the former putting it down to the fact that smaller banks found it easier to deal with the bureaucracy while the latter suggested that management in smaller banks found it easier to concentrate on the key profitable segments. In two other cases, CAR and LDR, there was uncertainty as to the direction of their expected impact on profits. Our results suggest that the relationship is positive and statistically significant in both cases. These results are consistent with previous studies that have investigated the determinants of the profitability in China. For example, Sufian and Habibullah (2009) and García-Herrero et al. (2009) found a positive relationship between CAR and profitability. Their findings suggest that the banks with a strong capital structure are less likely to default, therefore, it is relatively easier for banks to attract low cost funding. Furthermore, the strong capital structure of banks helps them to withstand a negative economic shock that provides additional security to depositors. Similarly, there are studies that have found a positive relationship between LDR and the profitability of Chinese banks. Tan and Floros (2012b) suggested that the low liquidity of banks indicates that the banks have lent out higher amount of loans and that have generated higher level of profitability. There is some evidence that the banks with high CRR are more profitable. We find weak evidence that the FININC has a negative impact on the profitability of Chinese banks which is consistent with our findings for India.

All three macroeconomic variables have an impact on the performance of Chinese banks. In line with the findings of previous studies, we find that both the INF and INT have a positive impact on the performance of the Chinese banks. In general, banks increase their lending rate during inflationary periods which leads to higher profitability. Perry (1992) suggests that if banks are able to predict inflation, they adjust their interest rates accordingly which results in high profitability during inflationary periods. Surprisingly, GDP growth has a negative impact on the profitability of Chinese banks. However, this is consistent with the findings of (Tan & Floros, 2012a) who suggest that economic growth improves the performance of the business but it reduces the barriers to entry for banks. Our dummy variable for foreign banks is significant and negative indicating that local banks are more profitable than foreign banks in China. The lower profitability of foreign banks is a function of the strict requirements placed on foreign banks by the Chinese government limiting their access to some of the very profitable markets such as providing foreign exchange facilities (Heffernan & Fu, 2010). Finally as with India, our findings suggest that the performance of Chinese banks was also unaffected during the global financial crisis of 2008-2009.

Column 4, Column 5 and Column 6 report the results of ROD. Similar to India, the results of ROD are largely consistent with the results of ROA. All the bank-specific variables have same impact on ROD as in case of ROA. Industry-specific variable FININC had a negative impact on ROA, however, the coefficient of FININC is statistically insignificant in case of ROD. Similarly, macroeconomic variable, interest rate had a positive impact on ROA, however, interest rate does not have any impact on ROD. In case of ROA, we found that foreign banks are less profitable than local banks, however, in case ROD, the coefficient of foreign banks is statistically insignificant.

Table 5: Regression results of India

Variables	Panel A - ROA			Panel B – ROD		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Bank-specific variables</i>						
Non-performing loan ratio	-0.0402*** (-4.22)	-0.0405*** (-4.31)	-0.0533*** (-5.43)	-0.0391*** (-2.94)	-0.0375*** (-2.82)	-0.0516*** (-3.70)
Capital adequacy ratio	0.0519*** (5.56)	0.0516*** (5.63)	0.0635*** (6.80)	0.0925*** (7.02)	0.0927*** (7.05)	0.107*** (8.05)
Log (bank size)	-0.118** (-2.13)	0.0696 (1.10)	0.128** (1.99)	-0.200** (-2.48)	0.00955 (0.10)	0.113 (1.22)
Loan to deposit ratio	-0.00788*** (-2.69)	-0.00373 (-1.24)	-0.00107 (-0.35)	-0.00531 (-1.30)	-0.00156 (-0.37)	0.00141 (0.32)
Off-balance sheet activities Ratio	0.00200 (0.77)	-0.00354 (-1.29)	-0.00374 (-1.38)	0.00311 (0.84)	-0.00217 (-0.55)	-0.00243 (-0.63)
Cost to income ratio	-0.0567*** (-17.11)	-0.0580*** (-17.86)	-0.0582*** (-18.16)	-0.0744*** (-16.04)	-0.0758*** (-16.45)	-0.0767*** (-16.80)
<i>Industry-specific variables</i>						
State-owned banks		-0.252** (-2.34)	-0.285*** (-2.65)		-0.298* (-1.79)	-0.370** (-2.35)
Cash reserve Requirement		0.0166 (0.88)	-0.0139 (-0.69)		0.0339 (1.29)	-0.0114 (-0.40)
Financial Inclusion		-0.0992*** (-4.82)	-0.0813*** (-3.18)		-0.0897*** (-3.06)	-0.0612* (-1.68)
<i>Macroeconomic variables</i>						
Inflation			-0.0529*** (-4.57)			-0.0701*** (-4.26)
Interest rate			0.0433 (0.73)			0.122 (1.45)
GDP growth			0.0172 (0.61)			0.0492 (1.24)
<i>Dummies</i>						
Foreign Banks	0.859*** (6.22)	0.829*** (6.26)	0.821*** (6.22)	1.711*** (8.20)	1.661*** (8.09)	1.636*** (8.49)
During GFC	0.0797 (1.58)	-0.00723 (-0.14)	0.240 (1.16)	0.133* (1.92)	0.0424 (0.57)	0.563* (1.92)
Constant	4.335*** (11.38)	4.590*** (11.16)	4.043*** (5.21)	4.983*** (9.26)	5.002*** (8.56)	3.562*** (3.23)
Number of observations	577	577	577	577	577	577
Number of Years (2004-2014)	11	11	11	11	11	11
Adjusted R-squared	61.25%	66.06%	68.12%	65.39%	68.59%	70.5%

Note: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimation results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

Table 6: Regression results of China

Variables	Panel A - ROA			Panel B – ROD		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Bank-specific variables</i>						
Non-performing loan ratio	-0.0647*** (-9.22)	-0.0552*** (-7.54)	-0.0533*** (-7.24)	-0.0676*** (-7.41)	-0.0590*** (-6.20)	-0.0579*** (-6.03)
Capital adequacy ratio	0.0143*** (6.05)	0.0128*** (5.41)	0.0119*** (5.19)	0.0265*** (8.47)	0.0247*** (7.90)	0.0237*** (7.80)
Log (size)	-0.0281 (-1.13)	-0.0617** (-2.25)	-0.0851*** (-3.11)	0.0184 (0.56)	-0.0373 (-1.02)	-0.0709* (-1.93)
Loan to deposit ratio	0.000748 (0.70)	0.00185* (1.68)	0.00332*** (2.95)	0.00399*** (2.84)	0.00504*** (3.50)	0.00683*** (4.59)
Off-balance sheet activities Ratio	0.000597 (0.53)	0.000779 (0.70)	0.000666 (0.61)	0.000286 (0.20)	0.000422 (0.29)	0.000231 (0.16)
Cost to income ratio	-0.0316*** (-23.71)	-0.0321*** (-24.17)	-0.0308*** (-23.28)	-0.0383*** (-22.06)	-0.0390*** (-22.48)	-0.0375*** (-21.60)
<i>Industry-specific variables</i>						
State-owned banks		0.00975 (0.07)	0.0393 (0.29)		0.207 (1.02)	0.251 (1.35)
Cash reserve Requirement		0.0139*** (4.13)	-0.000626 (-0.13)		0.0167*** (3.81)	-0.00210 (-0.32)
Financial Inclusion		-0.0111 (-0.34)	-0.0822* (-1.94)		0.0284 (0.65)	-0.0667 (-1.16)
<i>Macroeconomic variables</i>						
Inflation			0.0290*** (4.04)			0.0379*** (4.07)
Interest rate			0.0599** (1.99)			0.0575 (1.46)
GDP growth			-0.0478*** (-4.75)			-0.0583*** (-4.40)
<i>Dummies</i>						
Foreign Banks	-0.162* (-1.93)	-0.158* (-1.92)	-0.183** (-2.41)	-0.0123 (-0.11)	-0.0162 (-0.14)	-0.0537 (-0.52)
During GFC	0.0130 (0.48)	0.00705 (0.25)	0.0254 (0.63)	0.0184 (0.52)	0.0200 (0.55)	0.0259 (0.49)
Constant	2.643*** (16.27)	2.596*** (8.59)	3.346*** (6.72)	2.593*** (12.01)	2.293*** (5.70)	3.404*** (5.10)
Number of observations	1090	1090	1090	1090	1090	1090
Number of Years (2004-2014)	11	11	11	11	11	11
Adjusted R-squared	49.93%	50.87%	51.76%	45.37%	47.25%	48.56%

Note: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimation results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

As reflected in Table 5 and Table 6, the results for India and China with the profitability measure ROD are largely consistent with ROA, therefore, we will use only ROA for the subsequent analysis.

5.2. *Effect of bank-specific variables across the banks in India and China based on pooled data*

5.2.1. *Banks in India versus Banks in China (Table 7)*

Table 7 reports on how the impact of the bank-specific variables differs across Indian and Chinese banks. The analysis is conducted using the regression set out in equation 2. Our major finding is that there is a significant difference in the impact that four of our six bank-specific variables have on the profitability of banks in India and China. Perhaps the most interesting of these differences is that SIZE has a positive impact on profitability in India whereas the effect is negative for Chinese banks. It appears that banks in India can take advantage of economies of scale which is also reflected by a negative correlation between SIZE and COST. On the other hand, our findings for China are in line with the findings of Tan (2016) that suggest that the managers of smaller Chinese banks are more able to focus on the key profitable segments which helps them to increase profitability.

The other three variables where the impact differs are LDR, CAR and COST. LDR has a positive and significant effect on bank profits in China but there is no statistically significant relationship between LDR and bank profits in India. It suggests that the banks in China more effectively manage their loan portfolio with an increase in loans leading to an increase in their profitability. This finding gains some support from the low NPLR (1.71%) of Chinese banks compared to the NPLR (3.53%) of Indian banks. CAR has a positive effect on bank profitability in both countries but this impact is much greater in India where a 1% increase causes bank profits to increase in India by an amount in excess of three times the impact in China. One possible explanation is well capitalized banks in India are better in terms of attracting low cost deposits compared to well capital capitalized banks of China. In both countries, a higher COST translates into significantly lower profits but this impact is significantly higher in India than it is in China.

The other two variables which have a similar effect in both countries are the NPLR and OFFBS. NPLR has a negative impact on profitability in both India and China while OFFBS proves to have no impact on profits in either country.

Table 7: Effect of bank-specific variables on ROA of banks in India and banks in China

	NPLR	CAR	SIZE	LDR	OFFBS	COST
India (X_{it})	-0.0458***	0.0467***	0.256***	-0.00300	-0.000863	-0.0478***
Difference ($D.X_{it}$)	0.000201	-0.0329***	-0.264***	0.00580**	0.00178	0.0148***
China	-0.045***	0.0138***	-0.008***	0.0028**	0.0009	-0.033***

Note: The table reports the result for the regression equation 2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total assets of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. $D.X_{it}$ is used to examine a possible different relationship of bank-specific variables for Indian and Chinese banks. D will take the value of zero for Indian bank and a value of 1 if the bank is Chinese.

5.3. *Effect of bank-specific variables across different categories of bank*

In this section, we analysed the data for each of the countries by splitting the sample up in three different ways, i.e., local and foreign banks, banks during GFC period and non-GFC period and state-owned and private banks. The analysis is also conducted using the regression set out in equation 2.

5.3.1. *India (Table 8)*

Table 8 highlights how the impact of the bank-specific variables on the profitability of Indian banks differs across local and foreign banks, periods inside or outside GFC, and state-owned banks and privately owned banks. Three of the variables have the same impact on the profitability of the banks across all categories of banks and are consistent with the results we reported for the pooled data: NPLR and COST having a negative impact on bank profits across all categories and the CAR always has a positive impact. With respect to each of these variables there are some points to note. First, NPLR has a much greater negative impact on the profitability of local banks than they do on foreign banks. Second, COST has a much greater negative impact on the profitability of foreign and private banks than they do on local banks and state-owned banks.

As always, SIZE is an interesting variable with it most cases maintaining the positive relationship with profitability that we have highlighted previously. However, there is one large exception with SIZE have a negative impact on the profits of state-owned banks whereas the typical positive relationship is maintained for private banks. The possible explanation for a negative effect of SIZE on the profits of state-owned banks in that the operating cost of large state-owned banks in India is higher and the quality of staff is poor (Kumbhakar & Sarkar, 2003). Our findings are consistent with Kumbhakar and Sarkar (2003) that suggest the productivity of private banks is higher than state-owned banks in India. The others factors highlighted by our analysis is that SIZE did not make any difference to the performance of banks during the GFC nor did it contribute to any difference in the performance of local or foreign banks.

We previously found weak evidence that a high LDR reduces the profitability of the banks in India but we do find exceptions when we examine the sub-samples reported on in Table 8. One exception that we found is the foreign banks where there is a positive relationship between LDR and profitability of the foreign banks which does not hold for the local banks. It suggests that foreign banks in India more effectively manage their loan portfolio with an increase in loans leading to an increase in the profitability. The other exception being that during the non-GFC period, LDR had a negative association with bank profitability which was significantly different to the insignificant impact that it had during the GFC. During the non-GFC period, Indian banks have a higher LDR compared during the GFC period, which translates into a negative relationship between LDR and profitability of banks.

Finally we have the OFFBS that previously have been found to explain none of the variability of bank profits. Now we find some big differences within our sub-samples. One finding is that OFFBS had a negative impact on the profitability of Indian banks during the GFC whereas this relationship was positive during the non-GFC years. Off-balance sheet items include contingent items such as guarantees, derivatives and commitments. It appears that off-balance sheet activities became unprofitable during GFC due to bank-specific and foreign exchange risks associated with them. Furthermore, overall impact was worse as banks in India increased their off-balance sheet exposure (as percentage of total assets) from 21.24% (non-GFC period) to 24.23% (GFC period).

Similarly, we found that OFFBS had a negative impact on the profitability of local banks but a positive impact on the performance of foreign banks. Our results for foreign banks are consistent with findings of Singh (2010) that suggest the OFFBS has a positive effect on the profitability of foreign banks. The previous findings of no association applied with respect to both state-owned and private banks.

Table 8: Effect of bank-specific variables on ROA across different periods and categories of banks

	NPLR	CAR	SIZE	LDR	OFFBS	COST
Local Banks (X_{it})	-0.0679***	0.0602***	0.163***	-0.00433	-0.00696**	-0.0499***
Difference ($D.X_{it}$)	0.0595**	0.0103	0.209	0.0183***	0.00975	-0.0400***
Foreign Banks	-0.008***	0.070***	0.372***	0.014**	0.003**	-0.089***
During GFC (X_{it})	-0.0516*	0.0523***	0.0946	0.0102	-0.0150***	-0.0618***
Difference ($D.X_{it}$)	-0.00389	0.00964	0.0537	-0.0145**	0.0159***	0.00270
Non-GFC Period	-0.055***	0.062***	0.148	-0.004*	0.0009**	-0.059***
State-owned (X_{it})	-0.0502***	0.0761***	-0.459**	-0.00625	-0.00158	-0.0431***
Difference ($D.X_{it}$)	-0.00453	-0.0333	0.503***	0.0108	0.000704	-0.0328***
Private banks	-0.054***	0.043***	0.044**	0.004	-0.0008	-0.0759***

Note: The table reports the result for the regression equation 2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total assets of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. $D.X_{it}$ is used to examine the effect of bank-specific variables across different type of bank categories. D will take the value of zero if the bank is local, if the year is 2008 or 2009 (GFC period) or if the bank is state-owned. D will take a value of 1 if the bank is foreign, if the period is non-GFC period (i.e., 2004-2007 and 2010-2014) or if the bank is private.

5.3.2. China (Table 9)

Table 9 highlights how the impact of the bank-specific variables on profitability vary across local and foreign banks, the banks lay inside or outside the GFC and state-owned and privately owned banks in China. The results for the Chinese banks are more homogenous than is the case for Indian banks with the sign across almost all of the sub-samples being the same as we previously found for the whole sample. A consistent finding in our previous analysis is that there is a negative relationship between SIZE and its profitability. This finding continues to hold for all of our sub-samples with the exception of state-owned banks where our findings suggest that there is no relationship between SIZE and profitability.

Two other variables for which we have consistently found a negative relationship is NPLR and COST and this remains the case across almost all of our sub-samples. The one exception is the coefficient for NPLR for state-owned banks which is insignificant in contrast to it being strongly negative for private banks. Our analysis highlights that NPLR has a much larger negative impact on the profit of Chinese banks during the GFC than they did during the non-GFC period. There are no exceptions when it comes to the impact of COST on the profitability of Chinese banks with it being clearly negative for all sub-samples. This negative impact is fairly similar for local and foreign banks, and for state-owned and private banks but it is much larger during the non-GFC period as compared to what it is during the GFC years. It appears that banks focused on cost efficiencies when the profits were threatened during GFC.

Two variables which were previously found to have a negative impact on the profits of Chinese banks are the CAR and LDR and this again was largely maintained for our sub-samples. The one exception is the state-owned where our findings suggest that neither the CAR nor LDR

have a significant impact on their profitability. Indeed, it seems that the extent of the profitability of state-owned banks is immune to almost all of our bank-specific variables with COST being the only variable which has a significant (negative) coefficient. Finally, we have previously found that OFFBS had no impact on bank profitability in China and this finding holds for all of the sub-samples.

Table 9: Effect of bank-specific variables on ROA across different type of bank categories.

	NPLR	CAR	SIZE	LDR	OFFBS	COST
Local Banks (Xit)	-0.0513***	0.0142***	-0.0842***	0.00412***	0.000815	-0.0312***
Difference (D.Xit)	-0.0216	-0.00634	0.0222	-0.00204	-0.00187	0.000648
Foreign Banks	-0.073***	0.007***	-0.062***	0.002***	-0.001	-0.03***
During GFC (Xit)	-0.0978***	0.00965***	-0.104***	0.00351*	-0.00190	-0.0274***
Difference (D.Xit)	0.0519***	0.000895	0.0267	-0.000731	0.00299	-0.00537**
Non-GFC Period	-0.046***	0.010***	-0.077***	0.003*	0.0011	-0.033***
State-owned (Xit)	-0.0168	0.0189	-0.00640	0.000240	-0.00710	-0.0322***
Difference (D.Xit)	-0.0408*	-0.00878	-0.0850	0.00331	0.00791	0.000457
Private banks	-0.057***	0.010***	-0.091***	0.004***	0.0008	-0.032***

Note: The table reports the result for the regression equation 2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total assets of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. Interaction variables are used to examine the effect of bank-specific variables across different type of bank categories. D will take the value of zero if the bank is local, if the year is 2008 or 2009 (GFC period) or if the bank is state-owned. D will take a value of 1 if the bank is foreign, if the period is non-GFC period (i.e., 2004-2007 and 2010-2014) or if the bank is private.

6. Conclusion

This study investigates the effect bank-specific, industry-specific and macroeconomic variables have on the profitability of commercial banks in the two largest and emerging economies in Asia. Our sample comprises 217 commercial banks in India and China over the period 2004-2014.

Our findings with respect to bank-specific variables for India and China show a negative impact of NPLR on profitability suggesting that the banks with more conservative lending policy achieve superior performance in both countries. Similarly, our results show that the banks that maintain a high CAR are considered safe and are able to attract low cost deposits which make them more profitable compared to the banks with low capital. The importance of cost control is highlighted by the strong negative relationship between COST and bank profits. These findings are largely consistent with those of other studies although they do resolve some uncertainty with respect to whether a bank would benefit from pursuing a conservative or aggressive lending policy.

There is some variation in the findings for the bank-specific variables at the level of individual countries. Most notably is SIZE which has a somewhat expected positive impact on bank profitability in India but a somewhat surprising negative impact in China. However, the China finding is consistent with the findings of Tan (2016) who put it down to the managers of the smaller banks being better placed to concentrate on the more profitable opportunities.

The industry-specific and macroeconomic variables have slightly lesser impact than the bank-specific variables. In each country, there are state-owned and private banks. We find that the private banks in India perform better than state-owned banks but the relationship between ownership and bank profitability is insignificant in China. We observed a negative impact of FININC on the profits of Indian and Chinese banks. The only macroeconomic variable that has any impact in both countries is INF with the impact being the expected positive in China whereas it takes on a negative sign in India. A higher interest rate leads to greater profits for banks in China but higher economic growth has a less expected negative impact on bank profits.

Other questions of interest are do the explanatory variables impact differently for Indian and Chinese banks, local and foreign banks, banks during GFC and non-GFC period and state-owned and private banks? The answer to these questions will assist in determining whether these banks need to be treated differently, especially by regulators. Our results highlight that many of the bank-specific variables have a significant impact on the profitability of all type of banks, but that the direction of that impact that vary across the variables. For example, we find that large banks are more profitable in India but SIZE has a negative effect on the profitability of banks in China. Similarly, SIZE has a positive impact on the profitability of foreign banks while it has no effect on the profitability of local banks. Furthermore, SIZE has a positive impact on private banks but it is insignificant in case of state-owned banks.

We stressed at the beginning of the paper the importance of a well-performing banking sector to the development of emerging countries. In this paper we have identified a number of factors that are important in explaining variations in the profitability of banks across India and China. This provides insights into the foundation of a banking system best able to meet the funding needs of a developing economy. Further analysis could be undertaken to confirm the link between the variable identified and economic development.

Appendix A

Dependent and Explanatory Variables

Bank Profitability

We have selected return on assets (ROA) as a key measure of bank profitability which is defined as profit before tax as a percentage of total assets of the bank. ROA reflects the efficiency of banks in terms of generating income from their assets (Athanasoglou et al., 2008). ROA is the most widely used in the literature as a measure of profitability of the banks (Golin & Delhaise, 2013). For example, Mirzaei et al. (2013) used ROA as a measure of profitability in emerging and advanced markets. Similarly, Athanasoglou et al. (2008) and Dietrich and Wanzenried (2014) have also used ROA as a determinant of profitability in their studies. We have also used another profitability measure return on deposits (ROD) to check whether the results are consistent with ROA. Bashir (1999) has also used ROD as a profitability measure in his study.

Bank-specific Determinants of Profitability of Banks

Non-performing loan ratio (NPLR) (-): NPLR is measured as a ratio of non-performing loans to total loans expressed as a percentage. The criteria of classifying loans as non-performing loans vary across countries. In India and China, loans are classified as non-performing loans when they are overdue by 90 days. NPLR is widely used as a measure of credit quality and allocative efficiency in the existing literature. The prior research suggests that the banks with high level of non-performing loans have a poor quality loan portfolio. Athanasoglou et al. (2008) and Dietrich and Wanzenried (2014) used loan loss provisions over total loans as a proxy for allocative efficiency and found a significant negative effect on the profitability of the banks. Similarly, Bodla and Verma (2006) and Tan and Floros (2012b) found that NPLR had a negative effect on the profitability of the banks in India and China, respectively. Based on the extent literature research, we hypothesise that there will be a negative relationship between NPLR and bank performance.

Capital adequacy ratio (CAR) (+/-): The CAR is measured as the ratio of tier-1 and tier-2 capital to the risk-weighted assets expressed as a percentage. Basel accords require banks to maintain minimum CAR to assist them to absorb losses. It also protects the depositors and brings stability in the overall financial system of the country. Many researchers have found a relationship between capital ratio and bank profitability but the direction of this relationship is still uncertain. Athanasoglou et al. (2008) argue that banks with adequate capital are more

profitable than counterparts. Their findings suggest that high level of capital assists banks to absorb negative economic shocks. On the other hand, Dietrich and Wanzenried (2011) and García-Herrero et al. (2009) found a negative relationship between capital ratio and the profitability of the banks. Based on the mixed findings to date, we are unable to predict the direction of the relationship between CAR and bank profitability.

Total assets (SIZE) (+): Most of the previous studies have used total assets as a measure of bank size. Dietrich and Wanzenried (2011) suggest that the large banks benefit from the economies of scale and have more flexibility in diversifying their loan products but at the same time they are likely to have higher agency costs. Smirlock (1985) and Pasiouras and Kosmidou (2007) found a positive effect of SIZE on the profitability of the banks in USA and Europe, respectively. In contrast, Athanasoglou et al. (2008) and Tan and Floros (2012a) found that SIZE had a negative impact on the profitability of the banks in Greece and China, respectively. On the weight of numbers, previous research has found that SIZE has a positive effect on the profitability of the banks, therefore, we hypothesise that SIZE will have a positive impact on bank profitability.

Loan to deposit ratio (LDR) (+/-): LDR is measured as the ratio of total banks loans to total bank deposits expressed as a percentage. LDR has been used as a measure of bank liquidity in the existing literature. A bank with low LDR is highly liquid but may also possibly losing lending opportunities (Kosmidou, Pasiouras, Zopounidis, & Doumpos, 2006). Hence it is not surprising that the existing literature has mixed findings on the relationship between LDR and bank profitability. Pasiouras and Kosmidou (2007) and Molyneux and Thornton (1992) found a negative relationship between liquidity and profitability of the banks. On the other hand, Bourke (1989) and Kosmidou et al. (2006) argue that liquid banks are more profitable. Taking account of the existing literature, we are unable to predict the sign of the relationship between LDR and bank profitability.

Off-balance sheet items (OFFBS) (+/-): Off-balance sheet activities are measured as a ratio of off-balance sheet items to the total assets of the bank expressed as a percentage. Off-balance sheet items include contingent items such as guarantees, derivatives and commitments which are the sources to generate non-interest income. However, there are bank-specific and foreign exchange risks associated with off-balance sheet items (Aktan, Chan, Žiković, & Evrim-Mandaci, 2013). Casu and Girardone (2005) suggest that the off-balance sheet items may have a significant impact on the profitability of the banks due to risks associated with them. Demirgüç-Kunt and Huizinga (2010) reported a positive relationship between OFFBS and

bank profitability, however, Mirzaei et al. (2013) reported a negative relationship between OFFBS and bank profitability in the advanced markets. From existing literature it appears that there is a relationship between OFFBS and bank profitability but the direction of this relationship is uncertain. Based on mixed findings to date, we are unable to predict the sign of the relationship between OFFBS and bank profitability.

Cost to income ratio (COST) (-): We have measured operating efficiency by the ratio of operating costs to total income expressed as a percentage. It is almost certain from the existing literature that COST has a negative impact on the profitability of the banks. Bodla and Verma (2006), Athanasoglou et al. (2008), Mirzaei et al. (2013) and Dietrich and Wanzenried (2014) reported a negative effect of overheads on the performance of the banks. Based on these findings, we hypothesise that a high COST lowers the operating efficiency and have a negative effect on the bank profitability.

Industry-specific Determinants of Profitability of Banks

Bank Ownership (GOVT) (-): Our dataset consists of state-owned and private banks. We have used dummy variable for bank ownership, that is, one if the bank is owned by government and zero otherwise. Short (1979) suggests that ownership has a significant effect on the profitability of bank, however, others argue that ownership does not have any effect on the profitability (Bourke, 1989; Molyneux & Thornton, 1992). Micco, Panizza, and Yañez (2007) argue that state-owned banks are less profitable because of high operating costs. Iannotta, Nocera, and Sironi (2007) also suggest that state-owned banks are less profitable than private banks but they suggest that it is because of their poor credit quality. In line with the findings in the existing literature, we hypothesise that state-owned banks are less profitable than private banks.

Cash reserve requirements (CRR) (+/-): In order to prevent banks from adopting aggressive lending strategies, central banks in many countries have imposed the reserve requirement policy. The banks are required to maintain a minimum fraction of deposits as reserves. That portion of deposits cannot be lent out. Due to unavailability of actual data on mandatory reserves that banks are holding, we have used the minimum percentage of deposits required to be maintained by banks in India and China. Glocker and Towbin (2012) believe that an increase in the reserve requirement reduces the loan size of the banks which have potential to decrease the profitability of the banks. On the other hand, Olusanya, Oyebo, and Ohadebere (2012) argue that reserve requirement improves the quality of credit portfolio of the banks and it can have a positive impact their profitability. CRR is not used in previous empirical studies to determine

profitability, therefore, we are unable to predict the sign of the relationship between CRR and bank profitability.

Financial inclusion (+/-): Financial inclusion relates to the “proportion of individuals and firms that use financial services” (World Bank, 2014). In our study, we use number of branches per 100,000 adults as a measure of the financial inclusion. The access to financial services reduces the poverty level in the countries (World Bank, 2014), however, it can increase the default rates and can have an overall negative effect on the performance of the banks (Burgess, Wong, & Pande, 2005). Financial inclusion is not used in previous studies to explain profitability, therefore, we are unable to predict the sign of the relationship between FININC and bank profitability.

Macroeconomic Determinants of the Profitability of the Banks

Inflation (INF) (+): Inflation is measured as annual percentage change in the appropriate consumer price index. Perry (1992) suggests that if banks are successful to predict inflation rate, they can improve their profitability by keeping lending rates higher than deposit rates. Demirgüç-Kunt and Huizinga (1999) and Athanasoglou et al. (2008) found a positive effect of inflation on the profitability of the banks. One recent study by Tan (2016) also suggests that the inflation has a positive impact on the profitability of the banks in China. On the other hand, Mirzaei et al. (2013) concluded that the inflation has a negative impact on the profitability of the banks in emerging and advanced markets. On the weight of numbers, previous research has found a positive relationship between inflation and the profitability of the banks, therefore, we hypothesise that inflation will have a positive impact on bank profitability.

Interest rates (INT) (+): In our study, we use interest rate expressed as a percentage as a proxy for monetary policy. It is also referred to as the discount or cash rate in some countries. In our study, we have used the discount rate applicable in each country over the last quarter of each calendar year. It is a monetary policy tool that central banks use to either promote or reduce the level of economic activity in the country. When central banks increase the interest rate, the banks usually improve their spread through increasing lending rates by more percentage points than they do deposit rates (Demirgüç-Kunt & Huizinga, 1999; Maudos & De Guevara, 2004). Based on the results of Short (1979) and Demirgüç-Kunt & Huizinga (1999), we hypothesise that interest rates will have a positive impact on bank profitability.

GDP growth (GDP) (+): In our study, we have used annual growth rate of GDP expressed as a percentage. Cyclical trends can have a significant effect on the profitability of banks. For

example, during recessionary periods, businesses are unlikely to grow which may reduce the demand for loans. The reduced demand for loans has the potential to decrease the profitability of the banks. On the other hand, businesses are more likely to expand during boom which may increase the loan portfolio of the banks, therefore, bank profits are expected to increase. In line with previous research of Athanasoglou et al. (2008) and (Mirzaei et al. (2013)), we hypothesise that GDP growth will have a positive impact on bank profitability.

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