



# Two-Level Predictors of Profitability in Banking Sector: A Study of Indian Commercial Banks

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**Abstract:** This paper investigates bank-specific and industry-specific factors that determine the profitability of Indian banks. To explore the relationship random effect estimates on a data set of 63 banks from 2006 to 2020. Bank-specific factors include assets size, capitalization, asset quality, liquidity and operational efficiency and industry-specific factors include banking concentration and banking sector development. Based on panel data analysis random effect model is BLUE for the regression purpose. The study reveals that CAP and OE has a positive relationship with ROA while lnAS, AQ, LIQ, BC and BSD have negative relationship with ROA. Our paper highlights new facts for enhanced understanding of profitability in emerging economies like India.

**Keywords:** Bank-specific, Industry-specific, profitability, random effect model

## I. Introduction

India is one of the largest countries in South Asia region with a sound financial system characterized by a diversified portfolio of financial institutions (Ghosh, 2016). Currently, India is one of the fastest-growing economies in the world. There are many banks and financial institutions in India, and they perform different tasks in economic activities. Indian banking is receiving more attention recently because of a higher Gross Domestic Product (GDP) growth rate. There is no doubt that banks convert deposits into productive investments as a method to facilitate economic growth in any country (Tabash M., 2014). A reliable and efficient banking system has to achieve three goals: to give a considerable profit, to offer a high-quality service to customers, and to have sufficient funds to lend to borrowers. The growth of any economy largely depends on its banking sector. Hence, the importance of bank profitability in the economy can be determined at the micro and macro levels. At the micro level, profit is a determinant and required for any competitive banking institution. Every bank tries to earn and achieve good profits in order to be in the business especially at the time of growing competition in the financial markets. At the macro level, a profitable banking sector should be able to absorb external negative shocks and to achieve the stability of the financial system.

The study of profitability of the banking sector is of a great interest in the developed economies. However, in emerging economies like India, the number of studies that focus on profitability of commercial banks is not too many. In this context, the study of the profitability of commercial banks in India will be of greater interest for policymakers and finance scholars. This means the understanding of the determinants of bank profitability is essential and pivotal to the stability of the economy because the well-being of the banking sector is very critical to the welfare of the economy at large.

## II. Review of Literature

Extensive research worldwide has been conducted for examining the aspects that influence profitability of banks. Prior studies of a bank's profitability can be classified into three categories. First, studies examined from different countries around the world (Perera and Wickramanayake 2016). Second, studies are among different banks in the same region Chowdhury and Rasid (2017) who studied GCC countries, Petria, et al, (2015) who studied EU 27 countries, Menicucci and Paolucci (2016) who studied Europe, Finally, studies that have originated from single country. For example, Bougateg (2017) studied Tunisia, Tan (2016) studied China, and Almaqtari et al (2018) and Singh and Sharma (2016) studied India. ROA and ROE have been major part of prior studies have measured profitability.

However, bank's profitability was investigated by prior research as a function of both bank-specific (internal) and macroeconomic (external) determinants (Singh and Sharma, 2016). Bank related determinants are associated to result of managerial decisions of a bank (Rjoub et al., 2017). Bank specific variables such as capital adequacy ratio, asset quality ratio, liquidity ratio, operating efficiency ratio, deposits ratio and bank size are assessed by (Singh and Sharma 2016; Rani and Zergaw 2017; Rjoub et al. 2017).

On the other hand, macroeconomic factors are related to major economic environment that are out of bank's control and they do act as determinants for banks profitability (Ongore and Kusa, 2013). Furthermore, such determinants comprise variables such as GDP, inflation rate, interest rate and exchange rate Chowdhury and Rasid, 2017; Menicucci and Paolucci, 2016).

Amandeep (1983) studied several variables that affect the profitability with the help of regression analysis. The author had tried to define various factors that affect the dependent variable, i.e., profitability, also used trend analysis and ratio analysis for commercial banks in India. Mishra (1992) studied and evaluated the profitability of scheduled commercial banks considering the interest and non-interest income and interest expenditure, manpower expenses and other expenses. He observed liquidity ratio, cash reserve ratio, as compared to the income, advances and total investment than interest income has deteriorating profitability of Indian commercial banks

Although extensive research has been conducted on banks' profitability determinants in different countries, comprehensive empirical evidence from emerging and developing countries have either yielded ambiguous evidence or mixed results (Almaqtari et al, 2018). With regard to banks' profitability determinants studies in the Indian context, there are not too many studies that investigate this issue. Singh et al, (2016) have examined bank-specific and macroeconomic factors that determined the liquidity of Indian banks. Further,

Almaqtari et al., (2018) have found that bank size, assets management ratio has a significant impact on banks' profitability as measured by both ROE and ROA.

### III. Data and Methodology

The aim of this study is to explore bank-specific and macroeconomic factors influencing the liquidity of Indian banks. These variables include: assets, capitalization, asset quality, liquidity and operational efficiency, banking concentration and banking sector development (Bonfim & Kim, 2012; Bonner et al., 2013).

#### Data and sample

Our study considered balanced panel data of 63 commercial banks pertaining to the period 2006–2020. The banks include public banks, private banks and foreign banks operating in India, with 945 bank–year observations. Banks with incomplete or inconsistent data series were excluded. Data were taken from the various issues of Trend and Progress of Banking in India as documented in the data base of Reserve Bank of India (RBI).

#### Methodology

The present study analyzes balanced panel data of Indian commercial banks pertaining to the period 2006 to 2020. The f-test, BPLM test and Hausman test are applied to determine the better model fit for the analysis among OLS, fixed and random effect.

#### Model Specification

The specification of determinants of liquidity to be estimated has been formulated in the following equation:

$$ROA_{it} = \alpha_i + \beta_1 \text{LnAS}_{it} + \beta_2 \text{CAP}_{it} + \beta_3 \text{AQ}_{it} + \beta_4 \text{LIQ}_{it} + \beta_5 \text{OE}_{it} + \beta_6 \text{BC}_{it} + \beta_7 \text{BSD}_{it} + \varepsilon_{it}$$

Where  $i$  indicates an individual bank;  $t$  refers to year;  $\beta_1: \beta_7$  are the coefficients of determinant variables and  $\varepsilon$  is the error term.  $\alpha$ , is the intercept term on the explanatory variables. The description of variables is given in the table below:

Table 4.1: Variable Description

Variable	Acronym	Description	Expected Results
<b>Dependent</b>			
<b><i>Profitability Predictors</i></b>			
Return on Assets	ROA	Profit after tax to average assets	
<b>Independent</b>			
<b><i>Bank-Specific Variables</i></b>			
Assets Size	LnAS	Logarithm of total assets	+/-
Capitalization	CAP	Market share of bank	+

Asset Quality	AQ	Loss loan provisions to total assets	+
Liquidity	LIQ	Total advances to total assets	-
Operational Efficiency	OE	Total operating expenses to gross income	-
<b>Industry-Specific Variables</b>			
Banking Concentration	BC	Total assets of 5 largest banks to total assets of banks	-
Banking Sector Development	BSD	Assets of all banks to GDP	+/-

#### IV. Descriptive Analysis

Table 4.2 illustrates descriptive statistics for the variables used in this study. It provides details in the form of maximum, minimum, mean, median and the standard deviation for the dependent variable and its explanatory variables. Similarly, the results show the descriptive statistics for bank specific and macroeconomic variables for the period of 2006-2020. The results reveal that ROA has minimum value of -9.62 and maximum of 10.230. The results in Table 4.2 also indicate that there is a variation between the mean values and standard deviation of both bank-specific and industry-specific variables for the same period. Bank specific determinants have an average value of 4.366 for lnAS, CAP, AQ, LIQ, OE are 15.416, 0.866, 0.515 and 0.526 with standard deviation of 1.07, 15.729, 5.747, 0.158, 7.232 respectively.

Table 4.2: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
<b>ROA</b>	1.044	1.06	10.230	-9.62	1.596
<b>lnAS</b>	4.366	4.579	6.597	0	1.07
<b>CAP</b>	15.416	9.264	98.316	0	15.729
<b>AQ</b>	0.866	0.294	172.461	-3.295	5.747
<b>LIQ</b>	0.515	0.576	0.834	0	0.158
<b>OE</b>	0.526	0.223	222.407	0	7.232
<b>BC</b>	0.401	0.39	0.480	0.368	0.033
<b>BSD</b>	0.696	0.688	0.780	0.629	0.035

The variation between the mean values and the median values of all variables signifies that there is a considerable heterogeneity among the selected banks. From industry-specific context, BC has average value of 0.401 and 0.696 for BSD with standard deviation of 0.033 and 0.035 respectively.

#### Correlation Analysis

The table of correlation matrix explains correlation coefficients between dependent and independent variables with multi collinearity diagnostics. A high collinearity of independent variables is not acceptable. Moreover, if high correlation is found among variables, such variables are exempted and each of those is considered as an individual factor. Table 4.3 below shows that there is no multicollinearity between dependent and independent variables. The matrix depicts that CAP and OE has positive relationship with ROA while as lnAS, AQ, LIQ, BC and BSD have negative relationship with profitability. The results also show that the highest value of correlation exhibited between two variables is 0.675 which was found in case of lnAS and CAP. For more reliable analysis, multicollinearity diagnostics was conducted using VIF tests. The results in Table 4.3 indicates VIF has a maximum value of 2.202 and the lowest value of tolerance is 1.009 which indicate that there exist no multicollinearity problems among variables.

Table 4.3: Correlation Matrix

Variables	ROA	lnAS	CAP	AQ	LIQ	OE	BC	BSD	VIF
ROA	1.000								1.230
lnAS	-0.268	1.000							2.202
CAP	0.312	-0.675	1.000						1.908
AQ	-0.097	0.057	-0.051	1.000					1.010
LIQ	-0.251	0.503	-0.418	0.026	1.000				1.378
OE	0.036	0.007	0.019	-0.006	-0.063	1.000			1.009
BC	-0.256	0.114	-0.035	0.057	-0.024	0.049	1.000		1.059
BSD	-0.120	0.184	-0.017	-0.042	0.072	-0.008	0.187	1.000	1.092

### Regression Analysis (OLS or fixed or random effects model)

The OLS and fixed effect regressions both measure the relationship but the BLUE (Best Unbiased Linear Estimate) is chosen on the basis of F-test which is significant 19.93 at (0.000) thus rejecting OLS and considering fixed effect better model as shown in Table 4.3. Now, to chose between OLS and random effect Brush Pagan Lagrange Multiplier test was performed which is 727.93 at (0.000) as significant and again rejecting null (OLS) and considering random model better. After this Hausman test is done in order to determine between the fixed and random effect model which is insignificant 11.23 at (0.128) thus accepting null hypothesis that random effect model is better.

Table 4.3: Regression Analysis

ROA	Coef.	St. Err.	t-value	p-value	95% Conf	Interval	Sig
lnAS	-0.214	0.112	-1.91	0.056	-0.434	0.005	*
CAP	0.012	0.006	2.12	0.034	0.001	0.023	**
AQ	-0.019	0.007	-2.81	0.005	-0.033	-0.006	***
LIQ	-0.393	0.431	-0.91	0.362	-1.237	0.452	
OE	0.003	0.005	0.61	0.54	-0.007	0.014	
BC	-10.886	1.227	-8.87	0.00	-13.291	-8.48	***
BSD	-2.259	1.218	-1.85	0.064	-4.647	0.129	*
Constant	7.946	0.854	9.30	0.00	6.272	9.621	***
<b>Mean dependent var</b>		1.044					
<b>R-squared</b>		0.311					
<b>SD dependent var</b>		1.596					
<b>Number of observations</b>		945					



<b>F Test</b>	19.93 (0.000)
<b>BPLM Test</b>	727.93 (0.000)
<b>Hausman Test</b>	11.23 (0.128)
*** $p < .01$ , ** $p < .05$ , * $p < .1$	

Overall, the results reveal that the R square for ROA is 0.311 for random effect model which means that this model bank-specific and industry-specific contributes 31% to the profitability indicator of ROA. As illustrated in the random effect model in Table 4.3 for ROA, among bank-specific factors, only CAP and AQ ratio is found to have statistically significant impact on ROA as ( $p$  value=0.005). In industry-specific only BC has significant impact on ROA. The coefficient of AQ and BC is negative implying that they have negative significant impact with ROA while as CAP has positive impact with ROA.

Concerning lnAS, LIQ and OE have insignificant impact on ROA as depicted by the  $p$  values 0.056, 0.362 and 0.54 respectively. Further lnAS and LIQ has negative impact with ROA at the same time OE has a positive impact on profitability predictor. BSD form industry-specific variables is also statistically insignificant negative impact on ROA.

## V. Conclusion

The present paper investigated the impact of bank-specific and industry-specific predictors on banks' profitability. Banks' profitability as measured by ROA of 63 Indian commercial banks during a period from 2006 to 2020 was a function of both bank-specific and industry-specific predictors. Bank-specific variables have been considered as independent variables which comprised of variables namely; assets size, capitalization, asset quality, liquidity and operational efficiency. Similarly, industry-specific predictors represent the second category of independent variables which included banking concentration and banking sector development. The study reveals that capitalization and operational efficiency have positive relationship with ROA while assets size, asset quality, liquidity banking concentration and banking sector development have negative relationship with ROA.

Regulators and policymakers are recommended to consider the industry-specific factors in such a way that can enhance the profitability of the Indian commercial banks. Further, more focus is needed and required by bankers, bank managers, and other professionals on the bank-specific determinants for efficient utilizing of banks' resources in such a way that they can influence significantly and positively the Indian commercial banks' financial performance.

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