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DETERMINANTS OF PROFITABILITY OF COMMERCIAL BANKS IN INDIA DURING BASEL REGIME: A TIME SERIES AND CROSS-SECTIONAL ANALYSIS.

1. **Tushar Kanta sethy, Ph. D. Scholar, Department of Business Administration, Sambalpur Univeristy, Jyoti Vihar, Burla, Sambalpur Odisha, India, PIN-768019.**

2. **Prof. Padmabati Gahan, Professor, Department of Business Administration, Sambalpur Univeristy, Jyoti Vihar, Burla, Sambalpur Odisha, India, PIN-768019.**

ABSTRACT:

This paper aims to understand the emergence of Basel banking norms i.e. Basel I, Basel II, and Basel III. The primary purpose of developing this understanding is to study these norms in the Indian context and the modifications made by the Reserve Bank of India while adopting these Basel norms in India. The current study examines the determinants of profitability of Indian scheduled commercial banks during the Basel regime. The analysis is conducted over a period of 18 years in which the Indian banking sector has faced different challenges such as implementation of Basel I (2002), Basel II (2008), Basel III (2013) accord. The analysis is based on balanced panel data over a period ranging from 2002 to 2019 for 37 scheduled commercial banks of India. Profitability of Indian banks is measured by two proxies, namely, return on assets (ROA) and return on equity (ROE), whereas bank size, assets quality, capital adequacy, liquidity, operating efficiency, deposits, leverage, and assets management are used as bank-specific factors. Further, a set of macroeconomic determinants such as gross domestic product, inflation rate, export, import, interest rate, and three dummy variables (Basel I, Basel II, and Basel III) are used as independent variables.

Stationary test along with correlation matrix, pooled, fixed, random effect models and Hausman test are used in this study. The results revealed that bank size; assets management ratio, and operational efficiency, are the most important bank-specific determinants have positively and significantly affect the profitability of Indian

commercial banks as measured by ROA as well as ROE. However, leverage ratio and asset quality have significant and negative impact on ROA and ROE during the period of study. With regard to the macroeconomic determinants, the results revealed that the GDP, export, and interest rate are found to have a positive significant impact on ROA and ROE. However, inflation rate and Basel accords have significant and negative impact on ROA and ROE during the period of study.

1. INTRODUCTION:

A reliable and efficient banking system has to achieve five goals: to give a considerable profit, to offer a high-quality service to customers, to have sufficient funds to lend to borrowers, to maintain the stability, and to fulfil the entire regulatory requirement. The growth of any economy largely depends on its banking sector. Developing nation like India, the economy largely depends upon the banking sector performance. 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 recent Silicon valley bank (SVB) crisis in US had been given a lesion to policy makers as well as central bank authority over the world to take strong steps so that this type of crisis will not happen in future in any country. Though Indian policy makers have been demanding that there will be no impact of SVB collapse on Indian economy, but we could not denied such impact directly or indirectly on Indian economy.

There are many literature review have been carried out by many researchers in the area of bank profitability, bank failures, impact of financial crisis, impact of Basel accord on financial sectors etc. over the world. However, in developing economies like India, the number of studies that focus on profitability of banks is not that much, particularly during the Basel regime. In this context, the study of the profitability of commercial banks in India will be of greater interest for policymakers and finance scholars specifically during the Basel regime. 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. The objective of the study is to investigate the determinants of profitability of commercial banks in India during the Basel regime. The period of the study was considered from 2002 to 2019. The Basel I

accord was implemented in Indian banking sector in the year 2002 and the Basel III implementation started in the year 2013 which needs to be complete by 2019, but as on date there is some regulatory requirement of Basel III have not been completely implemented in India as per directives of reserve bank of India (RBI), the central bank authority in India.

1.1. INDIAN BANKING SECTOR AND BASEL ACCORDS

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). After the banking sector reform in 1991, the Indian banking sector has become a fast growing industry that has contributed to the growth of other major industries (Signh, SIdhu, Joshi, & Kansal, 2016). Currently, India is one of the fastest-growing economies in the world. The Indian banking sector comprises a large number of banks with mixed ownership types. There are 12 public-sector (PSB) banks in which government has majority ownership of over 51%, 21 private-sector (PVSB) banks and 43 foreign banks (FBOI), 56 regional rural, 1,574 urban cooperative, and 93,913 rural cooperative banks as of march 2020. The PSB banks constitute 73.7% share in the assets of the banking system, while private and foreign banks constitute only 19.5% and 6.7%, respectively. These commercial banks are regulated and monitored by the Reserve Bank of India (RBI). The regional rural banks, urban cooperative banks, and rural cooperative banks were excluded from Basel accord implementation in India as per directives from Reserve bank of India.

Born in 1974, after the turmoil in both the currency and the banking market caused by the bankruptcy of the German bank Bankhaus Herstatt and initially known as the Committee on Banking Regulations and Supervisory Practices, the Basel Committee originally involved the G10 central bank Governors. From its inception, the Basel Committee has significantly widened its membership, and its main goal is to reinforce the stability of the financial systems through the implementation of new banking supervision policies. The first relevant Basel Accord, now widely known as Basel I, took place in 1988, as a response to the crisis of sovereign debts experienced by various Latin American countries at the beginning of the 80's and becoming effective only 4 years later in 1992.

The major goal of Basel I was to develop a regulatory scheme tailored towards banks characterized by an international presence and such to reduce the credit risk to allow these banks to be solvent in the case of financial distress. More specifically, the framework introduced with Basel I imposed new capital standards, based on a risky weighted approach, where banks are required to hold a share of capital of at least 8% of their

risky assets, although national regulations were allowed to impose even stricter requirements. With Basel I, two major forms of regulatory capital were introduced, respectively denominated as TIER 1 (or core capital) and TIER 2. While the first involved instruments like common stocks, disclosed reserves and preference stocks, the second included a set of hybrid capital instruments, such as debt and equity, undisclosed reverses, and instruments with a maturity higher than 5 years. Although the framework developed in Basel I provided a new regulatory scheme aimed at reducing credit risk, its major drawback was represented by the lack of measures devoted to the regulation of market risk and, for this reason, the agreement, which was welcomed with scepticism and criticized (Dionne, 2013), went through various amendments in 1991, 1995 and 1996. The main elements of innovation were introduced with the amendment that took place in January 1996, which, for the first time, introduced a regulation of market risk and allowed the use of internal risk models, which relied on the application of the value-at-risk (VaR) model to evaluate the degree of market risk of capital standards.

With Basel II, established in 2004, the new regulatory framework was developed along three pillars, respectively represented by the maintenance of capital requirements, more active supervisory policies, and enhanced market discipline. While the 8% threshold was maintained, banks were provided with the choice between the standardized approach and the internal rating-based approach to calculate their capital requirements. These approaches differ in the way in which credit risk is calculated. More specifically, while the former requires credit risk to be calculated in a standardized way and supported by an external agency, in the latter banks can rely on internal ratings to evaluate their credit risk exposure, provided that the supervisory authority explicitly permits the application of this approach. Moreover, in the Internal Rating-based approach, banks must calculate various measures of credit risk, like the probability of default, loss given default, the exposure at default, the effective maturity, expected losses and unexpected losses.

To deal with the market risk, Basel II introduced the adoption of the VaR method, while for operational risk three different approaches were implemented, respectively known as the Basic Indicator, Standardized and the Advanced Measurement Approach. Specifically, in the Basic Indicator Approach, banks are required to hold a proportion of capital which is equal to the average of the positive annual gross incomes registered in the three previous years, multiplied by a fixed percentage. In the Standardized Approach, instead, eight different banks' business lines, respectively represented by corporate finance, trading and sales, retail banking, commercial banking, payment and settlement, agency services, asset management and retail brokerage, have been identified, and the share of capital is obtained by multiplying the gross income of each specific business line by a business-

specific factor. Finally, in the advanced measurement approach, which requires the approval of the relevant supervisory authority, the share of capital is computed as the three-year average of the regulatory quality charges registered by each business unit.

Supervisory policies were instead enhanced through the introduction of stress tests aimed at assessing the adequacy of capital standards. In this framework, while banks are required to evaluate and monitor their risky activities, supervisors must evaluate the adequacy of banking capital standards and can set additional requirements to specific banks, if they are not fully compliant with the minimum capital requirements.

The enhancement of market discipline was instead assumed to be achieved through the implementation of new disclosure requirements for banks, meant to reduce moral hazard (Freixas & Rochet, 2008) and to dampen the asymmetric information in the market, to provide it with more transparent information concerning the exposure to risk of financial institutions (Bank for International Settlements, 2006). The limits of the regulatory framework embedded in Basel II emerged with the advent of the 2007 financial crisis, which led to the introduction, in 2010, of Basel III, which was mostly designed to strengthen financial stability and resilience of the financial system to adverse economic shocks.

The Basel-I period was in vogue from 1988 to 2008. In India, there had not been full implementation of Basel-I. Some of the norms were implemented from 2000 and the incorporation of market risk amendment in 2002 to the Basel-I makes an end to the pre-Basel period in 2002. Therefore, 2003 is the beginning of Basel-I for the Indian banking sector. The RBI issued Basel-II guidelines in 2008 for implementation in 2009. Hence, 2009 marks the inception of Basel-II era in the India's banking sector which ends in April 2013. The RBI decided to implement the Basel III capital regulation India from April, 2013 in phases and full implementation will be completed till March 31, 2018 but extended till March 31, 2019.The Indian banking system faces the challenge of complying with the stringent requirements of Basel III framework, while at the same time maintaining growth and profitability.

This paper is organized as follows: section 2 provides the literature review; Section 3 Variable selection; Section 4 data and methodology of the study. Section 5 data analysis and results; Section 6 concludes the paper and gives suggestions and recommendations.

2. LITERATURE REVIEW

Bank's profitability has been extensively investigated in different countries around the world. AL-Omar and AL-Mutairi (2008), Bougatef (2017), Dietrich and Wanzenried (2014), Francis (2013), Marijana, Poposki, and Pepur (2012), Menicucci and Paolucci (2016), Naeem, Baloch, and Khan (2017), Ongore and Kusa (2013), Pasiouras and Kosmidou (2007), and Petria, Capraru, and Ihnatov (2015) have investigated the determinants and factors affecting bank's profitability in different countries and from different regions. Similarly, Garcia and Guerreiro (2016) and Saona (2016) have focused their research on internal and external factors affecting bank's profitability. Further, Anbar and Alper (2011), Athanasoglou,Brissimis, and Delis (2008), Louzis, Vouldis, and Metaxas (2012), Masood and Ashraf (2012), Rani and Zergaw (2017), Rjoub, Civcir, and Resatoglu (2017), A. Singh and Sharma (2016), and Zampara, Giannopoulos, and Koufopoulos (2017) have examined bank-specific and macroeconomic factors affecting bank's profitability. These studies used ROA, ROE, or both as measurements and proxies of banks profitability (e.g., Chowdhury & Rasid, 2017; Jara-Bertin, Moya, & Perales, 2014; Menicucci & Paolucci, 2016; Naeem et al., 2017; Pathneja, 2016; A. Singh & Sharma, 2016; Tiberiu, 2015; Zampara et al., 2017). Banks profitability investigated by these studies is commonly explained by both internal and external determinants. The internal determinants are sometimes called microeconomic determinants (Louzis et al., 2012; Rjoub et al., 2017; Saona, 2016; A. Singh & Sharma, 2016) that are specific to each bank and that, in many cases, are the direct result of managerial decisions. These determinants have basically revealed the policy of provisioning, liquidity levels, operational efficiency, bank size, capital adequacy, and expenses management (Menicucci & Paolucci, 2016). In majority of prior studies, variables such as capital adequacy, liquidity, deposits, asset quality, operating efficiency, and bank size are used as a function of internal determinants and micro or bank-specific factors of banking profitability (e.g., Bougatef, 2017; Chowdhury & Rasid, 2017; Garcia & Guerreiro, 2016; Menicucci & Paolucci, 2016; Naeem et al., 2017; Pathneja, 2016; Petria et al., 2015; Rani & Zergaw, 2017; Rashid & Jabeen, 2016; Rjoub et al., 2017; Salike & Ao, 2017; A. Singh & Sharma, 2016; Tiberiu, 2015; Zampara et al., 2017).

External factors are called macroeconomic determinants (Athanasoglou et al., 2008; Louzis et al., 2012; Masood & Ashraf, 2012; Rani & Zergaw, 2017; Rjoub et al., 2017; A. Singh & Sharma, 2016). These are the factors that reflect economic, industry, and legal environment that are out of the control of bank's management (Ongore & Kusa, 2013). Factors such as inflation rate, gross domestic product (GDP), exchange, and interest

rate are some external determinants of banks profitability that are considered by previous studies (Acaravci & Çalim, 2013; Chowdhury & Rasid, 2017; Francis, 2013; Jara-Bertin et al., 2014; Marijana et al., 2012; Masood & Ashraf, 2012; Menicucci & Paolucci, 2016; Ongore & Kusa, 2013; Pasiouras & Kosmidou, 2007; Saona, 2016).

Different studies are conducted and focused their investigation on single or several countries. For example, some evidence drawn from these studies were focused on countries including Europe (Menicucci & Paolucci, 2016;Pasiouras & Kosmidou, 2007; Petria et al., 2015), Gulf

Cooperation Council (GCC) countries (AL-Omar & ALMutairi,2008; Chowdhury & Rasid, 2017), South Asian,East Asian, Middle East and African countries (Masood& Ashraf, 2012), Latin American, Argentina, Brazil, Chile,Colombia, Mexico, Paraguay, Peru, and Venezuela (Jara-Bertin et al., 2014), Greek (Athanasoglou et al., 2008),Chile, Colombia, El Salvador, Honduras, Mexico and Paraguay(Tiberiu, 2015), Pakistan (Rashid & Jabeen, 2016), 12 Asian economies (Salike & Ao, 2017), Tunisia(Bougatef, 2017), Portugal (Garcia & Guerreiro, 2016),and Macedonia (Marijana et al., 2012).

There is a large body of literature outlining the benefits that are implied by increased capital standards (Admati et al., 2011; Berger & Bouwman, 2011) as well as the costs of such standards (Cosimano & Hakura, 2011; Elliott, 2009; Kashyap et al., 2010). Basel II and III Accords have been examined several times, but no unanimity can be found regarding their effects on bank risk taking. Hakenes and Schnabel (2015), analyse the impact of Basel II Accord on the nexus between bank size and risk taking within a theoretical framework. They found that one of the effects of Basel II Accord was to provide large banks with a competitive advantage in the market and that the increased competition led small banks to undertake risky projects which, in turn, may determine an increase in the aggregate risk-taking. Di Biase (2012) evaluates the impact of increasing minimum capital requirements on the Italian banking industry and found that increased capital standards boost a bank's ROE when lending rates rise. Onali (2014) investigates the relationship between risk-taking and dividend pay-out ratios in relation to capital adequacy and found that bank risk-taking and pay-out ratios are positively correlated, though this impact is mitigated by higher capital adequacy, with the implication that the capital requirements set in Basel III might reduce the likelihood of risk-shifting.

A particular concern has been that direct regulation and supervision of banks' activities inhibits bank performance (Barth et al., 2004) and can negatively affect bank loan supply, which is a major source of interest income (Chiuri et al., 2002), while according to Mitchener (2007), regulation can negatively impact the stability

of the financial system and lead to higher suspension rates. Pasiouras et al. (2009) found that banks are more cost and profit efficient when their regulations increase market discipline and strengthen the authority's supervision power. Bordeleau et al. (2009) analyse the effect of regulatory constraints on profitability of US and Canadian banks over the 1997–2009 period, finding favourable evidence of a non-linear relationship. Banks with liquid assets are able to increase their profitability, but beyond a certain point, holding more liquid assets decreases a bank's profitability, all other factors being equal (Bordeleau et al., 2009). Wambu (2013) empirically examined whether profitability of Kenyan commercial banks is affected by liquid capital levels across 44 commercial banks from 2008 to 2012 and found that commercial banks' profitability and liquidity are positively correlated. On the other hand, Texteira et al. (2020), using data from OECD banks operating between 2004 and 2015, found a negative correlation between stricter regulations and profitability. In academic literature about Basel Accords and specifically Basel II, attention is also drawn to the relevant regulatory regimes for assessing both credit and operational risk: the advanced internal ratings-based (IRB) approach to credit risk, which can reflect more precisely the banks' assessments of portfolio risk. Repullo and Suarez (2004) analyse Basel's effects on lending pricing within a theoretical model of perfectly competitive market for loans, focusing on banks' choice between internal ratings based (IRB) approach to credit risk and less risk-sensitive standardized approach of Basel II. They discovered that low risk businesses benefit from lower loan rates from banks that use an IRB rating, whereas high-risk businesses benefit from lower lending rates from banks that use the standardized method. Ruthenberg and Landskroner (2008) focus on the same problem. Their empirical analysis distinguishes between corporate and retail clients. They find that high-quality customers borrow from large banks (mostly adopting the IRB rating), whereas low-quality customers choose small banks (adopting the standardized approach), obtaining more favourable loan rates.

Berger (2006) investigates the impact of the planned split application of Basel II risk-based capital standard on banks in the US loan market for small and medium businesses (SMEs). He noted that the introduction of Basel II might possibly harm the competitive position of banks that do not apply IRB. Internal ratings-based approaches may result in reduced minimum regulatory capital requirements, cutting businesses' marginal costs. Gavalas (2015) examines the effects of Basel III regulation on banks performance using data for some EU countries, showing that capital requirements increase banks' marginal costs which, in turn, determine an increase in lending rates. Furthermore, the paper discovers evidence of a negative link between the Basel accord and overall loan volume. Kim and Sohn (2017), using data from US insured commercial banks, analyse the

effects of liquidity on the link between bank capital requirements and bank lending. They show that the link between capital needs and loan growth is highly dependent on liquidity. More precisely, such requirements represent a beneficial policy only for large banks, provided that they have a sufficient amount of liquid assets. Roulet (2018) examines the implications of capital requirements imposed by the Basel III Accord after the 2008 recession using data from a group of commercial banks from 22 countries over the period 2008–2015. Evidence demonstrates that capital regulations, particularly for large banks, have a negative influence on lending growth, but liquidity indicators have a positive but perverse effect on the variable of interest. Naceur et al. (2018) examine the influence of Basel III on bank lending growth. They show that new regulatory rules have a positive but paradoxical influence on bank lending growth, highlighting the need of taking diverse institutions' features into account when implementing new regulations

Although the prior literature is attempted to do analyses on profitability of banks and implementation and implication of Basel accords, yielding mixed results or ambiguous evidence. However, there is no evidence of bank-specific and macroeconomic factors that determine the profitability of Indian schedule commercial banks during the Basel regime. Very few evidence focus on the Indian context such as A. Singh and Sharma (2016) that investigated bank-specific and macroeconomic factors that determined the liquidity of Indian banks. They suggested that bank-specific and macroeconomic factors such as bank size, deposits, profitability, capital adequacy, GDP, and Inflation significantly affects bank liquidity. Further, they found that bank size and GDP have a negative effect on bank liquidity. On the other hand, deposits, profitability, capital adequacy, and inflation showed a positive effect on bank liquidity during the Basel regime.

Accordingly, the present study aims to evaluate the determinants of profitability of Indian scheduled commercial banks during the Basel regime. Specifically, it empirically examines both bank-specific and macroeconomic factors that affect the banks' profitability as measured by ROA and ROE of Indian scheduled commercial banks during the Basel regime. This study bridges a gap in financial performance and profitability literature in India during the Basel regime. Furthermore, the current study extends and contributes to prior studies on profitability of banks and implementation and implication of Basel accords of different countries, it employs panel data of 37 Indian commercial banks over a period ranging from 2002 to 2019 and using different bank-specific and macroeconomic variables.

3. VARIABLES SELECTION

Two common measures were used by prior studies to measure the profitability of banks which are ROA and ROE (e.g. Athanasoglou et al., 2008; Garcia & Guerreiro, 2016; Naeem et al., 2017; Pathneja, 2016; Singh & Sharma, 2016; Tabash, 2018; Tiberiu, 2015; Zampara et al., 2017); this study uses ROA and ROE as proxies of banks' profitability. Two categories of explanatory variables were used in this study. Bank-specific (independent) variables were considered as internal factors, which include bank size, assets quality, capital adequacy, liquidity, operating efficiency, deposits, leverage, and assets management. Another category of explanatory variables is macroeconomic (external) determinants of profitability, which includes GDP, inflation rate, export, import, interest rate, and Basel. Explanation of both categories of independent variables is presented in the table no.1.

Table No. 1: Definitions of profitability Variables.

Variables	Acronym	Measure	Expected effect
Dependent Variables Profitability	ROA	Net Profit / Total Assets	
	ROE	Net Profit / Total Equity	
Independent Variables: Bank-Specific			
Asset Size	LNTA	Natural logarithm of total assets	+/-
Capital Adequacy	CAD	Equity/Total Assets	+
Asset Quality	AQ	Net Non-performing Assets / Net Advances	-
Deposit	DEPTA	Deposit/Total Assets	+/-
Operating Efficiency	OPRTA	Operating profit/ Total Assets	+
Asset Management	NIIM	Net Interest income/Total Assets	+
Financial Risk	LEV	Total Liabilities/Total Assets	+/-

Independent Variables: Macroeconomic			
Economic Activity	GDP	Annual real GDP growth rate	+/-
Inflation	INF	Annual inflation rate	+/-
Export	EXP	Export of goods and services as percentage of GDP	+/-
Import	IMP	Import of goods and services as percentage of GDP	+/-
Interest rate	INTR	Lending interest rate	+/-
Basel Accord	BASEL I	Basel I is a dummy variable of 1 for the years 2002-2008 and 0 otherwise	+/-
	BASEL II	Basel II is a dummy variable of 1 for the years 2008-2013 and 0 otherwise	+/-
	BASEL III	Basel II is a dummy variable of 1 for the years 2013-2019 and 0 otherwise	+/-

4. DATA AND METHODOLOGY

In this section, data sources and sample selection are provided. Then, the methodology and used models are discussed.

4.1. Data collection and Sample size

The dataset for the bank-specific variables used for this study is fetched from RBI database, which provides all information regarding all banks working in India. Thus, it is considered the most common and authenticated database for banking system information for India. The sample of this study is based on panel data that consists of 37 commercial banks with 666 observations for a period of 18 years from 2002 to 2019. 12 public sector banks (after merger and acquisition), 18 private sector banks, 7 foreign banks were considered for this study. Importantly, the study covered all public-sector banks that include both Nationalized and State Bank of India and its Associates, which accounts for about 70% of the banking system assets. The criteria for selection of these banks are based on the availability of data for the period covered by this study. Further, the current study

considers only the commercial banks whereas regional rural banks and urban rural cooperative banks were excluded. Macroeconomic data were collected from IMF and World Bank database; the reliable and authentic sources of data.

4.2. Model Specification and Econometric tools

Prior studies of banks' profitability either used a linear regression models (pooled, fixed, or/and random effect models;e.g., AL-Omar & AL-Mutairi, 2008; Pathneja, 2016; Rjoub et al., 2017; Salike & Ao, 2017; Tiberiu, 2015) or both generalized moments method (GMM) and linear regression models (e.g., Athanasoglou et al., 2008; Bougatef, 2017; Chowdhury & Rasid, 2017; Dietrich & Wanzenried, 2014; Louzis et al., 2012; Masood & Ashraf, 2012; Rashid & Jabeen, 2016; Saona, 2016; Tiberiu, 2015). The advantages of adopting panel data analysis are confirmed by researchers. The first advantage is its efficiency of econometric estimates over pure cross-sectional or pure time-series data analysis techniques (Baltagi, 2005; Hsiao, 2003). The second one is its ability to control for individual heterogeneity and multicollinearity (Kyereboah-Coleman, 2007). Panel data of 18 years for 37 Indian commercial banks is used to analyse the impact of bank-specific and macroeconomic factors on bank's profitability. Following Anbar and Alper (2011), Brooks (2014), Chowdhury and Rasid (2017), and Masood and Ashraf (2012), the essential structure and context of the panel data is defined as per the following regression model:

$$Y_{it} = \alpha + \beta x_{it} + u_{it} \qquad \text{…….. (1)}$$

Where Y_{it} denotes the dependent variable (Profitability), α is the intercept term on the explanatory variables, β is a k x 1 vector of parameter to be estimated, and vector of observations is x_{it} , which is 1 x k, t=1….., T; i=1,…., N. The practical and operational form, the aforementioned model can be expressed as follows:

Profitability = *f* (Bank-specific variables; Macroeconomic variables) …… (2)

Profitability is measured by ROA and ROE. Bank-specific variables include asset size, capital adequacy, assets quality, liquidity, deposits, assets management, operational efficiency, and leverages. Macroeconomic variables include GDP, inflation, export, import, interest rate, and Basel accord. Expanding the proxies used in Model 2, two models have been developed to investigate the factors that may determine banks' profitability in India during the Basel regime. The models hypothesize that the banks' profitability in India depends on internal factors (bank-specifics) and external factors (macroeconomic) that are as follows:

$$\begin{aligned} ROA_{it} = \alpha_{it} + \beta_1 AQ_{it} + \beta_2 CA_{it} + \beta_3 DEPTA_{it} + \beta_4 NIIM_{it} \\ + \beta_5 LEV_{it} + \beta_6 OPRTA_{it} + \beta_7 LNTA_{it} + \beta_8 GDP_{it} \\ + \beta_9 INF_{it} + \beta_{10} EXP_{it} + \beta_{11} IMP_{it} + \beta_{12} INTR_{it} \end{aligned}$$

$$+\beta_{13}BASEL\ I_{it} + \beta_{14}BASEL\ II_{it} + \beta_{15}BASEL\ III_{it} + u_{it} \quad \ldots\ldots\ldots (3)$$

$$ROE_{it} = \alpha_{it} + \beta_1 AQ_{it} + \beta_2 CA_{it} + \beta_3 DEPTA_{it} + \beta_4 NIIM_{it} + \beta_5 LEV_{it} + \beta_6 OPRTA_{it} + \beta_7 LNTA_{it} + \beta_8 GDP_{it} + \beta_9 INF_{it} + \beta_{10} EXP_{it} + \beta_{11} IMP_{it} + \beta_{12} INTR_{it} + \beta_{13} BASEL\ I_{it} + \beta_{14} BASEL\ II_{it} + \beta_{15} BASEL\ III_{it} + u_{it} \quad \ldots\ldots\ldots\ldots (4)$$

where '*i*' refers to an individual bank; '*t*' refers to year; β_1: β_{15} are the coefficients of determinant variables and $\mathbf{u_{it}}$ is the error term; and all other variables are as defined in Table 1.

Both models are estimated through pooled, random, and fixed effect regression. Further, the Hausman test is applied to determine whether to select fixed effect model or random effect model. Pasiouras and Kosmidou (2007) indicated that if the value obtained by the Hausman test is larger than the critical chi-square $\chi 2\ 0.5,10 = 9.341$ or $\chi 2\ 0.005,10 = 25.182$, then the fixed effects estimator is the appropriate choice.

5. DATA ANALYSIS AND RESULTS

5.1. Descriptive statistics:

Table 2: Descriptive Statistics

Variables	Obs.	Maximum	Minimum	Mean	Median	Std. Dev.
Panel A: dependent variables						
ROA	666	4.00	-7.92	0.79	0.90	1.09
ROE	666	28.14	-63.79	8.86	11.97	13.26
Panel B: bank specific determinants						
AQ	666	15.33	0.07	2.13	1.43	2.22
CAD	666	105.81	1.12	14.51	13.07	8.48
DEPTA	666	92.57	20.85	78.89	84.04	12.60
NIIM	666	6.40	-1.23	2.93	2.86	0.87
LEV	666	5.86	-5.44	0.76	0.79	0.86
OPRTA	666	8.26	-3.58	2.17	2.05	1.08
LNTA	666	7.54	2.48	5.75	5.88	0.85
Panel C: macroeconomic determinants						
GDP	666	23.83	7.21	13.77	13.38	3.88
INF	666	11.99	3.33	6.59	6.08	2.47
EXP	666	17.74	10.91	14.02	13.88	2.13
IMP	666	28.98	14.15	20.67	20.12	4.28
INTR	666	13.31	8.33	10.55	10.27	1.39
BASEL I	666	1.00	0.00	0.30	0.00	0.46
BASEL II	666	1.00	0.00	0.30	0.00	0.46
BASEL III	666	1.00	0.00	0.40	0.00	0.49

Sources: Author's Calculation

5.2. Unit root Test

As a prerequisite requirement and the starting point for the econometric analysis of the models of the study, stationarity of the panel data using a unit root test is conducted. Stationarity of the variables is tested by Levin, Lin, and Chu, Im, Pesaran, and Shin, Augmented Dickey–Fuller, and PP–Fisher tests. As shown in Table 3, all variables used in the models are found to be stationary at the first difference in all the applied tests. This leads to reject the null hypothesis of a unit root.

Table 3 Unit root test

	Level				1st difference			
Variables	ADF - Fisher Chi-square	Im, Pesaran and Shin W-stat	Levin, Lin, & Chu t	PP-Fisher Chi-Square	ADF - Fisher Chi-square	Im, Pesaran and Shin W-stat	Levin, Lin, & Chu t	PP-Fisher Chi-Square
P:anel A: dependent variables								
ROA	0.110	0.247	0.337	0.000	0.000	0.000	0.000	0.000
ROE	0.121	0.181	0.253	0.000	0.000	0.000	0.000	0.000
Panel B: bank specific determinants								
AQ	0.143	0.052	0.038	0.002	0.000	0.000	0.000	0.000
CAD	0.732	0.666	0.854	0.037	0.000	0.000	0.000	0.000
DEPTA	0.033	0.016	0.113	0.000	0.000	0.000	0.000	0.000
NIIM	0.499	0.193	0.017	0.240	0.000	0.000	0.000	0.000
LEV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OPRTA	0.128	0.040	0.014	0.000	0.000	0.000	0.000	0.000
LNTA	0.999	0.956	0.000	0.994	0.000	0.000	0.000	0.000
Panel C: macroeconomic determinants								
GDP	0.501	0.048	0.007	0.000	0.000	0.000	0.000	0.000
INF	0.984	0.552	0.742	0.707	0.000	0.000	0.000	0.000
EXP	1.000	0.969	1.000	0.935	0.000	0.000	0.000	0.000
IMP	0.827	0.191	0.292	0.094	0.000	0.000	0.000	0.000
INTR	0.633	0.084	0.000	0.438	0.000	0.000	0.000	0.000

Sources: Author's calculation

5.3 Pearson correlation

Table 4 shows the correlation matrix and diagnostics of multicollinearity for the above used variables in the study. The results depict that there is a positive and negative relationship between dependent and independent

variables. With regard to bank-specific variables, there is a positive/negative correlation between bank-specific variables and both ROA and ROE.

All independent variables have a low correlation that indicates the absence of multicollinearity issues in this study. For more reliable analysis, Variance Inflation Factor (VIF) test is conducted to test multicollinearity issues. According to Gujarati (2016), if VIF is more than 10 then, multicollinearity may be assumed. As it is shown in Panel B of Table 4, VIF values do not exceed 6.41 for all variables it indicate that there is no multicollinearity between independent variables.

Table 4: Correlation Matrix

	AQ	CAD	DEPTA	LEV	LNTA	NIIM	OPRTA	GDP	EXP	IMP	INF	INTR	ROA	ROE	BASEL I	BASEL II	BASEL III
Panel A: Pearson Correlation																	
AQ	1.00																
CAD	-0.17	1.00															
DEPTA	0.27	-0.26	1.00														
LEV	0.06	-0.34	0.20	1.00													
LNTA	0.12	-0.41	0.11	0.18	1.00												
NIIM	-0.40	0.02	-0.27	0.22	0.05	1.00											
OPRTA	-0.37	0.29	-0.38	-0.62	-0.10	0.63	1.00										
GDP	-0.29	0.00	-0.05	0.01	-0.03	-0.01	-0.01	1.00									
EXP	-0.28	-0.05	-0.09	-0.07	0.06	-0.10	-0.03	0.44	1.00								
IMP	-0.25	-0.03	-0.10	-0.08	0.11	-0.11	-0.03	0.37	0.95	1.00							
INF	-0.37	0.04	-0.06	-0.07	-0.03	-0.04	0.02	0.43	0.65	0.72	1.00						
INTR	-0.29	0.00	0.03	0.03	-0.21	0.09	0.05	0.22	0.10	-0.03	0.14	1.00					
ROA	-0.62	0.21	-0.19	-0.43	-0.04	0.54	0.78	0.17	0.14	0.10	0.16	0.19	1.00				
ROE	-0.73	0.12	-0.09	-0.28	0.02	0.40	0.55	0.22	0.21	0.17	0.28	0.30	0.84	1.00			
BASEL I	-0.13	0.02	0.10	0.11	-0.29	0.16	0.04	-0.09	-0.36	-0.53	-0.30	0.52	0.10	0.16	1.00		
BASEL II	-0.30	0.03	-0.07	-0.09	-0.01	-0.05	0.03	0.54	0.53	0.59	0.89	0.12	0.16	0.24	-0.43	1.00	
BASEL III	0.40	-0.05	-0.03	-0.02	0.27	-0.10	-0.06	-0.42	-0.16	-0.06	-0.55	-0.60	-0.24	-0.38	-0.53	-0.53	1.00
Panel B: diagnostics of Multicollinearity																	
VIF	1.17	1.19	1.20	1.19	1.30	2.11	2.16	1.71	6.41	4.31	1.94	1.94			4.14	2.09	2.35

Sources: Author's calculation

5.4. Breusch-Godfrey Serial Correlation LM Test:

The presence of autocorrelation is checked by using LM test applied on result of pooled regression model represented by equation (3) and (4) and found the p value of observed R-square is 0.162 and 0.144 respectively, which is more than 0.05 not rejecting the null hypothesis of no serial autocorrelation and confirmed the absence of autocorrelation in the error terms in the model.

5.5. White's heteroskedasticity:

The status of heteroskedasticity is tested by using White's heteroskedasticity applied on result of pooled regression model represented by equation (3) and (4) and found that the p value of observed R square is 0.089 and 0.076 respectively retaining the null hypothesis of homoskedasticity.

Table 5: Model estimation results summary

ROA	Pooled				Fixed Effect Model				Random Effect Model			
Variable	**Coeff.**	**Sd.Er.**	**t**	**Prob.**	**Coeff.**	**Sd.Er.**	**t**	**Prob.**	**Coeff.**	**Sd.Er.**	**t**	**Prob.**
C	0.27	0.09	2.84	0.00	0.45	0.13	3.64	0.00	0.28	0.14	11.85	0.00
Bank-specific determinants												
AQ	-0.17	0.02	-8.27	0.00	-0.16	0.02	-7.74	0.00	-0.17	0.03	-9.17	0.00
CAD	0.01	0.01	1.18	0.14	0.02	0.02	1.13	0.26	0.01	0.02	2.00	0.16
DEPTA	0.03	0.01	3.95	0.00	0.03	0.01	3.75	0.00	0.04	0.01	3.89	0.00
NIIM	0.08	0.05	1.97	0.00	0.07	0.08	6.90	0.00	0.05	0.05	9.15	0.00
LEV	-0.63	0.05	-13.86	0.00	-0.63	0.07	-6.11	0.00	-0.71	0.06	-8.15	0.00
OPRTA	0.02	0.03	5.14	0.00	0.07	0.10	4.03	0.00	0.05	0.04	4.24	0.00
LNTA	0.29	0.21	8.66	0.00	0.33	0.32	6.70	0.00	0.02	0.38	9.04	0.00
Bank-specific determinants												
GDP	0.03	0.01	12.64	0.00	0.02	0.01	12.49	0.00	0.02	0.01	8.71	0.00
INF	-0.07	0.02	-0.19	0.86	-0.03	0.04	-0.23	0.93	-0.04	0.04	-0.11	0.92
EXP	0.06	0.04	4.94	0.00	0.05	0.08	4.76	0.00	0.03	0.07	4.45	0.00
IMP	-0.01	0.02	-4.95	0.00	-0.01	0.02	-3.46	0.00	0.01	0.04	-3.32	0.00
INTR	0.04	0.03	7.43	0.00	0.03	0.03	6.20	0.00	0.04	0.04	6.91	0.00
BASEL I	-0.18	0.13	-5.80	0.00	-0.11	0.13	-4.80	0.00	-0.11	0.21	-4.53	0.00
BASEL II	-0.13	0.24	-6.43	0.00	-0.15	0.19	-3.79	0.00	-0.17	0.28	-7.24	0.00
BASEL III	-0.11	0.19	-4.38	0.00	-0.18	0.21	-8.40	0.00	-0.14	0.17	-8.60	0.00
Adjusted R	0.36				0.38				0.35			
F-statistic	25.61				22.67				23.19			
Prob (F-statistic)	0.00				0.00				0.00			
Hausman test					0.000							

Table 6: Model estimation results summary

ROE	Pooled				Fixed Effect Model				Random Effect Model			
Variable	**Coeff.**	**Sd.Er.**	**t**	**Prob.**	**Coeff.**	**Sd.Er.**	**t**	**Prob.**	**Coeff.**	**Sd.Er.**	**t**	**Prob.**
C	2.56	1.20	8.63	0.00	2.51	1.84	8.90	0.00	2.27	1.29	8.60	0.00
Bank-specific determinants												
AQ	-2.72	0.28	-11.66	0.00	-2.39	0.29	-11.20	0.00	-2.45	0.29	-11.48	0.00
CAD	0.17	0.10	3.18	0.27	0.14	0.10	1.36	0.18	0.11	0.10	1.16	0.25
DEPTA	0.18	0.11	1.80	0.07	0.20	0.11	1.79	0.08	0.20	0.11	1.79	0.08
NIIM	0.77	0.57	9.35	0.00	1.45	9.99	1.47	0.00	0.77	0.58	10.32	0.00
LEV	0.38	0.70	10.65	0.00	0.65	0.87	8.50	0.00	0.38	0.72	7.49	0.00
OPRTA	0.27	0.48	10.56	0.00	0.51	0.95	8.53	0.00	0.27	0.49	8.55	0.00
LNTA	0.38	3.81	1.74	0.00	3.72	3.94	1.86	0.00	3.38	3.90	1.89	0.00
Bank-specific determinants												
GDP	0.12	0.08	11.57	0.00	0.13	0.08	11.81	0.00	0.12	0.08	11.77	0.00
INF	0.08	0.27	0.29	0.77	0.06	0.27	0.22	0.82	0.08	0.27	0.29	0.77
EXP	0.66	0.55	8.20	0.00	0.67	0.56	8.20	0.00	0.66	0.56	8.17	0.00
IMP	-0.30	0.30	-1.01	0.00	-0.31	0.30	-1.02	0.00	-0.30	0.30	-0.99	0.00
INTR	0.41	0.33	1.24	0.00	0.36	0.34	1.05	0.00	0.41	0.34	1.22	0.00
BASEL I	-0.11	0.13	-8.40	0.00	-0.19	0.13	-8.80	0.00	-0.14	0.21	-6.73	0.00
BASEL II	-0.12	0.24	-5.33	0.00	-0.18	0.19	-6.79	0.00	-0.19	0.28	-9.74	0.00
BASEL III	-0.19	0.19	-6.89	0.00	-0.11	0.21	-4.40	0.00	-0.17	0.17	-6.60	0.00
Adjusted R	0.30				0.32				0.28			
F-statistic	18.75				18.59				18.80			
Prob (F-statistic)	0.00				0.00				0.00			
Hausman test					0.000							

5.6. Results of model estimation

Tables 5 and 6 show the estimation results of pooled Ordinary Least Squares (OLS), fixed and random effect models in Equations (3) and (4). Hausaman test is applied to select the most appropriate model from fixed effect model and random effect model. If Result: H0: Select RE (p> 0.05), H1: Select FE (p <0.05). In this study we select FE Model as p<0.05 is the most appropriate model.

The analysis of the results is presented below and categorized into two groups; bank-specific and macroeconomic determinants of profitability using both ROA and ROE as dependent variables that are regressed independently against both categories of explanatory variables as explained in Equations (3) and (4). Following is the discussion of the results based on these two categories.

5.6.1. Bank-specific determinants of Indian banks' Profitability

As shown in Table 5, ROA is used as a dependent variable and a function of both categories of bank-specific and macroeconomic determinants. To some extent, all the three models conducted show similar results. The results in these models demonstrate that AQ, DEPTA, NIIM, LEV, OPRTA, and LNTA have a significant impact on profitability measured by ROA in all the three models. As expected in Table 1, across the three models, it has been found that DEPTA, NIIM, OPRTA, and LNTA affect significantly and positively the profitability of Indian banks as measured by ROA at the level of 1% level of significance (P value < 0.01). This is consistent with some earlier studies (e.g., AL-Omar & AL-Mutairi, 2008; Athanasoglou et al., 2008; Chowdhury & Rasid, 2017; Menicucci & Paolucci, 2016) who agreed that banks with larger assets size lead to greater profitability. On the contrary, Francis (2013) reported that bank size has a negative effect on banks' profitability and Athanasoglou et al. (2008) found that bank size does not affect bank profitability significantly. AQ and LEV affects significantly ROA at the level of 1% (P value < 0.01). Expectedly, the coefficient of AQ and LEV are found to have a negative value. The results are similar with the studies of Yahya et al. (2017) and Jara-Bertin et al. (2014) who revealed that LEV is negatively related to banks' profitability (ROA).

In addition, the results in Table 5 demonstrate a significant impact of OPRTA on ROA in the three models at the level of 1% (P value < 0.01). The coefficient has the expected positive sign that reveals a positive impact on ROA. Consistently, AL-Omar and AL-Mutairi (2008), Marijana et al. (2012), Petria et al. (2015), Rashid and Jabeen (2016), and Salike and Ao (2017) agreed that operating expenses ratio is significant and is one of the

most important determinants of banks' profitability. This argument is supported also by Jara-Bertin et al. (2014) and Salike and Ao (2017) who proved that operational efficiency is a significant determinant in explaining banks' profitability. Contradictory, Chowdhury and Rasid (2017), Francis (2013), and Yahya et al. (2017) found that OPRTA ratio has statistically significant negative impact on ROA but Naeem et al.(2017) reported a negative as well as insignificant relationship with ROA.

Similarly, AQ ratio has the expected (negative) sign in all the three models. This indicates that AQ ratio has a significant negative impact on ROA at the level of 1% (P value < 0.01). This is contradictory with AL-Omar and AL-Mutairi (2008) who concluded a significant and positive relationship between AQ and ROA. Inconsistently, Naeem et al. (2017) found a negative relationship between AQ and ROA.

Regarding CAD ratio, the results of this study is in accordance with Naeem et al. (2017) who stated that CAD ratio has a positive but insignificant impact on the profitability of banks. Differently, Bougatef (2017) and Salike and Ao (2017) reported a significant positive impact whereas Yahya et al. (2017) declared a negative impact on the bank's profitability. In the same vein, a similar result regarding DEPTA ratio was found by Menicucci and Paolucci (2016) who suggested that banks with higher deposits tend to be more profitable but the effects on profitability are statistically insignificant in some cases.

With regard to the impact of bank-specific variables on the profitability of Indian banks as measured by ROE, the results indicate that AQ, DEPTA, NIIM, LEV, OPRTA, and LNTA are found to be significant and have an impact on ROE. AQ has negative significant impact on ROE at the level of 1% (P value < 0.01) in all the three models. LNTA has positive and significant impact on ROE at the level of 1% (P value < 0.01) in all the three models. This finding is consistent with Masood & Ashraf, 2012 and Jara-Bertin et al. (2014) who indicated that bank size is an important determinant of bank's profitability. CAD and INF have insignificant impact on the profitability of Indian banks as measured by ROE across the three models.

For the reliability of the three used models, the adjusted R square in case of ROA is 36% for the pooled model, 38% in the fixed effect model, and 35% in the case of the random effect model. It shows that both bank-specific and macroeconomic determinants are explaining about 36% to 38% of the variation of a bank's profitability as measured by ROA. Similarly, the value of the adjusted R square in case of ROE is 30% in the pooled model, 32% in the fixed effect model, and 27% in the random effect model exhibiting that both bank-specific and

macroeconomic determinants are contributing about 30% to 32% to the profitability. To evaluate and compare the results of the three models applied, it is clearly seen from the results of Tables 5 and 6 that all models have a P value of less than 1% revealing that all models are fit and significant. Furthermore, Hausman test was conducted for deciding the appropriate estimated model between both fixed and random effect models. The P value suggests that fixed effect model is superior and appropriate than random effect model as the P value of Hausman test is less than 0.05 (P value = 0.00 < 0.01). Accordingly, Hausman test suggests that fixed effect model is more appropriate than random effect model.

5.6.2. Macroeconomic determinants of Indian banks' profitability

Regarding the set of external factors affecting the profitability of Indian banks as measured by ROA, the findings of this study reveal that GDP, EXP, IMP, and INTR have significant impact on ROA at the level of 1% (P value < 0.01) in all the three models and they are found to have statistically significant impact on ROE also. Although INF exhibited a insignificant impact on ROA and ROE.

GDP has statistically significant impact on ROE at the level of 1% (P value < 0.01) in all the three models. This result is consistent with Garcia and Guerreiro (2016) and Rashid and Jabeen (2016) who reported that the real GDP growth has a negative impact on profitability. However, a contradictory result is found by Acaravci and Çalim (2013) and Yahya et al. (2017) who stated that banks performance are positively related to economic growth. Similarly, INTR rate is found to have a significant impact at the level of 1% (P value < 0.01) in all the three models at the level of 1% (P value < 0.01). Unexpectedly, it shows a positive coefficient that indicates a positive impact on ROE. This is in contradictory with Rashid and Jabeen (2016) who revealed that interest rate is negatively related to bank's performance. Differently, from the aforementioned external factors, INF rate has a statistically insignificant impact in all the three models at the level of 1% (P value < 0.01). This is in contradictory with Jara-Bertin et al. (2014) and Yahya et al. (2017) who declared that INF has a positive and significant impact on banks' profitability.

Overall, and in connection with the Hausman Test, fixed effect model should be considered superior than the random effect model. In this view, it can be concluded that all macroeconomic factors investigated by this study except INF are substantial determinants of profitability of the Indian banks measured by ROE.

5.6.3. Impact of Basel Accord on profitability of Indian banks

All the commercial banks in India have taken significant risk management initiatives in the form of various committees, processes and risk management departments to implement the Basel II accords in their organizational structure. The Basel III guidelines aim to improve banking sector ability to sustain long periods of economic and financial stress by laying down more rigorous and stringent capital and liquidity requirements for them. These regulations have been framed to enhance the quality, consistency and transparency of the capital base and strengthening the risk coverage of the capital frame work.

Asset quality, risk and increase in downgrades of Indian corporate by rating agencies leading to higher capital consumption for some banks. In this case, Indian banks needs to maintain higher regulatory capital to absorb financial shocks. At the same time the amount of regulatory capital maintained by Indian banks should not be used for their lending propose and it will reduces the profitability of banks as such cost of capital is higher for regulatory requirements than lending.

The study found that BASEL I, BASEL II and BASEL III have negative and statistically significant impact on ROA and ROE at the level of 1% (P value < 0.01) across the three applied models. This result is consistent with (Barth et al., 2004), and (Chiuri et al., 2002) who found that the regulatory capital requirement had negatively affect bank loan supply, which is a major source of interest income. Roulet (2018) found that Basel III capital regulations, particularly for large banks, have a negative influence on lending growth,

6. CONCLUSION AND RECOMMENDATIONS

The Indian banking sector has witnessed significant challenges and changes. Different challenges such as implementation of banking sector reform, Basel accords, and sustainability are recently noteworthy issues that affect the performance of Indian banks. Further, the increasing trend of the balance sheet indicators especially deposits, borrowings, loans and advances, and the declining in profitability over the few last years, imposition of Prompt Corrective Action (PCA) on five nationalized banks raises a major concern on the performance of Indian banks. This study examined bank-specific and macroeconomic determinants of 37 Indian commercial banks' profitability during the Basel regime. ROA and ROE were taken as dependent variables, whereas independent variables were divided into two categories. The first category includes bank-specific variables (internal), namely, assets size, capital adequacy, asset quality, liquidity, deposit, asset management, and

operating efficiency. The second category represents macroeconomic variables such as GDP, inflation rate, export, import, interest rate, and Basel accords.

The results indicate that bank-specific factors such as bank size, assets management ratio, and operational efficiency have a positive impact on ROA during the Basel regime. On the other hand, there is a negative impact of leverage on ROA. With regard to the impact of macroeconomic determinants on ROA, the results revealed that inflation rate has a negative impact on ROA. Concerning the bank-specific and macroeconomic determinants of profitability of Indian banks measured by ROE during Basel regime, the results indicate that bank size, assets management ratio, liquidity ratio, and GDP are found to have a significant positive impact on ROE. Further, there is a negative relationship between leverage, inflation rate, the Basel I, Basel II, and Basel III on the profitability of Indian banks measured by ROE.

The findings of this study have considerable implications for bankers, policymakers, regulator, analysts, and academicians. Bankers and policymakers should focus on the bank-specific factors that play an important role in the profitability of Indian banks. More emphasis should be given to the deposits and liquidity ratios for efficient utilization and effective performance of the Indian banks. Further, minimizing the costs, increasing the portfolio of the equity financing over the debt financing, and an efficient managing of the financial risk are some important bank-specific factors that should be given more consideration by bankers and policymakers. Banks' managers, bankers, and other professionals should focus on the bank-specific factors for effectively utilizing their resources in such a way that affect positively the financial performance of the Indian banks. In addition, policymakers and regulators should give more consideration to the macroeconomic factors especially interest rate, export, import and, inflation rate which proved that have an important role in the profitability of Indian banks. It is recommended that regulators and policymakers should consider the macroeconomic factors in such a way that improve the profitability of the Indian banks. Finally, future research could investigate this issue by including more variables or using other techniques of analysis such as GMM, ARDL or other techniques. Further, future studies may compare the profitability of Indian banks with the private and public sectors.

This study sought to bridge a gap by providing new empirical evidence on the bank-specific and macroeconomic determinants that affect the profitability of Indian commercial banks. The findings of the present study have considerable contributions to the existing stock of prior studies by comprehensively

explaining and empirically analysing the current state of profitability among the commercial banks of India. It focuses on a major and important sector in an emerging economy like India. It gives attention to the sustainability of the country's banking system, severe stress, bad loans, and an increase in banking frauds.

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