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Explanatory Factors of Indian Private Banks' Profitability: A Panel Data Approach

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Abstract

The large and growing level of non-performing assets in the Indian banking sector is unarguably one of the biggest problems, wiping off the profitability of banks irrespective of their ownership. The present study examines the impact of different macroeconomic and bank-specific drivers of profitability on private-sector banks operating in India. The study takes return on assets (ROA) and return on equity (ROE) as a proxy for the banks' profits covering the period from 2005 to 2020. Both fixed-effect and random-effect models are used. The findings reveal that bank size, net interest margin, non-interest income (NII), and gross domestic product (GDP) have a favourable impact on ROA, whereas non-performing assets (NPAs) exert a considerable negative impact on ROA. The impact of capital adequacy ratio (CAR), efficiency (EFF), and inflation (INF) on ROA are statistically insignificant. Further, the results show that bank size, capital adequacy, efficiency, and asset quality have a considerable negative effect on ROE, but non-interest income and GDP influence positively. The study has significant implications for bankers and regulators when it comes to making strategic decisions to improve bank profitability while developing policies.

Keywords: Non-Performing Assets, Return on Assets, Return on Equity, Profitability, Fixed Effect model, Panel data

JEL: C23

1. Introduction

The expansion and efficiency of banks are critical to the economy's stability and long-term growth. A country's economic strength is reflected in its efficient banking system (Horobet et al., 2021). This is particularly true in economies like India, where banks act as catalysts for economic growth by facilitating financial intermediation (Dietrich & Wanzenried, 2014). Banks contribute to the creation of new sources of money both globally and domestically. They are crucial to capital production, which promotes the sustained growth of the economy (Bhasin, 2017). Therefore, the soundness of banks is an important consideration for the financial

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system's stability (Jayakumar et al., 2018). In a challenging, competitive, and constrained environment, Indian commercial banks must effectively use their resources to generate consistent profits (Viswanathan et al., 2014). The banks' profits in India have been deteriorating for the past few years, which is evident in their ROA and returns on equity (ROE). Therefore, it is imperative to ask, "What are the determinants and their likely effect on the profitability of banks in India?" Furthermore, it is interesting to note that private-sector banks have unique characteristics and enjoy greater independence than public-sector banks. They also demonstrate swift and effective decision-making, which helps their profitability. The private sector banks can arrange funds at a comparatively lower interest rate and deploy them in profitable assets at a lesser cost. Even though the foreign banks and state-owned banks are more efficient, private banks recovered much faster after the global financial crisis of 2008. Further, private sector banks have encountered certain challenges such as competition with international counterparts, technological disruptions, regulatory changes, and political risks affecting their profitability. Therefore, it becomes important to explore the factors affecting the profitability of private sector banks in India separately. There is a good number of empirical studies (Bapat, 2018; Tejesh, 2021) that have examined the impact of various macroeconomic and bank-specific factors on the profitability of commercial banks, especially the public sector banks, but the empirical studies in the context of private sector banks are scant. To bridge this gap, we examine the impact of bank-specific factors and macroeconomic factors on private banks' profitability (ROA) by using the panel data analysis technique. By applying the fixed effect and random effect models, we estimated the empirical results and found a positive impact of bank-specific factors on profitability, suggesting that bankers may focus more on these factors, which are under their direct control.

Public sector banks account for 72.9% of the total banking industry in India, with private banks accounting for the remainder, which are expected to contribute higher profitability than private counterparts. Privatization takes place due to the increased risk profile of state-owned banks, according to a report published in 'The Economic Times' on July 14, 2022. The massive consolidations and privatizations will pose a challenge to the profitability of private banks. Reinvestigating the profitability factors of private sector banks is thus required.

This study contributes to extant literature in the following ways. Firstly, it focuses on the profitability of banks in developing nations like India, where the studies are scant. Secondly, unlike previous studies, this study investigates the impact of bank-specific and macroeconomic factors on private-sector banks' profitability in India. Third, we are investigating a 15-year time range to provide more precision, which has not been examined in previous studies. The remaining paper follows as section 2 reviews related studies, and sections 3 and 4 provide the theoretical background and variables of profitability. Section 5 describes the sample selection and empirical model, which is followed by findings and implications in sections 6 and 7.

2. Empirical Review

The profitability of banks has been examined extensively in many developed and developing countries. The factors affecting banks' profitability can be broadly classified as bank-specific or internal, and macroeconomic or external (Dietrich & Wanzenried, 2011; Herdhayinta & Supriyono, 2019; Le & Ngo, 2020; Tejesh, 2021; Kumar & Bird, 2022).

2.1. Empirical studies investigating the impact of bank-specific variables on profitability

The literature investigating the effect of bank-specific variables on their profitability includes the noticeable work of (Staikouras & Wood, 2004; Batten & Vo, 2019; Alfadli & Rjoub, 2020; O'Connell, 2022). The important bank-specific variables affecting the banks' profitability are loan size, efficiency, capital adequacy, bank size, liquidity, credit deposit ratio, bank expenses, diversification, non-interest income, non-performing loans, and operating cost ratio. O'Connell (2022) employs an econometric model to demonstrate how bank-level characteristics, such as capital ratio, influence UK commercial banks' profitability, enhancing short-term liquid assets and profitability. Alfadli and Rjoub (2020) hypothesize that higher asset suitability proportions (CAR) result in higher financial performance of banks in the Gulf Cooperation Council countries. Almaqtari et al. (2019) find strong evidence that efficiency, leverage, size of the bank, number of branches, and asset management ratio all have a major impact on bank profitability. Rakshit (2022) investigates the cost and efficiency of Indian commercial banks using a data envelopment analysis technique with a two-stage efficiency score. The findings show that efficiency has a positive effect on profit and that private-sector banks have lower cost efficiency than public-sector banks. Batten and Vo (2019) in their study on the profitability of banks in Vietnam specify that capital adequacy, bank size, risk, expense, and productivity positively impact the profitability of commercial banks. Djalilov and Piesse (2016) use data sets for 4 years from 2000 to 2013 for European countries and report a positive association between profitability and credit risk. Menicucci and Paolucci (2016) investigate the relationship between internal factors and the profitability of European banks using a dataset of 35 lending institutions from 2009 to 2013. Using regression on unbalanced panel data analysis, they find that size and capital ratio are more important for bank profitability than other statistically significant determinants. Similar results are reported by Ali and Puah (2019), who argue that bank size is significantly and positively connected with bank profitability as large-sized banks enjoy more economies of scale and thus more profits and greater financial growth. Lee and Hsieh (2013) found that capital has a stronger impact on bank profitability in low-income countries, while its effect is weaker in high-income countries. Khrawish (2011) examined profitability in Jordanian commercial banks from 2000 to 2009 and reported significant and positive variations in profitability along with bank size, net interest margin, and capital. Athanasoglou *et al.* (2008) probed and contemplated that internal factors such as equity to assets proxy to capital, and productivity affect bank profitability positively and significantly but bank size was found to be insignificant for bank profitability while that of Naceur and Goaied (2008) witness that capital and net interest margin have a positive impact profits of Tunisian banks. Bapat (2018) in his study discovered that profits are adversely affected by the NPAs and operating

efficiency measured by the cost-to-income ratio of banks. Bucevska and Misheva (2017) examined the determinants of profitability of banks in six Balkan countries for 5 years (2005 to 2009) and reported that bank size exerts a minor influence on the profitability of banks in these countries. Hoffmann (2011) in his study found an inverse linkage between the profitability and capital ratio of US banks for the period from 1995 to 2007, which concludes that during this period, banks worked cautiously and disregarded profitable investment opportunities.

2.2. Empirical studies investigating the impact of macro-economic factors on banks' profitability

Jadah et al. (2020) in their study demonstrate the positive relationship between GDP growth, an indication of economic growth, and the performance of banks in Iraq because a robust economy aids banks in earning higher profits. Almaqtari et al. (2019) observed the impact of profitability drivers for a period from 2008 to 2017 and found that exchange rate, inflation, demonetization, and interest rate turn out to be statistically important. Batten and Vo (2019) in their study on Vietnamese banks, discover that inflation is an important determinant of banks' profits which sounds logical as with a rise in inflation lending and deposit rates of banks also tend to rise. Dietrich and Wanzenried (2011) consider the period from 1999 to 2006 and revealed that the GDP growth rate is the most important determining factor, having a positive influence on bank income in Switzerland. Aburime and Uche (2008) in their study in Nigeria find that exchange rate, inflation, monetary policy, and real interest rates have a statistically important impact on the profitability of Nigerian banks for the years from 1980 to 2006. Similar findings have been reported by Haneef et al. (2012) in their study in the context of Pakistan for the period from 2006 to 2010.

There are a few studies that report a negative impact of macroeconomic variables on banks' profitability (Dietrich & Wanzenried, 2011; Khrawish, 2011; V. Kumar & Bird, 2022)). For instance, Kumar and Bird (2022) in their study found evidence that GDP, inflation, and interest rates do not help to achieve profitability in Indian banks. Similarly, Khrawish (2011) in his study found a significant negative impact of GDP and inflation on ROA for a selected panel of Jordanian banks. Dietrich and Wanzenried (2011) in their study on Swiss banks find that the market concentration rate and tax rate have a statistically significant negative impact on their profitability. In contrast, Bucevska and Misheva (2017) find that inflation and GDP growth rate have no significant impact on profitability. These studies have taken ROA, ROE, or both as a proxy for the profitability of banks (e.g., Jara-Bertin et al., 2014; Kumar & Dhingra, 2016; Bapat, 2018; Horobet et al., 2021).

3. Theoretical framework

The present empirical work contemplates various prominent theories postulating the impact of a bank's size, capital adequacy, bankruptcy costs, market structure, and efficiency on profitability. These theories include expected bankruptcy cost theory, signaling theory, and market power theory. The association between profitability and capital is given in the expected bankruptcy cost hypothesis (Berger & DeYoung, 1997; Baselga-Pascual et al., 2015) and the risk-return hypothesis (Athanasoglou et al., 2008). As per signaling theory, the availability of higher capital vis-à-vis borrowed capital triggers a positive impact on the value of a

bank. Bank management deliberately reveals the information in the market that their bank is in a better position than its peers and can raise equity financing from the market compromising its profitability (Berger & DeYoung, 1997; Baselga-Pascual et al., 2015). In contrast to it, bankruptcy theory postulates that a bank tends to hold more amount of equity to avoid financial distress because of unexpectedly high bankruptcy costs (Berger & DeYoung, 1997). Both the signaling and bankruptcy theories support the hypothesis that capital adequacy has a favourable impact on the profits of banks. While, risk-return hypothesis explains that increased capital leverage of a firm increases the financial risk and profitability of the firm thus it posits an inverse relationship between two variables such as the owner's funds and income (Hoffmann, 2011; Sharma & Gounder, 2012). Market power theory postulates that the profitability of a bank is a corollary of market variables whereas the theory of efficient structure undertakes internal efficiencies (Olweny & Mamba, 2011b). Thus, theories confer conflicting theoretical perspectives.

4. Drivers of Profitability

Two common measures that have been extensively suggested in the literature as proxies for the banks' profitability are ROA and ROE (Kumar & Dhingra, 2016; Islam et al., 2017; Bapat, 2018; Gaur & Mohapatra, 2021; Horobet et al., 2021). The ROA metric represents the amount of money earned on each dollar of assets and higher ROA signals a more successful and efficient business while ROE is computed by dividing the net income by total shareholders' equity. In harmony with earlier studies, our study considers both ROA and ROE as a proxy of banks' profitability.

4.1. Bank-Specific Determinants of Profitability

4.1.1 Bank Size: In agreement with the previous studies, total assets have been considered as a proxy for bank size (Alpen & Anbar, 2011; Noman et al., 2015; Ali & Puah, 2019). Normally, larger firms enjoy economies of scale, which reduces their processing cost significantly (Boyd & Runkle, 1993) which increases their efficiency but it may result in managerial inefficiencies which can affect their profits adversely. No specific hypothesis about the impact of bank size on their profits can be formulated because of mixed empirical findings.

4.1.2 Capital Adequacy Ratio: In sync with prior studies, we use the ratio between owners' funds to total assets as a proxy for the capital adequacy ratio (CAR) of banks (Schiniotakis, 2012). Considering the findings of previously mentioned studies, the influence of CAR on the profitability of the banks is not uniform (Sharma & Gounder, 2012). Many empirical studies have shown that CAR is a statistically significant and positive factor for evaluating profitability (Menicucci & Paolucci, 2016; Salike & Ao, 2017). However, Hoffmann (2011) in his study found a negative but insignificant impact of CAR on different measures of profitability of banks.

4.1.3 Asset quality: Asset quality is measured by the ratio of non-performing loans to overall loans sanctioned by a bank. As Bougatef (2017) and Akhtar et al. (2020) establish a link between bank profitability and asset quality, and find that banks with poor asset quality have lower income.

4.1.4 Net Interest Margin: It is measured as a ratio of net interest income to total

assets (Lee & Kim, 2013; Silaban, 2017; Al-Homaidi *et al.*, 2020; Sofie et al., 2020). The expected impact of NIM on banks' profitability is positive.

4.1.5 Non-Interest Income: Non-interest income (NII) is calculated by taking the ratio of non-interest income to total assets. A review of previous empirical studies shows that a higher level of NII yields higher profits. (Alpen & Anbar, 2011; Ahamed, 2017)

4.1.6 Efficiency: Efficiency (EFF) is calculated with the Data envelopment analysis (DEA) technique with two-stage efficiency score (Rakshit, 2022).

4.2 Macroeconomic Determinants

4.2.1 Inflation: As a result of prior empirical studies, the inflation (INF) rate does not uniformly impact banks' profitability. Căpraru and Ihnatov (2014) in their study claimed that the INF has a good and considerable impact on profitability. However, according to Chowdhury and Rasid (2017), the INF rate has a considerable negative impact on the performance of Islamic banks. Thus, the impact of INF on banks' profitability cannot be conclusively drawn.

4.2.2 Gross Domestic Product: GDP is interpreted as a determining factor for demand and supply, which in turn is responsible for deposits and loan transactions (Masood & Ashraf, 2012; Jeris, 2021). Previous research on the effect of GDP on the profitability of banks has yielded mixed results. Masood and Ashraf (2012) and Messai and Gallali (2019) in their respective studies find an inverse association between GDP and banks' profitability. In contrast, Acaravci and Calim (2013) find a positive association between banks' performance and economic growth. Salike and Ao (2017) in their study report that GDP is insignificant for banks' profitability. Therefore, no directional impact of GDP on profitability can be ascertained.

5. Econometric Model

5.1. Sample data, period, and data source

The sample data comprises a balanced panel of 16 private sector banks as it solves the problem of heterogeneity, constant and unobservable characteristics of an individual bank (Hoffmann, 2011). The study is based on all private-sector banks that were in operation between 2005 and 2020. The inclusion of 16 private-sector banks is based on the quality of data availability. There were 18 private banks until 2020, but chosen partly because of the availability of data throughout the study period. The financial data for bank-specific variables is extracted from the Centre for Monitoring Indian Economy's (CMIE) Prowess database, whereas information on macroeconomic variables is taken from the RBI database.

5.2. Variables

Table 1 explains the operationalization of variables. The descriptive approach is used for establishing data normality and analysing means. Additionally, to identify the explanatory variables in the model and their multicollinearity, an elementary evaluation of the correlation coefficients of the variables was performed.

Table 1. Variables under Study

Variable	Notation	Measurement	Predicted effect on Profitability	Data Source
Profitability (Dependent variable)				
Return on Assets	ROA	Ratio of net profits to total assets		CMIE-Prowess database
Return on equity	ROE	Ratio of net income to equity		CMIE-Prowess database
Bank Specific Variables (Explanatory variables)				
Capital Adequacy Ratio	CAR	Ratio of equity to total assets	Inconclusive	CMIE-Prowess database
Size of the Bank	LASSET	Natural log of total assets	Inconclusive	CMIE-Prowess database
Asset Quality	NPAs	Ratio of non-performing assets to total loans	Negative	CMIE-Prowess database
Income Interest Margin	NIM	Ratio of net interest income to total assets	Inconclusive	CMIE-Prowess database
Efficiency*	EFF	Composite Score of Two-Stage Efficiency measured with the DEA technique	Positive	CMIE-Prowess database
Non-Interest Income	NII	Ratio of non-interest Income to total assets	Positive	CMIE-Prowess database
Macroeconomic Variables				
Economic Growth	GDP	Annual Gross Domestic Product (GDP) Growth Rate in percentage	Positive	RBI publications
Inflation	INF	Annual Rate of Inflation in percentage proxy by the consumer price index	Inconclusive	RBI publications

Source: Author's compilation

Note: *Results of two stage efficiency score have been computed separately by authors and are not the part of this manuscript.

5.3. Model specification

Our study employs linear regression with fixed-effect and random-effect models as suggested in prior studies (Demirgüç-Kunt & Huizinga, 1999; Athanasoglou et al., 2008; Flamini et al., 2009; Hoffmann, 2011).

The model required to be estimated can be specified as given below:

$$\acute{y}_{mt} = \alpha + \beta X_{mt} + \varepsilon_{mt} \quad (1)$$

$$x_{mt} = \alpha + \beta X_{mt} + \varepsilon_{mt} \quad (2)$$

where $\acute{y}_{mt}$ (ROA) and x_{mt} (ROE) are the dependent variables of the bank 'm' at a time 't', α is the intercept, β is a vector of parameters to be estimated, X_{mt} is the set of explanatory variables, m = 1, 2, ..., M, t = 1, 2, ..., T, ε_{mt} is the error term. For choosing between fixed effects and random effects models Hausman test has been applied. If the results of the

Hausman test are statistically significant, the fixed effect model is considered to be better than the random effect model.

6. Empirical Findings and Discussion

6.1. Descriptives

The descriptive statistics of our sample data are presented in Table 2. It includes mean, maximum, minimum, and standard deviation values for all the variables, which provide useful insight about the data. In comparison to the highest and minimum values of -5.39, 24.94, and 2.13, -63.78, respectively, ROA and ROE have mean values of 0.9 and 10.42, with standard deviations of 1.031 and 11.94. The average value for LASSET as measured by the natural log of its total assets is 10.618 with a minimum of 6.768, a maximum of 14.241, and a standard deviation of 1.593. The minimum and maximum values of CAR are 1.12 and 56.41, with a mean value of 14.625 and a standard deviation of 4.672. The average value of the EFF is 0.825 for all the private banks which is reasonably good. The average value of NII for the private banks is 1.355, with a dispersion rate of 0.553. The mean value of NIM is 2.982, with a minimum and maximum of 0.231 and 5.618. NPAs are the tune of 1.675 on average with an annual standard deviation of 1.892. The maximum value of 16.690 for NPAs is also very alarming. For macroeconomic variables, the average growth rate of GDP is 5.828, and the minimum value is -7.965 for the year 2020, which is expected as there was negative growth due to the pandemic of COVID-19 pandemic. The mean value of INF at 6.937 is also on the higher side, though expected in a developing economy. The coefficient of skewness is negative for EFF, NIM, and GDP which highlights the risk of left tail events also called black swan events in economics. Further, all the series except LASEET and EFF are non-normal as measured with the help of the coefficient of Kurtosis and the Jarque-Bera statistic.

Table 2. Descriptive Statistics

Variables	No. of Obs.	Min.	Max.	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (probability value)
ROA	304	-5.390	2.130	0.900	1.031	-2.720	13.214	1696.164(0.000)
ROE	304	-63.787	24.94	10.428	11.943	-3.11	12.421	2187.16(0.000)
CAR	304	1.120	56.410	14.625	4.672	4.764	37.690	16393.43(0.000)
EFF	304	0.446	1.000	0.825	0.100	-0.160	2.798	1.819 (0.403)
LASSET	304	6.768	14.241	10.618	1.593	0.002	2.509	3.056 (0.217)
NII	304	0.301	3.713	1.355	0.553	0.701	3.961	36.619 (0.000)
NIM	304	0.231	5.618	2.982	0.821	-0.130	3.738	7.757 (0.021)
NPAs	304	0.010	16.690	1.675	1.892	3.466	21.649	5014.051(0.000)
GDP	304	-7.965	8.498	5.828	3.882	-2.756	10.100	1023.442 (0.000)
INF	304	3.328	11.989	6.937	2.730	0.431	1.898	24.763 (0.000)

Source: Authors' calculations

Table 3. Unit root analysis

Variables	Levin, Lin and Chu t*	I'm, Pesaran and Shin W-stat	ADF – Fisher Chi-square	PP – Fisher Chi-square	Result
ROA	-3.2712***	-3.1298***	90.3043***	162.322***	Reject null hypothesis
ROE	-0.317***	-1.8168	-0.092316	153.422	Accept null hypothesis
CAR	-7.0413***	-5.8293***	103.055***	220.757***	Reject null hypothesis
EFF	-5.7434***	-7.7610***	131.703***	301.835***	Reject null hypothesis
LASSET	-2.9008***	-1.4448*	54.61**	65.9021***	Reject null hypothesis
NIM	-1.8873**	-4.4789***	83.0879***	192.815***	Reject null hypothesis
NPAs	-5.5340***	-5.7394***	106.322***	143.367***	Reject null hypothesis
NII	-4.5932***	-6.5884***	113.623***	246.108***	Reject null hypothesis
GDP	-6.1693***	-8.1788***	136.752***	178.016***	Reject null hypothesis

Source: Authors' computations. *, ** and *** represent two tail significance at the levels of *10%, **5% significance, ***1% respectively. The null hypothesis for the unit root test is the presence of a unit root in the series.

6.2. Unit root analysis

The stationarity of the time series data is a prerequisite for applying panel data analysis. The stationarity of different series has been tested with the help of various panel unit root tests as specified in the results. Table 3 shows that all variables used in the models are stationary at the first difference for all the tests applied.

6.3. The relation of ROA and ROE with their determinants

Table 4 shows the relationship between ROA and ROE and their determinants. The results of the correlation demonstrate that, except for NPAs, ROA and ROE have a positive association with all bank-specific and macroeconomic factors. The coefficient of correlation between the different variables helps in understanding the impact of one variable over another, along with detecting the possibility of multicollinearity, which can further be tested with the help of the variance inflation factor (VIF). Theoretically, the value of the correlation coefficient should be less than 0.8 (between the explanatory variables), else it may lead to the possibility of multicollinearity. The outcome of the variance inflation factor (VIF) is given in Table 4. The VIF value is less than the prescribed limit of 10 for all the explanatory variables, which confirms the absence of multicollinearity in our data.

Table 4. Correlation matrix and multicollinearity diagnostics test

	ROA	ROE	CAR	EFF	LASSET	NII	NIM	NPAs	GDP	INF
ROA	1.000									
ROE	0.925	1.000								
CAR	0.308	0.1693	1.000							
EFF	0.331	0.2152	0.061	1.000						
LASSET	0.094	0.3398	-0.051	0.094	1.000					
NII	0.194	0.2013	0.025	0.464	0.420	1.000				
NIM	0.478	0.3940	0.332	0.395	-0.020	0.130	1.000			
NPAs	-0.711	-0.6998	-0.255	-0.102	-0.015	-0.158	-0.272	1.000		
GDP	0.143	0.1475	-0.046	0.224	-0.200	-0.033	-0.060	-0.106	1.000	
INF	0.224	0.2226	0.193	0.012	-0.147	-0.001	-0.025	-0.337	0.021	1.000
VIF	NA	NA	1.204	1.335	1.118	1.617	1.498	1.299	1.184	1.220

Source: Authors' calculations

6.4. Results and Discussion

Table 5 presents the empirical results illustrating the impact of explanatory variables on bank profitability. According to the findings of the random effect model, the selected variables LASSET, NIM, NPAs, and GDP all significantly affect bank profitability. There is no evidence that the effects of CAR, EFF, or NII have a major impact on the profitability of India's private sector banks. As expected, NPAs have a detrimental effect on ROA and ROE, as opposed to the positive benefits of bank size, NIM, and GDP. The robustness of the random effect model is also manifested by the significant F-value of the regression. The adjusted R-square value is 0.2460, which is reasonable, and there is no sign of autocorrelation as well as indicated by the value of the Durbin-Watson statistic (1.8214), which further makes our model fit.

The relationship between ROA and CAR is positive but insignificant which means in Indian private sector banks capital adequacy is not a matter of concern which is unlike their public sector counterparts as reflected by many empirical studies (Athanasoglou *et al.*, 2008; Arias, 2011; Kumar & Dhingra, 2016). This also means that for private-sector banks in India expected bankruptcy costs hypothesis and signalling hypothesis are not applicable. Our results are in harmony with the findings of (Berger & DeYoung, 1997) but are inconsistent with (Naceur & Goaied, 2008; Arias, 2011). The LASSET has a significant positive effect on the ROA of private-sector banks which indicates that larger banks are likely to be more profitable vis-à-vis smaller banks. The positive relationship between the size of the banks and their profitability can be attributed to the fact that bigger banks are likely to enjoy more economies of scale which brings their costs down and improves their overall profitability (Alpen & Anbar, 2011; Menicucci & Paolucci, 2016). Thus, the regulator may help in creating a favourable environment for the mergers and amalgamation of banks which will also strengthen the financial system of the country. The Two-stage efficiency score of private sector banks is not a critical factor

for the banks' profitability. The justification for this can be that in the private sector, nearly all the banks are equally efficient because of this the impact of efficiency is not statistically significant for these banks which negates the application of the efficiency structure hypothesis for Indian private sector banks. The positive impact of NIM on profitability is also on the expected lines. The higher interest margin indicates that banks can identify profitable lending opportunities and are also able to mobilize funds at a lower rate. These results are in harmony with the studies of (Naceur & Goaied, 2008; Khrawish, 2011). Further, the statistically significant adverse impact of NPAs on the profitability of banks is also consistent with the empirical findings of the previous studies by Bapat (2018) and Gaur and Mohapatra (2020) and the fact that the problem of NPAs is one of the critical problems of banks in India over the past many years now. In line with our expectations, the effect of GDP is positive and statistically significant on profitability. The positive impact of GDP on profitability indicates that the high growth rate of GDP reflects the improved business opportunities for banks, which eventually results in higher profitability. The result is consistent with the study of (Flamini et al., 2009).

As regards the effects on ROE, EFF, LASSET, NPAs, and GDP all have a sizable detrimental effect, whereas NII has a favourable effect. The link between LASSET and ROE is significant and negative, implying that large banks are less lucrative than small banks since they are inadequate at sustaining quality standards owing to geographical growth (Batten & VO, 2019). The negative association between NPAs and ROE is attributed to the fact that bank loans become more hazardous, potentially reducing bank profitability (Jadah et al., 2020; Jera-Bertin et al., 2014). GDP has a strong negative impact on bank profitability since economies with low GDP growth rates benefit less (Almaqtari et al., 2019). In contrast, we see no discernible effect of inflation on bank profitability.

The results of the fixed effect model are more or less in line with the results of the random effect model. As per the fixed effect model size of the bank, NIM, NII, and GDP have a significant positive impact on ROA, while the impact of NPAs is also statistically significant but negative. CAR, EFF, and INF do not have statistically important effects on the profitability of private banks. The value of adjusted R-squared (0.2595) in the fixed effect model is better than the random effect model. The results of the fixed effect model are also free from serial correlation as reflected by the Durbin-Watson statistic (1.9735). Further, the Durbin-Wu-Hausman, popularly called the Hausman test, has also been applied to choose the appropriate model between the fixed effect and random effect models. If the statistic of this test is statistically significant, then the fixed effect model is preferred over the random effect model. In our results, the value of the Chi-square statistic of the Hausman test is significant at a 1% level of significance. Therefore, the results of the fixed effect model are more reliable than the random effect model. The pooled regression model has not been applied, as the Hausman test clearly shows that the fixed effect model is better than the random effect model.[1]

[1] According to (Wooldridge, 2010), if the results of the Hausman test clearly show that fixed effect model is better than REM then there is no need to apply pooled ordinary least square (OLS) method and it is employed when different sample for each year/month/period of the panel data is selected.

Table 5. Model Estimation Results

Dependent Variables	ROA		ROE	
	RANDOM EFFECT MODEL	FIXED EFFECT MODEL	RANDOM EFFECT MODEL	FIXED EFFECT MODEL
Variable	Coefficient	Coefficient	Coefficient	Coefficient
C	-0.2256***	-0.2862***	3.08094	9.16403
CAR	0.0112	0.0111	-0.143753	-0.1352
EFF	0.6502	0.6568	-8.30374	-10.8469*
LASSET	1.0593***	1.4085***	0.0396	-0.6176***
NII	0.1547	0.1953*	1.61330	2.7795*
NIM	0.5573***	0.5736***	6.24272***	7.1250
NPAs	-0.1447***	-0.1298***	-5.18675***	-5.3600***
GDP	0.0169**	0.0171**	0.279084**	0.3335***
INF	-0.0217	-0.0093	0.122660	0.0692
R-squared	0.2659	0.3294	0.5352	0.6373
Adjusted R-squared	0.2460	0.2595	0.4854	0.5874
F-statistic (p-value)	13.3554 (0.0000)	4.7160 (0.0000)	413.743 (0.0000)	54.2613 (0.0000)
Durbin-Watson stat	1.8214	1.9735	1.2674	1.1544
Hausman Test (Cross-Section Random Effects Test (Chi-Sq. Statistic)	20.13803***		25.3788***	

Source: Authors' calculations *, **, and *** represent two-tail significance at the levels of *10%, **5% significance, ***1%, respectively.

7. Conclusion

The significance of bank profitability in determining economic growth and stability has been a focus of recent research, particularly in developing nations such as India. Our research looks at how bank-specific and macroeconomic variables affected the profitability of private-sector banks in India from 2005 to 2020. We estimate the empirical results using a fixed effect model and find that bank size, NIM, NII, and GDP have a statistically significant positive impact on banks' profitability, whereas NPAs have a statistically significant negative impact on ROA. However, CAR, EFF, and INF have no discernible effect on banks' profits. The findings indicate that larger banks (by size), banks with a higher NII, and banks with a lower non-performing asset ratio are more profitable. While capital appears to have no direct effect, a bank with an adequate level of equity capital can manage its operations effectively, resulting in a higher interest margin and a higher profit level. In terms of ROE, CAR, EFF, LASSET and NPAs are found to have a negative and considerable impact on bank profitability. The positive effect of GDP growth on profitability suggests that when a country's macroeconomic climate is favourable, it can make larger profits than when conditions are adverse.

8. Implications

The study's empirical findings give key policy recommendations. To be more explicit, the current study proposes that to increase bank profitability, credit management practices with more conservative lending policies should be prioritised to reduce the level of NPAs. Furthermore, the study concludes that, rather than focusing on increasing the size of existing banks, new branches should be built to increase bank efficiency. We recommend that banks prioritise income diversification in addition to interest income to increase bank profitability.

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