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IMPACT OF MACRO-ECONOMIC AND BANK-SPECIFIC VARIABLES ON BANKS PERFORMANCE: A COMPARISON BETWEEN PRIVATE AND PUBLIC SECTOR COMMERCIAL BANKS

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Abstract *Present study is conducted to know the influence of bank-specific and macro-economic variables on bank performance in Indian context. A comparison has been made between public and private sector banks. For the purpose of the study, we have selected 32 commercial banks. Secondary data has been collected from the annual reports of the respective banks for the period 2010–11 to 2020–21. Panel regression model have been employed for the study. Empirical findings show that high operating expenses are not appropriately used to manage financial performance in sample banks especially for public sector banks. Study results also show that credit risk has an inverse association with financial performance. Leverage is negatively related to financial performance for public sector banks only. Deposit ratio, size and Annual GDP growth rate positively related to financial performance in all sample banks. While exchange rate has negative impact on the financial performances. The results show that different bank-specific and macro-economic variables influence differently with bank performance in public and private sector banks. The findings of the study will help policymakers and other stakeholders especially in the financial sector to understand various macro-economic and bank-specific variables impact on bank performances.*

Keywords: *Commercial Banks, Macro-Economic Variables, Bank Performance, Credit Risk, India*

INTRODUCTION

Since the last few eras, India's banking industry has seen considerable changes in its operating environment (Agarwal et al., 2009; Sinha & Mukherjee, 2016). This environment connected with external and bank-specific factors. It has influenced structure and performance of banks (Al-Jafari & Alchami, 2014; Athanasoglou et al., 2008). Despite the growing tendency of banking risk, banks continue to play a central role in economic activity (Kumar & Prakash, 2019; Zavadaska, 2018). A profitable banking sector can protect the economy from harmful waves and reward a stable financial system (Ozil, 2018; Barth et al., 2004). Therefore, researchers are interested to know the determinant of bank performance concerning macro-economic and bank-specific variables.

Indian banking industry comprises 12 public sector banks (PuSB), 20 private sector banks (PrSB), 46 foreign banks (FB) and 43 RRB. Commercial banks dominate the Indian financial system, and PuSB have the highest representation with respect to total assets (Bhattacharyya & Pal, 2013). Banking and financial institute are used as a grid of personal savings, macro and micro-credit supply, and it also supports the execution of financial policies and economic planning (Ariccia & Marquez, 2004). There is no question that the essential responsibility of banks is converting deposits into productive investments by offering quality services to customers. It also helps different economic sectors by planning and lending. Over the last few years, banks' profitability has significantly declined (Almaqtari et al., 2018). This declining trend in profitability raises the question of the reason behind the movement.

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Many studies have been conducted on bank profitability (Molyneux & Thornton, 1992; Al-Jafari & Alchami, 2014; Goddard et al., 2004; Athanasoglou et al., 2008; Almaqtari et al., 2018) to explain various macro-economic banks specific factor. Bank-specific factors originated from bank accounts such as balance sheet, profit & loss account and macro-economic factors are gross domestic product (GDP), inflation rate (IR), exchange rate (ER), etc., which are not related to bank management. Characteristics of these macro-economic and banks specific factors are different, and these are not constant over time. In this context, an important question needs to be addressed in Indian perspective: How do macro-economic and bank-specific variables influence banks' performance?

There are two motivations behind the study. Firstly, RBI is concerned about bank stability in India. However, it has not set forth specific goals and instructions for completing this attempt. Secondly, it has never produced conclusive responses to the following questions: why PrSB are more successful than other banks? How banks' profitability varies due to factors outside their control?

Therefore, we are interested to examine the impact of macro-economic and banks specific variables on bank performance in Indian context, and a comparison has been drawn between PrSB and PuSB.

The study results are helpful in a variety of ways. Firstly, the research assists in understanding the influence of different bank-specific variables on commercial bank performance. Secondly, the research provides the impact of several macro-economic variables on banks' performance. Thirdly, an assessment has been delivered between PrSB and PuSB about their profitability. At last, this study helps to formulate further policies and regulations to improve performance of Indian banking sector.

LITERATURE REVIEW

Several studies have been carried out around the world to know how banks' performances are influenced by macro-economic and bank-specific factors (Garcia & Guerreiro, 2016; Anbar & Alper, 2011; Ekinci & Poyraz, 2019; Singh & Sharma, 2016; Saleh & Afifa, 2020, Ghosh, 2021; Athanasoglou et al., 2008; Rani & Zergaw, 2017; Rjoub et al., 2017; Laline & Vennet, 2007; Awojobi, 2011; Ashraf et al., 2017; Louzis et al., 2012; Mishkin, 2009; Zhang & Daly, 2014; Masood & Ashraf, 2012). In this context, few authors discussed macro-economic impact on bank performance (Laline & Vennet, 2007; Neyapti & Dincer, 2015; Awojobi, 2011; Ashraf et al., 2017; Mishkin, 2009), few highlighted about bank specific influences on banks' performance (Ekinci & Poyraz, 2019; Saleh & Afifa, 2020, Ghosh, 2021; Barra & Zotti, 2018; Nguyen et al., 2018; Bhatia et al., 2018), and some studies are considered both bank-specific variables along with macro-economic variables on banks' performance (Louzis et al., 2012; Garcia & Guerreiro, 2016; Masood & Ashraf, 2012; Anbar & Alper, 2011; Athanasoglou et al., 2008; Rani & Zergaw, 2017).

Bank-specific factors are operating efficiency (OE), credit risk (CR), financial risk (FR) and size (Ghosh, 2021; Nguyen et al., 2018; Ekinci & Poyraz, 2019; Bhatia, 2018; Saleh & Afifa, 2020; Barra & Zotti, 2018). Sherman & Gold (1985), Oral & Yolalan (1990) claimed that banks OE is a factor that influences profitability. It refers to how successfully a bank can manage its fund to produce revenue. A good OE refers closely monitoring of debtors after lending money; therefore, its cutes chances of default (Gadzo et al., 209; Ahamed et al., 2021). Further, Allen and Rai (1996) posted banking performance can grow with the lowest possible cost of operation. More specifically, operational efficiency can be reached higher when banks use an exact combination of inputs (Athanasoglou et al., 2008). While bank performance may reduce due to poor OE (Chen et al., 2018; Le et al., 2019).

Another bank-specific factor is CR. Laryea et al. (2016), Ghosh (2021) and Kolapo et al. (2012) said interest income from borrowers is the prime source of revenue for banks. When the borrower defaults on his payment, then CR occurs. A high amount of non-performing loans in the balance sheet decreases profitability and increases chances of financial collapse (Ghosh, 2021; Kolapo et al., 2012; Karim et al., 2010). Therefore, successful CR management is essential for banking performance. Several studies (Kolapo et al., 2012; Karim et al. 2010; Afriyie & Akotey, 2012; Annor & Obeng, 2018) have been conducted to know the nexus between CR and bank performance, and most of them found CR reduces bank performance (Karim et al., 2010; Ghosh, 2021; Kolapo et al., 2012), few of them found CR increases bank performance due to high rate of interest (Afriyie & Akotey, 2012; Annor & Obeng, 2018).

FR risk is also a bank specific factor. Several studies (Ruziqa, 2013; Mun & Morgan, 2003; Al-Homaidi et al., 2018; Singh & Sharma, 2016; Chowdhury & Rasid, 2017) have been conducted on FR and bank performance. Hahm, (2004) and Lopez et al. (2020) mentioned high FR is caused by variations in interest rate changes in currency ER and liquidity gap. Liquidity gap has resulted from insufficient liquidity for normal operating environment (Chowdhury & Rasid, 2017). Interest rates fluctuate due to demand for credit. When the required credit increases, then interest rate will increase, while the required credit decreases, then the interest rate will decrease. Similarly, the currency ER varies subject to demand and supply in the forex market (Galati et al., 2004).

Another bank-specific issue is bank size. It is classified by total asset size of the bank. Appropriate construction of bank size is a technique for safeguarding the financial system (Adusei, 2015). Athanasoglou et al. (2008) found that larger banks have an unfavourable influence on financial stability because banks face huge losses globally during the crisis. However, Bertay et al. (2013) cited profitability is higher for larger banks than smaller ones.

Macro-economic factors include GDP growth rate, annual IR and ER (Garcia & Guerreiro, 2016; Anbar & Alper, 2011; Athanasoglou et al., 2008; Rani & Zergaw, 2017). Fluctuating the value of the host country's currency is a challenging problem in banking performance because this fluctuation directly impacts investors, shareholders and lenders. It leads to improper resource allocation (Umar et al., 2014). According to Revell (1979); Batayneh et al. (2021), wages and operational expenses rise faster than inflation may influence banks' profitability. At the same time, Perry (1992) specified that the impact of inflation on banks' profitability varies on whether inflation projections are fully filed or not. Therefore, IR is a crucial determinant of bank performance (Al-Homaidi et al., 2018). Volatility in ER is described as a risk linked with spontaneous movements in the ER. High ER fluctuation raises the cost of risk and reduces foreign trade (Almaqtari et al., 2018) reason behind the ER is decided upon when the trade agreement is signed, but payment is made after the future delivery. Therefore, various studies have found that ER is a key component of bank performance (Almaqtari et al., 2018; Al-Homaidi et al., 2018).

Financial success is a crucial aspect of any organisation. A good bank performance can boost bank value as well as shareholders' wealth (Athanasoglou et al., 2008). While poor bank performance is unable to do. Bank performance has been affected by several bank-specific and macro-economic factors. Several studies (Garcia & Guerreiro, 2016; Louzis et al., 2012; Anbar & Alper, 2011; Ekinci & Poyraz, 2019; Saleh & Afifa, 2020; Ghosh, 2021; Athanasoglou et al., 2008) have been conducted on this topic, but the results of these studies are not same because of demographic changes, changes in policy of banks, etc. so further studies can conduct to know impact of macro-economic variables, bank-specific variables and bank performance in Indian context.

Objectives

Present study examines the influence of bank-specific and macro-economic variables on bank performance in Indian context. In this context a comparison between PuSB and PrSB has been made to show their relative performances.

Hypothesis Development

This section develops hypothesis to fulfil our objectives. We divide this section into two parts: bank-specific variables and macro-economic variables on bank performance.

Bank-Specific Variables

Operating Efficiency

Commercial banks OE has been cited as one of the primary factors influencing a bank's success or failure (Bougatef, 2017; Garcia & Guerreiro, 2016; Chowdhury & Rasid, 2017). OE is a company's ability to minimise operating costs to achieve its goal by integrating proper people, processes and technology (Bougatef, 2017). With an appropriate pool of resources, banking operations can improve quality of services (Lotto, 2019). Banks effectively use deposits to support ventures that are anticipated to provide significant social and economic advantages. After lending money, they keep an eye on it to confirm efficient and effective usage. On the other side, if banks are directed inefficiently, their deposit can slow the economic progress of the bank (Chowdhury & Rasid, 2017). Therefore, OE is a key factor of bank performance.

Dimitris (2008); Sanchez et al. (2013) found a positive association between bank performance and OE. This implies that more profitable bank has higher OE. While Le et al. (2019) revealed that high OE reduces financial performance. Based on the above discussion, we assume that,

H_1: There is a significant positive relationship between OE and bank performance.

Credit Risk

Commercial banks experience a variety of risks, out of them CR is quite important because it directly impact on banks' financial performance. CR management is crucial for value creation and sustainability of banks. It is directly linked to commercial banks' financial health (Wagner & Marsh, 2006). High CR in the financial sector causes a slowdown in the economic growth rate (Chaibi & Ftiti, 2014), threats to all successful lending activity (Angelini et al., 2007). High amount of non-performing loan in balance sheet reduces profitability as well as high chances of financial collapse of banks (Ghosh, 2021; Kolapo et al., 2012; Karim et al., 2010). Therefore, CR management is a key determinant of banking performance.

Empirical studies found that a high amount of non-performing loans reduces profitability (Kolapo et al., 2012; Karim et al., 2010). However, Kurawa and Garba (2014); Afriyie and Akotey (2012) mentioned a positive association between the NPLR and bank performance due to a higher rate of interest. Based on the discussion, we assume that,

H_2: There is a significant negative relationship between CR and bank performance.

Leverage

Leverage (LEV) allows banks to amplify their potential profit using borrowed funds (Gatsi et al., 2016). Banks use their borrowed funds in credit packages such as house loan mortgages to improve returns. LEV helps diversify their risk by exercising borrowed funds by investing different types of assets. A high LEV ratio indicates high FR and low means low FR. Therefore, LEV is a key determinant of bank performance.

Sanusi and Ismail (2005) found in their study that a high-levered bank can earn high profitability. While few studies have been found that LEV negatively related to bank performance due to inefficient use of deposits (Bashir & Hassan, 2003). Based on the discussion, we assume that,

H_3: There is a significant positive relationship between LEV and bank performance.

Deposit Ratio

The term deposit refers to money held by a bank. In other words, money put into a banking institution for protection is called deposit account or savings account. Large portions of deposits are converted into loans & advances from there banks can earn huge amounts of interest. Therefore, deposit is a determinant of banks' performance.

Numerous studies have used deposit ratio (DR) to know the nexus with bank performance (Almaqtari et al., 2018; Anbar & Alper, 2011; Ghosh, 2021; Al-Homaidi et al., 2018; Parab & Patil, 2018). (Parab & Patil, 2018) mentioned DR able to increase bank performance. While Ghosh (2021) said DR reduces financial performance due to inefficient use of deposits or a large amount of non-performing loans. Some studies (Almaqtari et al., 2018; Anbar & Alper, 2011; Al-Homaidi et al., 2018) found DR had no meaningful relation to financial performance. Based on the discussion, we assume that,

H_4: There is a significant positive relationship between DR and bank performance.

Capital Adequacy Ratio

Capital adequacy ratio (CAD) is essential for banking stability (Dao & Nguyen, 2020). Altunbas et al. (2007) stated that high capital adequacy is a crucial factor to managing risk. Laeven and Levin (2009) said that high capital adequacy indicates high risk-taking capacity. We know that risk is directly associated with banks' returns. Therefore, CAD is a determinant of bank performance.

Fredrick (2012) said CAD is inversely related to ROE, and its coefficient is statistically significant. While Ghosh (2021) found CAD can increase banks' performance. Almaqtari et al. (2018) mentioned that CAD had no meaningful relation to bank performance. Based on the discussion, we assume that,

H_5: There is a significant positive relationship between CAD and bank performance.

Bank Size

Bank size denotes the ownership of assets by banks. Higher assets indicate a large bank and allows it to provide extra financial services at a minimum price. While lower assets indicate bank size is low. Kashyab and Stein (1995) said larger banks are granted more lending than smaller banks. So, larger banks can earn more interest than smaller banks. Therefore, bank size is a determinant of bank performance.

Few empirical studies have found that larger banks can improve financial performance due to proper use of assets or good OE (Almaqtari et al., 2018; Lotto, 2019; Al-Homaidi et al., 2018). While some academicians have remarked that larger banks cannot increase financial performance due to poor OE or asset quality (Athanasoglou et al., 2008). Based on the discussion, we assume that,

H_6: There is a significant positive relationship between Bank Size and bank performance.

Macro-Economic Variables

Annual GDP Growth Rate

The GDP is macro-economic status of a citizen's standard of living. Banks assist to boost an economy's overall investment prospect. It should be noted that banks not only mobilise saved funds but also provide loan. Fofack (2005) said an increasing GDP leads to reducing credit default and improving the standard of living. Therefore, annual GDP growth is a key indicator of bank performance.

Al-Homaidi et al. (2018) have found that rising GDP positively related to bank performance. Whereas Al-Jafari & Alchami, (2014), Almaqtari et al., (2018) found GDP inversely related to financial performance due to some bank-specific factors like high NPA, liquidity issues, etc. Based on the discussion, we assume that,

H_7: There is a significant positive relationship between annual GDP growth rate and bank performance.

Inflation Rate

Inflation defines the rate of growth in price over a specific period. There are three main reasons behind inflation: demand-pull, cost-push and built-in inflation. Rising inflation reduces bank lending activity and shares price, increasing cost of funds and interest rate on lending activity.

High IR reduces financial performance (Batayneh et al., 2021). While, Al-Homaidi et al. (2018); Athanasoglou et al. (2008) found high inflation enhance financial performance of bank due to high OE. Almaqtari et al., (2018) concluded IR had no meaningful relationship to financial performance. Based on the discussion, we assume that,

H_8: There is a significant negative relationship between annual IR and bank performance.

Exchange Rate

The price of one currency in relation to some other currency is defined by ER. It can divide into two types fixed and floating ER. ER fluctuates due to several reasons such as inflation, interest, speculation, balance of payment, public debt, etc. High fluctuation in ER influences bank performance (Lagat & Nyandema, 2016).

Al-Homaidi et al. (2018); Almaqtari et al. (2018); Kola et al. (2018) said high ER minimise bank performance due to deficit balance of payment, foreign currency lending. Based on the discussion, we assume that,

H_9: There is a significant positive relationship between annual ER and bank performance.

Data and Methodology

Goal of the study is to assess the impact of macro-economic and bank specific variables on bank performance. Additionally, a comparison between PrSB and PuSB for the purpose of the study, we selected listed (NSE/ BSE) 32 commercial banks, of which 12 PuSB and 20 PrSB for the period 2010–11 to 2020–21. Tamilnad Mercantile Bank and Lakshmi Vilas bank are unavailable due to lack of data. Here, we employed secondary data, and all data are collected from a published annual report from their website, Money control and www.screener.com. To assess the impact of macro-economic and bank-specific variables on bank performance of commercial banks in India following regression model has been used,

Financial Performance, P_{it}

$$P_{it} = \alpha + \beta_1(OE)_{it} + \beta_2 (CR)_{it} + \beta_3 (LEV)_{it} + \beta_4 (DR)_{it} + \beta_5 (CAD)_{it} + \beta_6 (SIZE)_{it} + \beta_7 (AGGR)_{it} + \beta_8 (IR)_{it} + \beta_9 (ER)_{it} + \varepsilon_{it}.$$

Where Bank performance are measured by (return on assets) ROA and (return on equity) ROE. Bank specific variables are OE, CR, LEV, DR, CAD and Bank size (SIZE). Macro-economic variables are Annual GDP growth rate (AGGR), IR and ER and Error term (ε) of ith bank in t year.

As proxies for bank performance indicators, we employed ROA and ROE. A strong bank performance can raise the value of owners. In other words, bank performance is a determinant of bank's economic health. Accounting measures are more robust at evaluating bank performance than stock return (Bhagat & Bolton, 2008).

Table 1: Measurement of Variables

Variable	Acronym	Measure	Evidence from Past Studies
Dependent Variables			
Profitability	ROA	ROA = Net Profit/ Total Asset.	(Garcia & Guerreiro, 2016; Anbar & Alper, 2011; Ekinci & Poyraz, 2019; Ramesh, 2019)
	ROE	ROE = Net profit/ Equity shareholders' fund.	
Independent Variable: Banks specific factors.			
Operating Efficiency	OE	OE = Operating Expenses/ Interest income.	(Bougatef, 2017; Chowdhury & Rasid, 2017)
Credit Risk	CR	CR = Non-performing Loan/ Loan and Advances.	(Kolapo et al., 2012; Karim et al., 2010; Agarwal et al., 2021)
Leverage	LEV	LEV = Total debt/ Shareholders' fund.	(Sanusi & Ismail, 2005; Bashir & Hassan, 2003)
Deposit Ratio	DR	DR = Deposit/ Total Asset	(Almaqtari et al., 2018; Anbar & Alper, 2011)

Variable	Acronym	Measure	Evidence from Past Studies
Capital Adequacy Ratio	CAD	CAD = (Tire 1 capital + Tire 2 capital)/ Risk-weighted Assets	(Fredrick, 2012; Ghosh, 2021; Biswas & Bhattacharya, 2020)
Bank Size	SIZE	SIZE = Natural logarithm of total asset.	(Almaqtari et al., 2018; Lotto, 2019, Ghosh & Mondal, 2022)
Independent Variable: Macro-economic factors.			
Annual GDP growth rate	AGGR	AGGR= Annual GDP growth rate.	(Almaqtari et al., 2018)
Inflation Rate	IR	IR= Annual Inflation rate.	(Batayneh et al., 2021)
Exchange Rate	ER	ER= Average exchange rate of US $ in a year.	(Kola et al., 2018)

Empirical Findings

Descriptive Statistics

Descriptive statistics for all variables (i.e., OE, CR, LEV, DR, CAD, SIZE, AGGR, IR, ER, ROE, ROA) are shown in in Table 2 of 32 commercial banks based on raw data of eleven years from 2010–11 to 2020–21. Mean value of OE, CR, LEV are 0.2497, 0.0281, 13.0967 and S.D. are 0.09675, 0.02853 and 4.12971. It indicates high deviation exists in the data set. ER varies from 46.67 to 74.57. Mean values of ROE and ROA are 0.0448 and 0.0046, and S.D. are 0.14646 and 0.01106. It shows high fluctuation exists in the data set.

Table 2: Descriptive Statistics

	N	MINIMUM	MAXIMUM	MEAN	S. D.
OE	338	0.11	1.43	0.2497	0.09675
CR	338	0.00	0.17	0.0281	0.02853
LEV	338	1.98	26.99	13.0967	4.12971
DR	338	0.10	0.93	0.7807	0.12833
CAD	338	7.51	56.41	14.2133	3.94411
SIZE	338	7.13	15.39	11.9231	1.44910
AGGR	338	-6.60	8.90	5.4251	4.15289
IR	338	3.33	11.06	6.1546	2.39318
ER	338	46.67	74.57	64.1990	8.09188
ROE	338	-0.81	0.25	0.0448	0.14646
ROA	338	-0.06	0.04	0.0046	0.01106

Correlation Analysis: Table 3 shows Pearson correlation of dependent variables, banks specific variables and macro-economic variables (i.e., ROA, ROE, OE, CR, LEV, DR, CAD, SIZE, AGGR, IR and ER) of 32 commercial banks based on raw data of six years from 2010–11 to 2020–21. CR has a negative relationship to ROA and ROE. Therefore, high CR implies bank performance is reduced. LEV is inversely related to ROA and ROE. It indicates high livered firm is unable to manage bank performance. ER is inversely associated with ROA and ROE. It indicates high ER reduces bank performance. Table 4 shows that our data set does not show multi-collinearity as the highest value of VIF is 2.938, below 5.

Table 3: Correlation (40 Commercial Banks)

	1	2	3	4	5	6	7	8	9	10	11
OE (1)	1										
CR (2)	-0.097	1									
LEV (3)	-0.328**	0.412**	1								
DR (4)	-0.311**	0.259**	0.527**	1							
CAD (5)	0.281**	-0.388**	-0.666**	-0.405**	1						
SIZE (6)	-0.132*	0.231**	0.103	-0.293**	-0.149**	1					
AGGR (7)	-0.081	-0.034	0.069	0.021	-0.045	-0.046	1				

	1	2	3	4	5	6	7	8	9	10	11
IR (8)	-0.088	-0.419**	0.104	-0.004	0.038	-0.129*	-0.117*	1			
ER (9)	0.088	0.399**	-0.170**	-0.006	0.023	0.196**	-0.148**	-0.753**	1		
ROE (10)	-0.073	-0.726**	-0.355**	-0.115*	0.324**	-0.045	0.186**	0.333**	-0.374**	1	
ROA (11)	0.039	-0.700**	-0.463**	-0.198**	0.460**	-0.073	0.192**	0.229**	-0.284**	0.925**	1

Note: "**' and '*' denotes 1%, and 5% level of significance, respectively.

Table 4: Collinearity Statistics

Variables	Tolerance	VIF
OE	0.811	1.232
CR	0.559	1.790
LEV	0.350	2.861
DR	0.482	2.073
CAD	0.529	1.892
SIZE	0.681	1.469
AGGR	0.846	1.182
IR	0.357	2.801
ER	0.340	2.938

Hausman Test Result: Tables 5, 6 and 7 show the Hausman test result of 32 commercial banks, 12 PuSB and 20 PrSB. Chi-Sq. statistics values of 32 commercial banks (Table 5) of ROA and ROE are 17.180749 and 53.080092, respectively and the values are significant at a 1% level. It implies that fixed effect model is appropriate for 32 commercial banks. Chi-Sq. statistics value of 12 PuSB (Table 5) of ROA and ROE are 14.915125 and 12.507444, respectively, ROA is significant at 1% level, while the value if ROE is insignificant. It implies that the fixed effect model is appropriate for ROA and the random effect is fitted for the ROE of 12 PuSB. Chi-Sq. statistics value of 20 PrSB (Table 6) of ROA and ROE are 32.155521 and 14.087390, respectively, and the values are significant at 5%. It suggests that fixed effect model is appropriate for 20 PrSB.

Table 5: Hausman Test (32 Commercial Banks)

Model with Dependent Variables	Chi-Sq. Statistics	Degree of Freedom	Probability
ROA	17.180749	6	0.0086
ROE	53.080092	6	0.0000

Table 6: Hausman Test (12 Public Sector Banks)

Model with Dependent Variables	Chi-Sq. Statistics	Degree of Freedom	Probability
ROA	14.915125	6	0.0209
ROE	12.507444	6	0.0516

Table 7: Hausman Test (20 Private Sector Banks)

Model with Dependent Variables	Chi-Sq. Statistics	Degree of Freedom	Probability
ROA	32.155521	6	0.0000
ROE	14.087390	6	0.0287

Regression Result

Table 8 shows the impact of macro-economic and bank-specific variables on bank performance of 32 commercial banks (all banks). F-values of ROA and ROE are 20.79756 and 17.31085, respectively and all values are statistically significant at 1% level. It shows how well-fitted the models are. The adjusted R2 value of ROA and ROE is 70.14% and 65.94% respectively, which shows that the model's power is enough.

Table 9 shows the impact of macro-economic and bank specific variables on bank performance of 12 PuSB. F-values of all variables are significant at a 1% level. It implies models are well fitted. The adjusted R2 value of ROA and ROE is 21.76% and 37.18% respectively, which shows the model's power.

Table 10 shows the impact of macro-economic and bank specific variables on bank performance of 20 PrSB. F-values of all variables are significant at a 1% level. It implies models are well-fitted. Adjusted R^2 value of ROA and ROE is 65.63% and 59.97%, respectively, it implies that the power of the model is sufficient.

OE is negatively related to ROA and ROE in case of all banks (Table 8), 12 PuSB (Table 9), and its coefficient is statistically significant. Our study is consistent with Le et al., (2019) and inconsistent with Dimitris, (2008); Sanchez et al., (2013). It means strong OE unable to boost bank performance. In other words, operating cost is higher respect to interest income.

Credit risk (NPLR) is inversely related to bank performance calculated by ROA and ROE in case of sample banks (Table 8), 12 PuSB (Table 9), 20 PrSB (Table 10) and its coefficient is statistically significant at a 1% level. Our findings go with Kolapo et al., (2012); Karim et al. (2010) and contradicts Kurawa and Garba (2014); Afriyie and Akotey, (2012). It means high non-performing loan reduces bank performance.

The reason behind the result may be information regarding excessive NPA is shared unequally from lower-level employees to top-level employees, and some portion of NPA could be wilful default by borrowers.

LEV is inversely as well as significantly related to bank performance (ROA and ROE) of sample banks (Table 8), 12 PuSB (Table 9). Our findings consistent with Bashir and Hassan (2003) and contradicts with Sanusi and Ismail (2005). It implies high levered firm reduces bank performance. Improper uses of debt and equity may cause of the result.

DR has a positive association to bank performance (ROA and ROE) of sample banks (Table 8), 12 PuSB (Table 9), 20 PrSB (Table 10 and it is statistically significant. Our findings consistent with Parab and Patil (2018) and inconsistent with Ghosh (2021) implies that banks can generate earnings by using deposit.

CAD positively related to ROA of sample banks (Table 8), 12 PuSB (Table 9), 20 PrSB (Table 10) and its coefficient is statistically true at a 1% level. Our findings consistent with Ghosh (2021), contradict Fredrick, (2012). It means strong capital helps to generate ROA.

Size has a positive relationship to bank performance of sample banks (Table 8), 12 PuSB (Table 9), 20 PrSB (Table 10) and it is significant at a 1% level. Our findings go with Almaqtari et al. (2018); Lotto, (2019); Al-Homaidi et al. (2018) contradict with Athanasoglou et al. (2008). It means larger banks can improve bank performance due to proper use of assets.

Annual GDP growth rate (AGGR) is positively related to bank performance (ROA and ROE) of sample banks (Table 8), 12 PuSB (Table 9), 20 PrSB (Table 10) and it significant at a 5% level. Our findings go with Al-Homaidi et al. (2018). It implies that rising GDP can enhance bank performance by reducing credit default.

ER is negatively related to bank performance of sample banks (Table 8), 12 PuSB (Table 9), 20 PrSB (Table 10) and its coefficient is statistically significant. Our findings consistent with Al-Homaidi et al. (2018); Almaqtari et al. (2018); Kola et al. (2018). Reason behind the result may be deficit balance of payment or a huge amount of foreign currency lending.

Table 8: Impact of Macro-Economic and Bank-Specific Variables on Bank Performance of 32 Commercial Banks (All Banks)

	Model 1 (ROA) (Fixed Effect)		**Model 2 (ROE) (Fixed Effect)**	
	Coefficient	**T - Value**	**Coefficient**	**T - Value**
(constant)	-0.034244	-2.238794***	-0.418266	-1.932336*
OE	-0.012178	-2.731434***	-0.146956	-2.329130**
CR	-0.176587	-9.044996***	-2.865589	-10.37212***
LEV	-0.000359	-1.688264*	-0.012544	-4.162833***
DR	0.031655	4.039855***	0.465056	4.194082***
CAD	0.000356	2.577198***	0.001679	0.859065
SIZE	0.003465	2.559606***	0.055567	2.900300***
AGGR	0.000446	5.113435***	0.005838	4.729864***
IR	-0.000129	-0.547933	0.001085	0.326061
ER	-0.000329	-3.376891***	-0.005345	-3.879524***
F-value	20.79756***		17.31085***	
Adjusted R^2	0.701480		0.659401	

'***' '**' and '*' denotes 1%, 5% and 10 % level of significance, respectively.

Table 9: Impact of Macro-Economic and Bank Specific Variables on Bank Performance of 12 Public Sector Banks

	Model 1 (ROA) (Fixed Effect)		**Model 2 (ROE) (Random Effect)**	
	Coefficient	**T - Value**	**Coefficient**	**T - Value**
(constant)	-0.067900	-2.160638**	0.0782224	0.298631
OE	-0.060973	-4.401217***	-0.753271	-3.711577***
CR	-0.111596	-4.401217***	-2.598612	-6.988022***

	Model 1 (ROA) (Fixed Effect)		Model 2 (ROE) (Random Effect)	
LEV	-0.000925	-3.779782***	-0.015462	-4.608990***
DR	0.020612	2.079733**	0.248425	1.656445**
CAD	0.000698	1.776511*	0.007230	1.095516
SIZE	0.008927	2.890647***	0.042121	3.582061***
AGGR	0.000254	2.549669**	0.004747	2.500896**
IR	-0.000274	-0.927903	-0.003076	-0.576485
ER	-0.000604	-3.985572***	-0.006097	-3.666157***
F-value	21.76014***		37.18432***	
Adjusted R^2	0.760162		0.713134	

'***' '**' and '*' denotes 1%, 5% and 10 % level of significance, respectively.

Table 10: Impact of Macro-Economic and Bank Specific Variables on Bank Performance of 20 Private Sector Banks

	Model 1 (ROA) (Fixed Effect)		Model 2 (ROE) (Fixed Effect)	
	Coefficient	**T - Value**	**Coefficient**	**T - Value**
(constant)	-0.044174	-2.329381**	-0.458720	-1.982157**
OE	-0.006828	-1.308366	-0.071469	-1.122123
CR	-0.229198	-6.930312***	-3.054819	-7.569115***
LEV	-1.90	-0.005979	-0.005263	-1.357229
DR	0.035588	3.294714***	0.513171	3.893062***
CAD	0.000451	2.658462***	0.002851	1.375651
SIZE	0.003147	1.878607*	0.029612	1.448356
AGGR	0.000528	4.237173***	0.005843	3.842068***
IR	-8.11	-0.246874	0.002697	0.672865
ER	-0.000218	-1.624656*	-0.002301	-1.402218
F-value	14.98401***		11.96958***	
Adjusted R^2	0.656359		0.599725	

'***' '**' and '*' denotes 1%, 5% and 10 % level of significance, respectively.

CONCLUSION

The Indian banking industry has seen many issues and development such as banking fraud, demonization, rising non-performing loan and sustainable modernisation. Since last few years trend of profitability has been downward in Indian banking sector, while increasing trend in deposit, borrowing, loan & advance, etc. Present study conducted to know influence of bank-specific variables and macro-economic variables on bank performance from 2010–11 to 2020–21 of 32 commercial banks in India out of which 12 PuSB and 20 PrSB. In addition, a comparison between PuSB and PrSB has been made. We used several types of bank-specific variables such as OE, CR, LEV, DR, size and CAD, and macro-economic variables like average GDP growth rate (AGGR), IR and ER.

The result shows that OE is inversely related to bank performance in sample banks especially on PuSB, which means higher operating costs are not appropriately used to generate revenue while OE has no meaningful relationship to bank performance in PrSB. CR has negative relationship to bank performance, and coefficient is very high. It indicates that good CR management is needed to develop by banks. LEV has a negative relationship to bank performance for sample banks especially for PuSB but insignificant for PrSB, it means inefficient management of FR reduces bank performance in case of PuSB. While DR is positively related to bank performance for sample banks. It implies that proper

utilisation of deposits can boost bank performance. Strong CAD can enhance stakeholders' value but not shareholders' value. AGGR is positively related to bank performance. At the same time, IR has no meaningful relationship to bank performance.

The empirical examination aims to know the impact of banks specific and macro-economic variables on bank performances by presenting fresh empirical data. The result of the study has significantly added to the body of knowledge by broadly clarifying and thoroughly analysing the commercial banks' performance in India. More specifically, a comparison has been made between PuSB and PrSB. The study findings seriously affect policymakers, analysts, bankers and academicians. Bankers and policymakers should be concerned about bank-specific variables such as rising non-performing loan (CR), OE and LEV. Further bankers should concern about their effective utilisation of resources in this way bank performances can increase. Policymakers should address more concern on macro-economic factors like annual GDP growth, IR and ER which contribute an important role in bank performance.

Our study is not free from drawbacks, we used only 32 Indian commercial banks but not included foreign commercial banks in India. Second limitation is financial performance measuring methods, further study can be conducted with different methods. Thirdly, we used two dependent variables, six bank-specific variables and three macro-economic variables, another study may be done using different variables.

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