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Policy Interest Rate and Bank Profitability-Scheduled Commercial Banks in India

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ABSTRACT

The main **aim** of this research study is to inspect the relationship between interest rate (monetary policy) and bank profitability, along with some bank specific, industry specific, and macroeconomic variables. The **research methodology** includes balanced panel data comprising 50 Indian scheduled commercial banks for 12 years from 2008 to 2020. Fixed effect and random effect model regression have been used to know the required relationship. Due to the presence of heteroskedasticity, the results for robust standard error have been presented. The **result** shows a positive association between the interest rate spread and two banks' profitability indicator return on assets (ROA), return on equity (ROE) while interest rate has an insignificant negative relationship on bank profitability. The study **concludes** that the central bank can increase or decrease the interest spread to maintain the surplus or deficit liquidity problem in the economy. Banks are advised to make the appropriate change in lending rate or deposit rate with respect to policy rate to make transmission channel efficient. Also, identify some other factors that affect the bank's profitability. It will help the bank manager to improve the bank's profitability.

Keywords: monetary policy; interest rate; bank profitability; bank specific; macroeconomic; panel data; fixed effect; random effect

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Процентная ставка и прибыльность коммерческих банков Индии

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АННОТАЦИЯ

Основная **цель** данного исследования заключается в выявлении взаимосвязи между процентной ставкой (денежно-кредитной политикой) и прибыльностью банка наряду с присущими банку отраслевыми и макроэкономическими переменными. **Методология** исследования включает сбалансированные панельные данные 50 индийских акционерных коммерческих банков за 12 лет с 2008 по 2020 г. Используются модели регрессии с фиксированным и случайным эффектом. В связи с наличием гетероскедастичности представлены результаты для робастной стандартной ошибки. Результат показывает положительную связь между спредом процентных ставок и двумя показателями прибыльности банков — рентабельностью активов (ROA) и рентабельностью собственного капитала (ROE), в то время как процентная ставка имеет незначительную отрицательную связь с прибыльностью банка. Сделан **вывод**, что центральный банк может увеличить или уменьшить процентный спред для поддержания профицита или дефицита ликвидности в экономике. Банкам рекомендовано вносить соответствующие изменения в кредитную или депозитную ставку по отношению к учетной ставке, чтобы сделать канал передачи информации эффективным. Также необходимо определить другие факторы, которые влияют на прибыльность банка. Это поможет менеджеру банка повысить его прибыльность.

Ключевые слова: денежно-кредитная политика; процентная ставка; прибыльность банка; специфика банка; макроэкономика; панельные данные; фиксированный эффект; случайный эффект

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INTRODUCTION

To achieve the desired level of inflation and economic growth, central banks in various countries depend on the instrument of monetary policy. One of the significant monetary policy tool is interest rate, also known as the policy rate [1]. The interest rates have fallen during the previous two decades in most advanced countries. The low interest rate has formed a competitive environment for financial organizations. Low interest rate has increased competition in the financial industry and enhanced risk appetite of the financial organizations [2]. There has been a significant fall in interest rate in India during previous two decades similar to other advanced countries. In 2019, reserve bank has reduced repo rate from 6 to 5.15% and further repo rate was reduced from 4.40 to 4% in 2020. The reduction in repo rate was made due to coronavirus outbreak. It is significant to note that repo rate was 7.75% in March 2007, which is considerably higher than the present repo rate of 4%. In major developed countries, interest rates of short term have wilted to close zero and interest rates of long term were historically low in several countries [3]. The central banks' hostile reaction during the initial phase of the financial crisis was acute to prevent an economic and financial meltdown. Though, there has been a serious concern in recent years that benefits of lengthy monetary accommodation may be decreased due to its adverse impact [4]. One reason for such effect is negative impact of lower interest rate on banks' profitability.

The link between monetary policy and bank profitability has been reported in the early literature review [5–6]. Some empirical studies have been dedicated specifically to the influence of interest rates on bank profitability [7–10]. These studies investigate the link between interest rates and bank profitability in different countries during different time frames. We find none of the studies in India that explored specifically the link between interest rates and bank profitability of commercial banks. Although, some studies focused on Bank lending channel of monetary policy.

Studies reveal that there could be heterogeneity in the reaction of banks to monetary policy. It may depend upon the competition in the banking sector. The reaction of banks to monetary policy lies in the quality of balance sheet. Several factors like capital, assets, size, liquidity, ownership, are the bank specific variable that may impact the bank's financial position and responses of banks to monetary policy. A study by J. Peek, E. Rosengren [11] stated that significant factor

of banks' response is capital to total assets ratio. Banks may be reluctant to provide credit even there is plenty of demand for credit if banks find it expensive to raise capital. R.P. Kishan, T.P. Opiela [12] indicates that undercapitalized and small banks are most affected by monetary policy. A study of [13] concluded that monetary policy has a substantial impact on the credit supply of banks with low ratio of securities to total assets.

In this research study, we investigated the link between interest rate (monetary policy) and bank profitability along with some factors of bank specific, industry specific and macroeconomic variables to gain more insight. The study has undertaken 50 Indian scheduled commercial banks over a timeframe of 12 years. We saw return on assets (ROA) and return on equity (ROE) for bank profitability. The regression results of this study found an overall negative insignificant link between interest rate and banks' profitability. The other independent variables show mixed results of positive and negative relationships with bank profitability.

LITERATURE REVIEW

Several studies have been executed to know the bank profitability in different economies across the globe. Though there were similar streams in the previous literature work of bank profitability, all investigated studies have common purposes as well as outlines. These studies have examined the factor contributing towards banks' profitability in diverse economies as well as from different areas [14–19].

Only few research that examined the link between monetary policy and performance of commercial banks. Though, it is no clear consensus among researchers and academicians on the impact of monetary policy has a positive or negative influence on bank performance. A recent study V. Kumar, S. Acharya, LT. Ho [1] on 19 commercial banks from New Zealand covering a timeframe from 2006 to 2018 reveals that a rise in short term interest rates increases the profitability of banks. M. Brei, C. Borio, L. Gambacorta [20] examine how lengthy period of low interest rate impacts the intermediation activity of banks by employing data of 113 international banks in 14 developed economies from 1994 to 2015. This study finds that low interest rate persuades banks to change their activities from interest producing to fee allied and trading activities. On average, one percent reduction in policy rate leads to 0.93% increase in revenue from fees as well as commission. Another study by C. Borio, L. Gambacorta, B. Hofmann [3] investigated 109 international banks from 14 advanced economies from 1995 to 2012

Table 1

Research studies on Monetary Policy and Bank Performance

Paper	Result	Unit and Period
V. Kumar, S. Acharya, LT. Ho [1]	Positive	19 banks, 2006–2018
J. Stráský, H. Hwang [7]	Negative	50 Banks, 2014–2018
C. Borio, L. Gambacorta, B. Hofmann [3]	Positive	109 banks, 1995–2012
C. Madaschi, I. Pablos Nuevo [8]	Negative	2 Countries, 2005–2016
H. Berument, R.T. Froyen [9]	Positive	Finnish banks, 2004–2014
R. Busch, C. Memmel [24]	Negative Short run, Positive Long run	Germany, 1968–2013
P. Alessandri, B.D. Nelson [10]	neg. SR, pos. LR	44 UK banks, 1992–2009
W.B. English [22]	Negative	355 US banks, 1997–2007

Source: Compiled by the authors.

shows a positive link between interest rate and bank profitability. H. Genay and R. Podjasek [21] propose that banks can easily compensate for the impact of low interest rates on profitability by changing their business practices, possibly through high fee income and low loan loss provisions. H. Berument, R. T. Froyen [9] studied Finnish retail banks from 2004 to 2014, when there was a substantial change in policy rate as well as market interest rate, this study also discloses a positive relationship. There is a belief among researchers and economists that tightening of monetary policy resulted in an economic contraction in the short run, whereas expansionary monetary policy leads to expansion of economy W.B. English [22]. The higher interest rates decrease credit demand and credit growth in the economy. Borrowers are likely to default at higher interest rates, and therefore, banks have to upsurge their loan loss provision to prevent these probable losses. Interest-free income also declines with the contraction of the real economy. The indirect impacts are generally believed to have negative impacts on performance of banks [23]. On the other hand, J. Stráský, H. Hwang [7] investigate 50 European banks from 2014 to 2018 by using quarterly bank level data and established a weak negative link between monetary policy and banks' profitability. Research performed by C. Madaschi, I. Pablos Nuevo [8] in Denmark and Sweden banks found that banks' profitability increased during negative interest rates. R. Busch, C. Memmel [24] also reveal short run negative impacts for Germany, while opposite results were seen in the long run where an upsurge in interest rate by 100 basis points resulted in around 7 basis points increase in the interest margin of the banks. Similar results were reported for UK banks

in the study [10]. W.B. English [22] works on the issue of interest rate risk and interest margin by investigating interest rate volatility. The study assumes that steeper term structure increases interest margins and volatility of interest rate has negative influence on net interest margin. The maturity mismatch as well as repricing frictions is mainly responsible for suppressed profits.

Although earlier studies are attempting to examine the relationship between profitability of banks and monetary policy on different economies, evidence from emerging and developing economies provides mixed or ambiguous results as shown in Table 1. None of the studies focus on the link between the interest rate and profitability of banks in India. Therefore, this study focuses on the relationship between interest rate and bank profitability of India by considering some variables as a control variable. Bank profitability is measured by return on assets and return on equity. Further, the present study extends and contributes to past studies from different economies as it considered panel data of 50 commercial banks covering a timeframe from 2008 to 2020. The rest of research paper is presented as follows. Section 2 consists of the methodology used for analysis and required data on variables for the study. The data analysis is reported in the third section. The results of regression analysis are presented in the fourth section. Lastly, conclusion emphasizes important findings as well their implications in the fifth section.

DATA AND METHOD

Description and Sources of Data

The present study has taken secondary data for investigation. The required variables such as bank specific as well as macroeconomic statistics have

Table 2

Descriptive Summery

Variable	Observations	Mean	Minimum	Maximum	Std. Dev
ROA	600	.8953	-9.62	4.21	1.340
ROE	600	7.111	-67.5	25.02	12.76
RP	600	6.720	4.92	7.94	.9551
SP	600	.9858	.250	2.68	.6337
CA	600	17.66	1.12	277.4	13.92
NIM	600	2.996	.946	.130	6.56
NPA	600	1.965	0.00	15.33	2.578
LIQ	600	.8572	.0453	358.2	14.61
SIZE	600	4.692	.630	6.60	.8174
CR 3	600	.3601	0.32	.410	.0353
INF	600	7.708	3.10	12.4	2.713

Source: Compiled by the authors.

been taken from published reports of RBI. The period considered for the current study is 12 years from 2008 to 2020. For better understanding, 50 scheduled commercial banks which include 12 public banks, 20 private banks, and 18 foreign banks, have been considered. Therefore, it makes a balanced panel data comprising 600 observations.

Descriptive Statistics

Summary statistics of all variables have been reported in Table 2. This table presents the number of observations, mean, minimum, maximum, and standard deviation to provide insights into the distribution of variables. The average value of ROA is 0.89%, ROE is 7.11% during the study period. A high standard deviation has been reported by liquidity (14.61) which indicates that liquidity of sample banks varies. The result depicts that capital has the highest average value, i.e., 17.6, followed by inflation (INF), repo rate (RP), size (SZ), net interest margin (NIM), nonperforming assets NPA, spread (SP), liquidity (LIQ), and CR3 as 7.70, 6.72, 4.69, 2.99, 1.96, 0.98, 0.85, and 0.36 respectively.

Method

The variables used in the present study to investigate the relationship between bank profitability and monetary Policy, along with some other determinants shown in Table 3. Bank profitability are measured by ROA and ROE. Two models have been used to

examine the link between interest rate and bank profitability.

$$ROA_{it} = \alpha + \sum \beta_{x1} MP_{it} + \sum \beta_{x2} SP_{it} + \sum \beta_{x3} CA_{it} + \sum \beta_{x4} NIM_{it} + \sum \beta_{x5} NPA_{it} + \sum \beta_{x6} LIQ_{it} + \sum \beta_{x7} SZ_{it} + \sum \beta_{x8} CR_{it} + \sum \beta_{x9} INF_{it} + \epsilon_{it} \quad (1)$$

$$ROA_{it} = \alpha + \sum \beta_{x1} MP_{it} + \sum \beta_{x2} SP_{it} + \sum \beta_{x3} CA_{it} + \sum \beta_{x4} NIM_{it} + \sum \beta_{x5} NPA_{it} + \sum \beta_{x6} LIQ_{it} + \sum \beta_{x7} SZ_{it} + \sum \beta_{x8} CR_{it} + \sum \beta_{x9} INF_{it} + \epsilon_{it} \quad (2)$$

The effect of monetary policy is measured by considering the repo rate as an independent variable. Repo rate is an interest rate levied by the Reserve bank for lending resources to commercial banks. Therefore, it is probable to have both positive and negative influences on bank profitability. Net interest margin shows the proportion of net interest income relative to total interest earning assets and therefore, banking profitability is expected to move in a similar direction as NIM. CAR is measured by equity to total assets. The capital adequacy ratio indicates the capital strength of the organization. Sufficient capital provides firm security against unforeseen shocks. Nonperforming assets indicate the credit risk of banks are measured by the ratio of net NPA to net advances. Bank profitability is estimated to move in the opposite direction of nonperforming assets. Liquidity management is measured by ratio of

Table 3

Description of Variables

Variable	Measurement	Description	
Return on Assets (ROA)	Net Income / Total Assets	ROA indicates the profit generated by using the existing assets. It is used to measure the organizations' profitability	
Return on Equity (ROE)	Net Income / Shareholder's equity	ROE shows the proficiency to create profits by utilizing shareholders' equity. It shows the firm's financial performance	
Independent Variable	Measurement	Description	Expected Sign
Monetary Policy			
Interest Rate (Repo)	Average Repo Rate	Repo rate is the interest rate levy by reserve bank for lending funds to banks	+/-
Spread (SP)	Repo rate-Reverse repo rate	Spread indicates the gap of interest rate between repo rate and reverse repo rate	+/-
Control Variable			
Capital Adequacy (CA)	Equity / Total Asset	Capital adequacy shows the part of owners' funds accessible to provide support to a firm's business activities	+
Net Interest Margin (NIM)	(Interest Earned-Interest Paid) / Total Assets	NIM indicates the net interest income earned with respect to total assets	+
Nonperforming Assets (NPA)	Net Nonperforming Assets/ Net Advances	This ratio represents the asset quality of a bank. It indicates the percentage of loans which has not received any interest or principal income	-
Liquidity Management (LIQ)	Cash and Cash Equivalent / Customer Deposits	It measures the liquid assets sustained by an organization in respect to its current liabilities	+/-
Size (SZ)	Natural log (Total Assets)	This indicates the size of assets held by a firm	+
Concentration (CR3)	Total Assets of Three Largest Banks / Total Banking Assets	Concentration indicates the competitiveness level in the industry	-
Inflation	Growth rate of CPI-IW	Consumer price index for industrial workers includes specific services, and measured depend on retail prices, and is used to decide the dearness allowance for employees, is the most appropriate indicator of general inflation	+/-

Source: Compiled by the authors.

Table 4

Pairwise Correlation Matrix between Internal Variables

	RP	PC	CAR	NIM	NPA	LIQ	SIZE	CR 3	INF
RP	1.000								
SP	0.221	1.000							
CAR	0.035	0.025	1.000						
NIM	0.055	0.169	0.281	1.000					
NPA	-0.069	-0.273	-0.065	-0.342	1.000				
LIQ	-0.077	0.033	-0.018	0.032	-0.010	1.000			
SZ	0.002	-0.219	-0.436	-0.302	0.255	-0.157	1.000		
CR3	-0.540	-0.295	-0.094	-0.176	0.271	-0.000	0.161	1.000	
INF	-0.056	-0.432	-0.081	-0.215	0.325	-0.034	0.177	0.681	1.000

Source: Compiled by the authors.

liquid assets to customer deposits. A balanced liquid asset is required to meet current financial obligations without hampering its profits. A large proportion of liquid assets implies less profit as existing assets bear a lower return rate. Generally, firms with large size are probable to achieve economies of scale and therefore increase bank profitability. Size variable is measured by the natural log of total assets. For industry specific variables, concentration ratio is measured by CR3, it shows the level at which market is regulated by big banks in the industry. As per the structure conduct performance (SCP) assumptions, a high concentration in the market leads to enhance market share and therefore, leads to monopoly revenue. Inflation generally affects the actual value of cost as well as revenue of banks. Banks can alter their interest rate in order to increase revenue than costs if inflation rate is projected. On the other hand, a bank cannot make appropriate changes in interest rates which leads to a faster increase in cost as compared to revenue in case inflation is unanticipated.

DATA ANALYSIS

Correlation Matrix

Table 4 displays the correlation matrix, representing the relationship between independent variables. All independent variables are not strongly correlated with each other. Therefore, multicollinearity will not be a serious issue in regression analysis. D.N. Gujarati and D. Porter [25] stated that correlation above 0.8 leads to the issue of multicollinearity. Further, this study has calculated variance inflation factor (VIF) to check the problem of multicollinearity, and results are reported in Table 5.

Diagnostic Test

The current study has executed some diagnostic tests to know the suitability of the models. Levin Lin Chu unit root test has been applied to know the stationarity of selected variables. All variables are stationary as result indicates that null hypothesis is rejected as p value calculated for individual variables is below 0.05. The existence of heteroskedasticity has been checked by Breusch Pagan Test. Both models have problems of heteroskedasticity as presented in Table 5. Robust standard error results have been interpreted and reported in the current study. The results of Wooldridge test agreed with the null hypothesis that no first order autocorrelation. The presence of multicollinearity has been checked by VIF. The average value of VIF is below 10 for the independent variable which suggests no existence of multicollinearity. Further, Hausman test has been done to choose the appropriate model among fixed effect or random effect as presented in Table 5.

REGRESSION RESULT AND DISCUSSION

The regression results of panel data are reported in Table 6. The final results for ROA model have been extracted from the fixed effect and ROE results from random effect. The current study shows the presence of heteroskedasticity in models, to overcome the issue results of robust standard error have been displayed. The result derived for equation 1 by taking ROA as bank profitability has been represented in Table 6. The result provides the fitness of model 1 as F value was found substantial at 5%. The rho (ρ) value is 0.339, which implies that error term with dependent variable. The value of R^2 (within) is 48.02

Table 5

Diagnostic Test and Model Selection

	ROA		ROE	
Breusch-Pagan Test	$\chi^2 (9) = 412.9$	$P > \chi^2 = 0.000$	$\chi^2 (9) = 304.5$	$P > \chi^2 = 0.000$
Wooldridge Test	$F (1,49) = 0.91$	$P > F = 0.344$	$F (1,49) = 0.09$	$P > F = 0.754$
VIF (Mean)	1.87		1.87	
Hausman Test	$\chi^2 = 29.70$	$P > \chi^2 = 0.0005$	$\chi^2 = 2.450$	$P > \chi^2 = 0.9823$
Model	Fixed Effect		Random Effect	

Source: Compiled by the authors.

per cent over the timeframe that signifies the explanatory power of model 1. Discussing the impact of predicting variables, a sufficient number of determinants were found to be significant influences on ROA.

Interest rate has a negative insignificant impact on ROA at 5% level. The interest rate is expected to have a positive impact on bank profitability as their revenue is likely to be higher when interest rate on loans are high (keeping every other thing constant). However, given that a higher interest rate also increases the bank funding costs (the increase is accompanied in the deposit rate too besides the lending rate). It is not so much the Interest rates that matter for the profitability but rather the net interest margin. In a prolonged lower interest rate regime during a weakened economy, the credit offtake slumps on account of reduced economic activity besides the refinancing of the long-term loans and advances at the lower rates, thereby leading to negative effect on banks' profitability. It has also been observed that banks generally tend to keep the net interest margin in their favor during the low regime rates by holding back the lending rates but decreasing the deposit rates to improve their profitability. This has been time and again raised by RBI in recent times advising banks to pass through from policy rates to bank lending rates. Earlier studies have mixed results on the link between interest rate and bank profitability. The previous studies [15, 26] show significant negative impact on bank profitability. An investigation by M. Brei et al. [20] recommends that decrease in interest rate by one percent leads to 0.93% increase in the non interest income. The decay interest rates also decrease the debt burden and inspires banks to increase their lending portfolio through aggressive lending which results in higher profitability. JA. Bikker, TM. Vervliet [2] and C. Borio, L. Gambacorta, B. Hofmann [3] argue that rise in short term interest rates increases the profitability of banks

because most banks borrow funds on a short-term basis and lend these funds on a long-term basis that will improve the lending margin as well as profitability. Some of the studies show the insignificant influence of interest rate on bank profitability [27, 28]. Interest spread has a positive significant influence on bank profitability in our study at a level of 5%. Generally, spread is increased to make central bank standing facilities costlier to encourage interbank trading and activities. It implies that if interest corridor increases bank borrows or lend their money to each other to deal with the issue of deficit and surplus liquidity. With this approach, Banks can borrow more funds to their customers and earn interest on it. An investigation by U. Bindseil, J. Jablecki [29] suggested that a wider corridor is associated with greater interbank turnover and large short-term volatility. Another independent variable, as expected positive relationship of NIM on bank profitability has been seen in table 6, and impact is significant at 5% level. A higher net interest margin leads to high productivity. B.S. Bodla, R. Verma [30] stated that positive association between bank profitability and net interest margin.

A similar result was also provided by the study [31]. The capital adequacy ratio shows a positive significant impact on ROA at 5% level. Capital adequacy provides the banks a buffer stock that protects them from unforeseen risks, therefore a positive impact on bank profitability. K. Bougatef [32] and O.O. Ebenezer, WA. WB. Omar, S. Kamil. [16] demonstrated positive link between capital and bank profitability while A. T. Yahya [33] stated negative influence on the banks' profitability. Nonperforming assets are serious concern in banks as it has an inverse relationship with banks' profitability. As expected, the result of present study shows a negative significant impact of nonperforming assets on ROA at 5%. Similar, results can be found in this study [34]. Inadequate liquidity is another factor of deteriorating bank profitability. Thus,

Table 6

Regression Results

	ROA		ROE		VIF
Variables	Coefficient (t-value)	Robust stand error	Coefficient (Z-value)	Robust stand error	
RP	-.04465(-1.23)	.03638	-.45423(-1.70)	.26644	2.14
SP	.34457(3.24)*	.10623	4.2316(7.34)*	.57686	1.44
CA	.00341(2.27)*	.00149	.03661(1.13)	.03235	1.32
NIM	.50218(3.93)*	.12786	1.9479(3.72)*	.52392	1.26
NPA	-.22320(-6.55)*	-.2232	-3.0940(-9.88)*	.31305	1.29
LIQ	.00640(2.55)*	.00250	.06497(10.65)*	.00609	1.04
SZ	.33074(1.20)	.27548	4.5455(7.65)*	.59415	1.45
CR3	-3.8447(-2.63)*	1.4613	-44.809(-2.38)*	18.819	3.78
INF	.00837(0.43)	.01966	-.09638(-0.52)	.18462	3.14
_cons	-.50826(-0.35)	1.4332	1.0835(0.14)	7.7882	-
Sigma_u	.5451		3.250		-
Sigma_e	.7596		7.465		-
Rho	.3399		.1594		-
R ² (Within)	0.4802		0.5807		-
Model Fit	F (9,49) = 149.97 P > F = 0.000		Wald χ^2 (9) = 888.48 P > χ^2 = 0.000		-

Source: Compiled by the authors.

Note: Significance exists at 0.05 level.

Table 7

Result Summary

Result Obtained				
Independent Variable	Expected Sign	ROA	ROE	Supported by
Interest rate (repo)	Positive/Negative	Negative insignificant	Negative insignificant	[28, 29]
Capital Adequacy	Positive	Positive significant	Positive insignificant	[16, 33]
Net Interest Margin	Positive	Positive significant	Positive significant	[31, 32]
Non-Performing Assets	Negative	Negative significant	Negative significant	[35]
Liquidity Management	Positive/Negative	Positive significant	Positive significant	[33, 36]
Size	Positive	Positive Insignificant	Positive significant	[35, 39]
Concentration	Negative	Negative significant	Negative significant	[40]
Inflation	Positive/Negative	Positive insignificant	Negative insignificant	[41, 43]

Source: Compiled by the authors.

adequate funds are required for the smooth working of banks. Liquidity management has significant positive association with ROA. K. Bougatef [32] and N. Salike, B. Ao [35] provide empirical evidence of positive association between bank profitability and liquidity while [36] reported negative influence of liquidity on bank profitability. C. T. Albulescu [37] found liquidity has a mixed impact. Bank size is found to be positively insignificant on ROA at 5% level. The result of this study is consistent with [34] who established that bank size does not influence profitability significantly. Previous studies [32, 38] show positive influence of bank size on bank profitability. The competition in banking industry has a positive link with banks' profits. High concentration leads to less competition in the market place and a large portion of the market share is in hands of large players. The empirical result shows negative association of concentration with profitability. The result is parallel to [39] who reported that negative concentration relation with banks' profitability and thus, no empirical evidence to support SCP hypothesis. Lastly, Inflation has a positive insignificant influence on banks' profitability. This result is similar to the previous study [40] which found that inflation does not impact bank profitability. According to the study of S. Gul, F. Irshad, K. Zaman [41] found a direct link between inflation and ROA. It implies that if banks suppose that inflation may be higher in the near future, the bank can upsurge their prices without facing any drop in demand for their product. Based on the condition that predicted inflation will be equivalent to actual inflation, thus, there will be no decline in business activities. On contrary, other empirical results such as [42, 43] show the negative link between inflation and bank profitability.

The result estimated for equation 2, measuring the bank profitability for ROE is reported in *Table 6*. The overall fitness of the ROE model shown by Wald χ^2 is sufficiently higher and substantial at the level of 5 percent. The explanatory power of model 2 has fairly well as indicated by R^2 (58.07), rho (ρ) is 0.1594 which means a change in the dependent variable is explained by error term. Interest spread has a positive significant impact at 5%. A larger impact of interest spread is recorded on ROE as compared to ROA, which shows an increase in the shareholder wealth due to an increase in interbank trading activities. Interest rate shows the negative and insignificant influence on ROE. Other independent variables except inflation have the same sign for ROE as shown in ROA. INF has a negative association with bank profitability (ROE) that indicates that banks cannot make

appropriate changes of interest rate which leads to faster increase in cost as compared to revenue if inflation is unexpected which results in decline in shareholder wealth. The summary of results is presented in *Table 7* along with empirical evidence of previous studies.

CONCLUSION AND POLICY IMPLICATIONS

Banking profitability plays a vital role in the development of an emerging economy. To measure the profitability ROA and ROE have been considered in the study. To know the relationship between interest rate and bank profitability, some control variable has been considered along with interest rate that affects bank profitability. This study shows the negative insignificant relationship between interest rate and two indicators of bank profitability. It is the net interest margin that affects the bank profitability not interest rate. It has been perceived that banks usually keep net interest margin in their favor during the low interest rate regime by decreasing the deposit rate and holding back the lending rate to improve the profitability. The interest spread has a positive significant relationship on the bank profitability. As the spread increases, banks are encouraged to engage in interbank business activities that help them address the deficit and surplus liquidity problem. This study reveals that some other independent variables also influence bank profitability. Capital adequacy, net interest margin, and liquidity management have a significant positive relationship on ROA while NPA and concentration have negative significant impact on ROA. In the second ROE model of bank profitability, net interest margin, liquidity management, and size have significant positive influence whereas NPA and concentration have negative significant impacts on bank profitability. Lastly, Inflation does not show any significant impact on bank profitability in both models.

The result informs policymakers and economists about the influence of interest rate on the profitability of banks and helps them in taking significant decisions related to any change in the policy rate. Banks are advised to make the appropriate change in lending rate or deposit rate with respect to policy rate to make transmission channel efficient. The central bank can increase or decrease the interest spread to maintain the surplus or deficit liquidity problem in the economy. Also, identify some other factors that affect the bank's profitability. It will help the bank manager to improve the bank's profitability. Nonperforming assets are one of the vital causes of deteriorating banks' profits for several years.

Bankers must work on their loan portfolios otherwise problem of the NPA in long run may risk the survival of banks. Bank management should pay attention to liquidity management as deficit liquidity may reduce bank profitability. The finding of this study shows that interest spread, nonperforming assets, net interest margin, liquidity, and concentration are significant factors that affect bank profitability. The policymakers and regulators

should consider these determinants to increase bank profitability in India.

The present study suffers from limitations that open a new idea for future studies. Different panel data for the bank group wise can be investigated, and comparisons can be analysed between different bank groups. Similarly, cross country examination can also be performed to investigate and compare the influence of interest rates between nations.

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B.P. Sahoo — discussed variables, research methodology and research findings.

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