THE American Journal of Humanities and Social Sciences Research (THE AJHSSR)
 2025

E-ISSN: 2581-8868 Volume-08, Issue-03, pp-70-83 www.theajhssr.com Research Paper

Crossref DOI: https://doi.org/10.56805/ajhssr Open Access

Decoding the Impact of Basel III Norms in Indian Banks: An Analysis of Risk Management and Financial Resilience in Select Public Sector Banks

¹Rachna Gupta, ²Dr Nishtha Pareek

¹(Associate Professor, Department of Commerce, Ramanujan College, University of Delhi Research Scholar, Banasthali Vidyapith) ²(Associate Professor, Department of Commerce and Management, Banasthali Vidyapith)

ABSTRACT

The study aims to explore the impact of Basel III regulations on risk management and financial resilience in Indian public sector banks. Furthermore, it highlights the effectiveness of Basel III norms in mitigating financial risks and promoting overall stability within the banking sector. The study employs a panel data regression technique to assess the impact of Basel III norms on financial performance of 5 public sector banks from 2013 to 2023. The data is divided into two sample periods: pre-Basel III (2013-14 to 2017-18) and post-Basel III implementation (2018-19 to 2022-23). The analysis evaluates how these regulatory changes influence banks' risk strategies and financial outcomes. The study highlights that capital adequacy measures and size of public sector banks in Basel III have positive and significant impact on public banks profitability. This study offers a comprehensive evaluation of the pre and post impact of Basel III norms on public sector banks in India.

KEYWORDS-Basel III, Leverage, Liquidity, Public Sector Banks

1. INTRODUCTION

The 2007–2008 financial crisis caused major disruptions to the global financial system, thereby revealing serious issues in the banking industry and highlighting the pressing need for a stronger regulatory structure (Jayadev, 2013). In response to this, the Basel norms were designed by the Basel Committee on Banking Supervision (BCBS). The objectives of these reforms were to lower systemic risk in the banking sector, strengthen financial resilience, and improve risk management procedures (King and Tarbert, 2011). Subsequently, Basel III standards were phased in starting in 2013, with the aim of strengthening banks against potential financial shocks by introducing stricter capital requirements, leverage ratios, and liquidity regulations (Naceur et al., 2018). As a consequence, Basel III has had a significant impact on how banks function, manage risks, and maintain financial stability (Gavalas, 2018).

Likewise, India, the world's largest rising economy, progressively embraced Basel III requirements, with the Reserve Bank of India (RBI) adjusting the standards to reflect domestic policies. This has had a substantial impact on the Indian banking system, including performance of banks, availability of funds for lending, portfolio risk, and quality of assets (Seth et al., 2022). According to research, the impacts of Basel III on profitability, efficiency, and resilience for banks around the world have been mixed, with some experts suggesting that greater capital ratios boost efficiency and others claiming that the severe standards may harm bank performance (Obadire et al., 2022). Furthermore, there is a difference in the extent and size of the Basel III effects on Indian banks' resilience, operational effectiveness, and financial performance (Jaiwani and Gopal krishnan, 2023).

Building on this, under the Basel III framework, the relative performance of public sector banks offers an interesting research topic in this regard. To begin with, the ownership structure, governance, operational effectiveness, and strategic aims of banks in the public sectors vary greatly (Barry et al., 2011). Specifically, public sector banks, which are frequently under government control, may prioritize goals like stability, regional development, and financial inclusion ahead of profitability (Ozili, 2021). As a result, this may influence how they comply with Basel III regulations.

In light of these considerations, the goal of this study is to look at and compare how Basel III regulations affect risk management and financial stability in public sector banks. The study's goal is to uncover the elements that influence relative performance of public sector banks in terms of financial stability and risk management, and analyze their responses to Basel III's increased capital and liquidity requirements. Panel regression is used in the study to assess Indian banks' performance across two time periods: before Basel III (2013–14 to 2017–18) and after Basel III (2018–19 to 2022-23). It looks at how banks' risk management and financial performance are affected by Basel III regulation reforms. The results show significant impact of Basel III on public banks. Public banks are benefitting significantly on account of strong capital base. Basel III has made banks more resilient, though it also makes compliance more difficult, especially for smaller institutions (Pervez and Ali, 2024). As a result, the policy implications are practically significant and suggest that authorities ought to take them into account for public sector banks.

The study is structured as follows: It begins with the theoretical framework and literature review, followed by the research design and methodology. Next, the data analysis and econometric model results are presented. The subsequent section interprets the econometric findings, while the final section discusses implications, limitations, and recommendations for future research.

2. THEORETICAL BACKGROUND

After doing a thorough exploration of the studies, the researcher is of the opinion that the various aspects of the accord, for the sake of simplicity, can be analysed under following suggested themes-

2.1 Capital Norms and financial performance, resilience and operational efficiency of banks

A crucial metric for evaluating a bank's financial health is the Capital Adequacy Ratio (CAR), which compares capital to risk-weighted assets (Hossain et al., 2018). Theoretically, a bank's capacity to tolerate economic shocks is improved by a greater CAR, which denotes a larger buffer to absorb possible losses. According to research, banks with adequate capital are more robust when the economy is struggling (Chiaramonte and Casu, 2017). The banks with greater capital buffers are less prone to act riskily because they can absorb losses internally rather than depending on outside assistance (Kwan and Eisenbeis, 1997). A more stable financial system is encouraged and excessive risk-taking is decreased by this self-sufficiency (Laeven and Levine, 2009).

Banks with larger capitalization levels were better able to handle the tumultuous market conditions during the 2008 global financial crisis (Giordana and Schumacher, 2017). For example, Sahut and Mili (2011) discovered that throughout this crisis, banks with higher capital levels performed better than their peers with lower capital. This emphasizes how crucial capital quality and quantity are in assessing a bank's resilience (Bui et al., 2017). Furthermore, well-capitalized banks showed their better financial resilience by continuing to lend and absorb risks after the crisis, as noted by Cohen and Scatigna (2016) and Priharta and Gani (2024).

However, the empirical research offers conflicting results about the relationship between capital requirements and bank performance, despite the fact that higher capital levels are frequently linked to improved financial stability. Numerous studies contend that stricter capital requirements reduce banks' exposure to risk by making them more cautious when making lending and investment decisions (Altunbas et al., 2007; Mamatzakis and Bagntasarian, 2019). According to Bui et al. (2017), a little rise in CAR considerably improved Australian banks' resilience. They did, however, issue a warning that overly stringent capital requirements would inhibit bank lending and result in less economic activity.

Moreover, scholars like Mendicino et al. (2018) warn about the unforeseen repercussions of too strict capital rules. They contend that increased capital requirements, especially those imposed by the Basel III framework, may result in lending inefficiencies and negatively impact banks' overall performance (Malherbe, 2020).

In addition, according to a number of studies, operational inefficiencies may result from the requirement to maintain larger capital levels. CAR and profitability are negatively correlated, according to Goddard et al. (2004), who contend that banks may become unduly cautious and prioritize capital reserves above investment prospects. They further argue that this prudence may lead to lost opportunities and ultimately reduce profits (Thakor, 1996).

Chiaramonte and Casu (2017) provide additional evidence of the detrimental effect on operational efficiency, arguing that banks' efficiency is decreased by more stringent capital requirements, especially in industrialized nations. Berger and Bonaccorsi di Patti (2006) support this claim by demonstrating a negative correlation between banks' operational efficiency and increased capital regulatory requirements. In this regard few researchers found that CAR doesn't affect profitability of banks (Putri et al., 2024; Hasanuh et al., 2024). Amidst this, the present

study aims to understand the impact of new capital norms, measured as CAR, on the financial parameters, operational efficiency and perseverance of banks.

2.2 Liquidity and Banks' financial performance, operational efficiency and resilience

Liquidity creation is generally considered as the fundamental task of financial institutions, very crucial for keeping the whole economy in good shape (Diamond and Dybvig, 1983). However, this liquidity generation carries certain risks that could challenge the survival of financial intermediaries (Brunnermeier and Pedersen, 2009). In fulfilling this role, banks provide depositors with easily accessible, liquid claims while simultaneously managing non liquid assets as agents of investors (Alaoui Mdaghri and Oubdi, 2022). For example, during the 2008 financial crisis, banks with higher liquidity risk significantly reduced lending, increased interest rates on deposits, and underperformed in the stock market (Acharya and Mora, 2015). Despite this, while much of the literature on banking has thoroughly examined capital and leverage regulations, discussions around liquidity regulations remain comparatively underdeveloped. Even though banks play a critical role in liquidity creation, there is still a considerable knowledge gap regarding how liquidity regulations affect bank behavior and performance (Diamond and Kashyap, 2016). Moreover, empirical research on this topic presents differing opinions.

On the one hand, some scholars argue that the assumption that more stringent liquidity regulations harm bank profitability is flawed (Nath et al., 2024). They suggest that higher liquidity leads to reduced risk of default, which subsequently reduces costs of financing and enhances profitability (Khan et al., 2015). Additionally, a stronger banking sector contributes to the overall economy by reducing societal costs, mitigating bankruptcy risks, and fostering macroeconomic stability (Papadamou et al., 2021).

On the other hand, many in the banking sector assert that stringent liquidity regulations limit banks' ability to create liquidity, ultimately leading to lower profitability (Nugroho et al., 2024). In support of this argument, Blundell-Wignall and Atkinson (2010) suggest that banks may start taking undue risk in areas untouched by Basel III because liquidity compliance negatively impacts profitability. Furthermore, Bordeleau and Graham (2010) highlight that while enhanced liquidity levels may initially boost profitability, this effect diminishes over time. Beyond a certain level, holding highly liquid assets decreases profitability as the opportunity costs of doing so outweigh the benefits of reduced default risk (Safitri and Geraldina, 2024). There is a need to understand the outcome of liquidity norms on banks. Hence, the study aims to understand the influence of liquidity norms as suggested in Basel III, measured as LCR on the financial performance, operational efficiency, and resilience of banks.

2.3 Leverage and Banks' financial performance, operational efficiency, resilience

Regulations pertaining to leverage encourage banks to finance their operations primarily using internally produced capital or equity capital. This strategy aims to strengthen a bank's resilience in times of economic instability by lowering reliance on external borrowing. Leverage restrictions, according to DeAngelo and Stulz (2015), not only motivate banks to preserve liquidity but also boost commercial banks' competitiveness.

Moreover, key financial theories like trade-off theory, pecking order theory, and agency cost theory are frequently cited by authorities to support the execution of leverage ratios (LRs) (Acosta-Smith et al., 2020). Trade-off theory states that banks need to strike a balance between risk-taking and leverage (Saona, 2016). Regulators seek to strike the best possible balance by implementing LRs, which guarantees that banks have sufficient capital to bear any losses and preserve financial soundness (Christensen et al., 2012). But when paired with internally determined capital requirements, these leverage limits can occasionally result in reduced lending to low-risk clients and increased lending to high-risk borrowers (Petria et al., 2015). The objective of financial stability may be compromised by this unforeseen effect (Kiema and Jokivuolle, 2010).

But according to Janda and Kravtsov (2019), these rules may also limit the expansion of mortgages, lower bank profitability, and may raise financial institutions' risk appetite. A substantial body of research backs up the idea that a bank's profitability is enhanced by having more equity capital in relation to total assets, which lowers financial leverage. Paolucci (2016) asserts that higher equity-to-total-assets ratio can lower funding costs and improve a bank's credibility. On the other side, a number of researchers contend that expanding equity capital could have a detrimental impact on bank profitability. They contend that banks may not be able to take full advantage of debt-financing options that could spur future growth due to higher capital ratios (Saona, 2016). Since excessive capitalization is frequently linked to lesser risk, it diminishes the advantages of the tax breaks that debt offers, including interest deductibility, which lowers business value and profitability (Budhathoki et al.,2020). Based on this debate, the study aims to understand the impact of leverage under Basel III norms, measured as LR, on the financial performance, operational efficiency, and resilience of banks.

2.4 Size and Banks' financial performance, operational efficiency, resilience

The theory posits that larger banks may benefit from economies of scale, resulting in a positive correlation between bank size and profitability (Bolívar et al., 2023). In support of this argument, numerous researchers, for instance Iannotta et al. (2007) have provided empirical evidence reinforcing the idea that larger banks can achieve greater profitability. However, the literature also suggests a nuanced perspective, indicating that the relationship between bank size and profitability is not entirely straightforward (Priharta and Gani, 2024).

Specifically, there is general consensus that the average cost curve in banking follows a flat U-shape, where medium-sized banks tend to outperform both large and small institutions in terms of realizing economies of scale (McKeown, 2017). For instance, significant scale efficiency advantages appear to be confined to smaller banks, and even then, these benefits tend to be modest, often amounting to 5% or less (Berger and Humphrey, 1994). Larger banks may also benefit from economies of scope, which arise from the cooperative delivery of linked services. For instance, banks may be able to increase profitability by using their branch networks to cross-sell mortgage loans with other products like house or life insurance. According to Elsas et al. (2010), economies of scope indeed play a significant role in the banking industry and boost profitability. But according to Barros et al. (2007), bigger and more varied institutions might actually do worse. They contend that smaller, more specialised banks could be better equipped to handle problems like lending with asymmetric knowledge, which would enhance their performance (Hasan et al., 2020).

In other words, the relationship between bank size and profitability may be non-linear. While increasing size may initially boost profitability, bureaucratic inefficiencies and other operational challenges may set in as banks grow beyond a certain point, leading to diminishing returns (Athanasoglou et al., 2008). Thus, while economies of scale provide advantages at certain stages of growth, larger size does not guarantee sustained profitability. Amidst this debate, the study aims to understand the impact of bank's size under Basel III norms, measured as TA, on the financial performance, operational efficiency, and resilience of banks.

3. RESEARCH METHODOLOGY

3.1 Sample and Data

At present there are three categories of banks operating in India viz. banks in the Public Sector owned by the government of India, Private Sector banks and foreign banks working in India. The researcher proposes to include 5 public sector banks in the sample of the study namely- State Bank of India (SBI), Punjab National Bank (PNB), Bank of Baroda (BOB), Bank of Maharashtra (BOM) and Indian Overseas Bank (IOB) (as they have majority of the share in the Indian banking industry). Data is typically gathered from secondary sources like: Financial databases (such as Thomson Reuters, CRSP, Bloomberg etc.), reports and publications from the government, databases and industry reports. See table 1 for definition of study variables.

The financial indicators which measure profitability are Return on Assets (ROA), Return on Equity (ROE) (Neupane, 2020) and Net Interest Margin (NIM), Gross Non-Performing Assets Ratio (GNPA) measures resilience (risk management) (Cicchiello et al., 2022), and, operational efficiency is measured by cost-income (CI) (Jaiwani and Gopal Krishnan, 2023).

The panel data spans from 2013 to 2023. The time period is so chosen because Basel III norms were introduced in the year 2013 in India. However, it took four to five years for the entire implementation (Jaiwani and Goplal Krishnan, 2023). Data is further divided in two samples - pre and post implementation of Basel III norms. Since the objective of the research is to determine impact of Basel III norms on banks, it's imperative to divide the data in pre and post Basel III period.

Pre Basel norms sample data consists data from 2013-14 to 2017-18 Post Basel norms sample data consists data from 2018-19 to 2022-23 The study is based on the panel data for ten years (from 2013-14 to 2022 –23) and for select 5 PSB's (Five public sector banks – SBI, BOB, PNB, IOB, BOM)

Variables	Symbol	Definition	Formula
Return on Assets	ROA	"ROA is a signal of the profitability of a firm. It indicates the profit of the firm	"Profit after tax / Average Total Assets"
		firm. It is measured as the ratio of net income and total assets"	
Return on Equity	ROE	"ROE is the measure of a company's annual return (net income) divided by the value of its total shareholders' equity"	"Profit after tax / (Total equity + Total equity at the end of previous year)/2)"
Net interest margin	NIM	"NIM reveals the amount of money that a bank is earning in interest on loans compared to the amount it is paying in interest on deposits"	"(Interest received on loans - interest paid on deposits) / Average invested assets"
Cost-income ratio	CI	"The cost-income-ratio reflects the extent to which non-interest expenses of a bank make a charge on the net total income (total income – interest expense). The lower the ratio, the more efficient is the bank"	"Non-interest expenditure / Net Total Income*100"
Capital adequacy ratio	CAR	"CAR indicates the amount of capital available to the bank. It is calculated as the ratio of equity to the bank's Risk weighted assets"	"Capital (Tier 1+Tier 2+Tier 3) / RWA"
Gross non-performing assets	GNPA	"GNPA ratio is the ratio of the total gross non-performing loans to the total advances"	"Gross Nonperforming loans / total loans"
Leverage ratio	LR	"The LR is a non-risk-based capital measure and is defined as Tier 1 capital over a bank's total exposure measure, which consists of both on and off-balance-sheet items"	"Tier 1 capital / on and off-balance-sheet exposures"
Liquidity Coverage Ratio	LCR	"The LCR is the proportion of highly liquid assets held by financial institutions to ensure that they maintain an ongoing ability to meet their short-term obligations (i.e. cash outflows for 30 days)"	"Stock of liquid high- quality assets / Net cash outflow over 30 days"
Total Assets	TA	Natural log of total assets of the bank	"nlog(total assets)"

Table 1-Study Variables and their Definitions

(Source- The Basel Committee on Bank Supervision, 2013)

3.2 Model Specification (Panel Regression Models)

The equation for random effects model is:

 $Y_{it} = X_{it} \beta_i + \alpha + (\mu_i + e_{it})$

 Y_{it} : performance measure indicators (dependent variables) for bank i at time t;

 α : time-invariant firm-specific effects;

X_{it}: the independent variables;

 β_i : coefficients and

e_{it}: a random disturbance.

Based on above equation the financial performance, resilience and leverage are measured using following models :

$ROA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it}$	(1)
$ROE_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LRit + \beta_4 TA_{it} + e_{it}$	(2)
$NIM_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it}$	(3)
$CI_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it}$	(4)
$GNPA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it}$	(5)
ROA_{it} = Return on Assets for firm i at time t	
$ROE_{it} = Return on Equity for firm i at time t$	
$NIM_{it} = Net interest margin for firm i at time t$	
$CI_{it} = Cost$ income ratio for firm <i>i</i> at time <i>t</i>	
$GNPA_{it} = Gross non-performing assets (GNPA) for firm i at time t$	
β_1 , β_2 , β_3 , β_4 = Coefficients of the respective variables	

 $\beta_0 = \text{Intercept}$

 $e_{it} =$ Error term for firm i at time t

Null hypothesis- there is no adverse effect of Basel III norms on the profitability, operational efficiency and resilience of public sector banks in India.

4. DATA ANALYSIS

4.1 Pre-Basel Analysis

The approach explains that the sample spans the years 2013–14 through 2017–18. For banks, the first five years are seen as a warm-up period in order to maintain Basel III regulatory requirements.

Table 2 -Descriptive Statistics									
Statistic	CAR	NIM	Cost-income Ratio	LCR	LR	GNPA	ROA	ROE	ТА
Mean	11.78	2.58	50.97	140.73	4.06	9.76	-0.02	-1.86	13.83
Maximum	13.17	3.44	63.53	322.18	5.88	25.28	0.75	13.00	15.70
Minimum	9.20	1.94	39.17	74.93	0.00	2.94	-2.30	-47.00	12.42
Std. Dev.	1.26	0.46	5.98	56.48	2.10	5.86	0.79	15.32	0.96

(source- Author's own)

Table 3-Correlation Analysis									
	CAR	COST	GNPA	LCR	LR	NIM	ROA	ROE	TA
		-INCOME							
CAR									
COST-	0.5063								
INCOME									
GNPA	-0.4922	-0.2863							
LCR	-0.6813	-0.4701	0.6031						
LR	-0.1186	0.4532	0.3174	0.0844					
NIM	-0.6853	-0.6214	0.4880	0.5406	0.0273				
ROA	0.7747	0.6542	-0.5682	-0.5961	-0.0134	-			
						0.853			
						9			
ROE	0.7030	0.6543	-0.5494	-0.5567	0.0811	-	0.7670		
						0.832			
T .4	0.7004	0.4040	0.0007	0.5410	0.0010	5	0.5000	0 5010	
IA	0.7294	0.4848	-0.3036	-0.5642	0.0810	-	0.5880	0.5910	
						0.589			
						1			

(source- Author's own)

Table 4– Panel Regression									
Variables	ROA	ROE	GNPA	NIM	Cost-income				
					Ratio				
Constant	-5.0519	-101.84	49.04	0.4798	42.43				
	(0.0462)**	(0.054)*	(0.0278)**	(0.7309)	(0.167)				
LR	0.029	1.0955	-	0.113	0.6921				
	(0.6171)	(0.3846)	0.0758(0.883)	(0.003)***	(0.0992)*				
LCR	-0.0017	-0.0362	0.01217	-0.0018	0.0542				
	(.5462)	(0.5562)	(0.6356)	(.2733)	(0.0126)**				
CAR	0.4365	6.801	-2.2801	0.1408	9087				
	(0.0135)**	(0.057)*	(0.1195)	(0.1470)	(.4174)				
ТА	0.0016	1.4841	-0.9999	0.0177	0.6510				
	(0.9931)	(.7107)	(0.5485)	(0.8722)	(0.6171)				
Adi R-sauare	53 8%	11 1%	39 32%	46.4%	33 7%				
Auj K-square	55.670	44.470	59.5270	+0.+/0	55.770				
F-statistics	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***				
Hausman test	0.456	0.476	0.856	0.132	0.435				
Residual diagnostics	0.231	0.454	0.143	.321	0.154				

(source- Author's own)

(Note- For all models, the random-effect model over the fixed-effect model has been selected applying the Hausman test. The Hausman test's null hypothesis (H₀) asserts that "random effect is the preferred model". Because the Hausman test's p-value was higher than 0.05, we were unable to rule out the null hypothesis. Breusch-Pagan test is used for residual diagnostics. The p value is more than .05 in all the models for the residuals. This shows that the residuals have constant variance and there is no noise in the data. It further means that the assumption of homoscedasticity stands true for the residuals of panel regression. No issue of multicollinearity was found in the data)

4.2 Post - Basel Analysis

The methodology discusses the sample's dates, which range from 2018–19 to 2022–2023. Five years later, public sector banks are thought to have sufficiently adopted the Basel standards (Jaiwani and GopalKrishnan, 2023).

Table 5 -Descriptive Statistics										
	Cost- NIM LCR LR GNPA ROA ROE TA									
	CAR	income								
Mean	13.76	50.85	2.87	164.22	4.00	8.77	0.07	2.92	14.20	
Maximum	16.24	59.20	3.37	387.13	5.85	21.97	0.96	19.43	15.52	
Minimum	9.73	44.82	2.03	121.27	0.05	2.78	-2.95	-52.00	12.43	
Std. Dev.	1.67	3.70	0.39	51.81	2.12	4.69	0.83	15.64	1.08	

(source- Author's own)

Table 6-Correlation Analysis									
	CAR	Cost- income	NIM	LCR	LR	GNPA	ROA	ROE	ТА
CAR									
Cost- Income	-0.1427								
NIM	0.5460	0.3380							
LCR	-0.3316	-0.2220	-0.5661						
LR	-0.1210	0.3951	0.1755	0.0462					
GNPA	-0.5639	-0.4643	-0.8984	0.6939	0.1090				
ROA	0.6906	-0.0612	0.7350	-0.4481	0.2703	-0.6991			
ROE	0.7660	-0.0900	0.7977	-0.4842	0.1068	-0.7629	0.9592		
ТА	0.1485	0.4369	0.8251	-0.5311	0.3270	-0.7488	0.5441	0.5718	

(source- Author's own)

Table 7 – Panel Regression									
Variables	ROA	ROE	GNPA	NIM	Cost-income				
Constant	-8.2435	-178.9749(0.0001)***	53.8456	-2.340	41.9889				
	(0.0014)***		(0.0000)***	(0.0023)***	(0.0010)***				
LR	0.0952	0.3700	0.0271	-0.0036	0.4869				
	(0.0958)*	(0.6780)	(0.8092)	(0.8281)	(0.0846)*				
LCR	-0.0010	-0.0060	0.0245	-0.0001	-0.01004				
	(0.6815)	0.8848	(0.0001)***	(.8250)	(0.4353)				
CAR	0.3236	6.5737	-1.1006	0.09915	-0.4452				
	(0.0001)***	(0.0000)***	(0.1195)	(0.0000)***	(0.1912)				
ТА	0.2571	6.4019	-2.3989	0.2737	1.0340				
	(0.0540)*	(0.0049)***	(0.0000)***	(0.0000)***	(0.1099)				
Adj R-square	66.9%	76.39%	78.35%	83.8%	16.15%				
F-statistics	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***				
Hausman test	0.2341	0.4322	0.7653	0.5634	0.4265				
Residual diagnostics	0.1241	0.3652	0.9864	0.5462	0.2871				

(source- Author's own)

Key financial parameters for banks are displayed in the tables. During the pre-Basel III period, with a minimum of 9.20% and a high of 13.17%, the Capital Adequacy Ratio (CAR) of 11.78% indicates modest capital strength. A measure of profitability called net interest margin (NIM) has an average of 2.58% with some variation (Std. Dev. 0.46) (TABLE 2). The average cost-income ratio, which reflects bank efficiency, is 50.97%. The liquidity coverage ratio (LCR), which indicates liquidity irregularities, varies significantly (mean 140.73, standard deviation 56.48). With a mean of 4.06%, the leverage ratio (LR) is somewhat constant. The Gross Non-Performing Assets (GNPA) show problems with asset quality; they vary greatly, with an average of 9.76%. Negative returns on equity (ROE) and return on assets (ROA) indicate difficulties with profitability. At a mean of 13.83, Total Assets (TA) are comparatively constant.

Correlation analysis (TABLE 3) shows that higher capital adequacy increases profitability but is linked to lower asset quality and liquidity, which shows that CAR positively correlates with profitability (ROA, ROE) but negatively with GNPA and LCR.

Post Basel III, the average Capital Adequacy Ratio (CAR) among banks is 13.76, with a standard deviation of 1.67, this suggests that capital adequacy has been generally consistent over time. Gross Non-Performing Assets (GNPA) averages 50.85 with moderate variability (standard deviation 3.70), but the Cost-Income Ratio averages 2.87 with a fair amount of consistency (TABLE 5).

The results of the correlation study show that CAR has a negative association with NIM and LCR but a positive correlation with profitability metrics (ROA and ROE), suggesting that greater capital adequacy is linked to improved profitability at the expense of lower interest margins and liquidity. While GNPA and CAR have a slight negative association, COST - INCOME and CAR have a large positive correlation (TABLE 6).

The regression analysis investigates the relationship between profitability metrics—ROA, ROE, GNPA, NIM, and cost-income ratio—and bank-specific characteristics, contrasting their behavior before and after Basel III implementation. The results demonstrate notable shifts in the significance and magnitude of key variables over time (TABLE 4 and TABLE 7).

5. DISCUSSION

Public sector banks (PSBs) exhibit distinct financial characteristics, particularly in their reliance on capital strength. Furthermore, PSBs are less sensitive to leverage (LR) in driving profitability, instead they depend on CAR, which influences both cost efficiency and returns (TABLE 8). Jaiwani and Gopalkrishnan (2023) also argue that Basel III norms have positively influenced the profitability of public banks.

_		Impact on		Impact on	Impost on
Docal III	Impost on DOA	KUE (Drofitabilit	Impost on NIM	Cost-mcome Dotio	CNDA
Basel III	Impact on KOA	(Promabilit	Impact on NIN		GNPA
Factor	(Profitability)	y)	(Profitability)	(Efficiency)	(Risk)
		Pre: No		Pre: adverse	Pre: No
	Pre: No impact	impact	Pre: Positive	impact 🗙	impact
LR (Leverage	Post: Positive	Post: No	impact 🔗	Post: adverse	Post: No
Ratio)	impact 🔗	impact	Post: No impact	impact 🗙	impact
					Pre: No
LCR		Pre: No			impact
(Liquidity		impact		Pre: adverse	Post:
Coverage	Pre: No impact	Post: No	Pre: No impact	impact 🗙	adverse
Ratio)	Post: No impact	impact	Post: No impact	Post: No impact	impact 🗙
		Pre: Positive			
	Pre: Positive impact	impact 🔗			Pre: No
CAR (Capital	\checkmark	Post:	Pre: No impact		impact
Adequacy	Post: Positive	Positive	Post: Positive	Pre: No impact	Post: No
Ratio)	impact 🔗	impact 🔗	impact 🔗	Post: No impact	impact
TA (Total	Pre: No impact	Pre: No	Pre: No impact		Pre: No
Assets / Bank	Post: Positive	impact	Post: Positive	Pre: No impact	impact
Size)	impact 🔗	Post:	impact 🔗	Post: No impact	Post:

Table 8- Impact of Basel III on Public sector banks

Decoding the Impact of Basel III Norms in Indian Banks...

		Positive			positive
		impact ≪⁄			impact ≪
		ROE		Cost-Income	
		(Profitabilit	NIM	Ratio	GNPA
Metric	ROA (Profitability)	y)	(Profitability)	(Efficiency)	(Risk)
		Not Adverse			
Overall	Not Adverse 🔗	\checkmark	Not Adverse 🔗		Not Adverse
Impact	(Improved)	(Improved)	(Improved)	Not adverse 🔗	\checkmark
		Accept Null	Accept Null	Accept Null	Accept Null
Hypothesis	Accept Null	Hypothesis	Hypothesis	Hypothesis	Hypothesis
decision	Hypothesis				

Table shows that overall, Basel III improved profitability of banks (Source- Author's own)

5.1 Capital Adequacy Ratio (CAR)

Before Basel III, CAR positively influenced ROA, ROE and NIM. However, post-Basel III, CAR emerges as a critical determinant of profitability, exhibiting stronger positive and statistically significant effects on both ROA, ROE and NIM (Kumar, 2024). This reinforces the importance of higher capital adequacy in ensuring profitability and safeguarding equity investors, aligning with Gaur et al. (2022), who highlighted that stricter capital requirements improve credit quality.

5.2 Leverage Ratio (LR)

Pre-Basel III, LR showed limited significance, except for its positive impact on NIM, suggesting that leverage contributed to favorable interest margins. Post-Basel III, LR loses its influence on NIM and profitability metrics, but it continues to positively affect the cost-income ratio, albeit marginally. This indicates that while leverage boosts operational costs relative to income, its broader role in enhancing margins diminishes under the new regulatory framework. Pattanaik et al. (2018) previously noted that higher leverage increases non-performing assets (NPAs), adversely impacting efficiency, a concern that becomes less pronounced post-implementation.

5.3 Liquidity Coverage Ratio (LCR)

Pre-Basel III, LCR had a minimal impact across variables. Post-implementation, its influence becomes evident, particularly with a significant effect on GNPA (LCR increases GNPA) and a negative impact on NIM. These findings align with Sidhu et al. (2022), who argued that a higher LCR narrows interest spreads, reducing NIM and, consequently, profitability. This interplay underscores Roy et al.'s (2019) observation that while increased liquidity improves stability, it comes at the cost of profitability.

5.4 Total Assets (TA)

Before Basel III, TA showed negligible influence on profitability metrics. Post-implementation, TA becomes a significant factor, positively impacting ROE, ROA, and NIM. This supports Menicucci and Paolucci (2016) assertion that larger banks benefit from economies of scale, though it contrasts with Islam (2021), who found a negative size-profitability relationship. Interestingly, the post-Basel III results also indicate that larger banks are more effective in reducing NPAs, suggesting improved credit management (Jaiwani and Gopalkrishnan, 2023).

Hence, it is evident that key financial metrics that affect the financial performance of public sector banks are capital adequacy and size. Public sector banks benefit significantly from a strong capital base, as reflected in the Capital Adequacy Ratio (CAR), which plays a crucial role in enhancing profitability (ROA, ROE), interest margins (NIM), and operational efficiency (Cost-Income Ratio). Leverage Ratio (LR) has a limited impact on profitability but adverse effect on cost efficiency and while no effect on GNPA. Similarly, Liquidity Coverage Ratio (LCR) does not significantly affect public banks' profitability or efficiency, indicating that capital strength is their primary driver of performance. However, profitability very significantly depends on the size of a bank. Further, the size of public sector banks lowers the risk of GNPAs. The public sector banks rely on a strong capital base for profitability and efficiency.

6. CONCLUSION

Basel III has had a profound impact on Indian public sector banks, bringing both opportunities and challenges. The revised capital adequacy standards require PSBs to raise substantial capital, it is a difficult task given their limited profitability and reliance on government recapitalization efforts (Singh & Rastogi, 2020). Additionally, leverage ratio requirements have curtailed excessive borrowing, reduced systemic risk while also limiting the growth potential.

Despite these challenges, Basel III has enhanced financial stability and resilience in the public banking sector. Stricter regulations have improved risk management practices, ensuring greater financial discipline. However, the high costs of compliance, coupled with capital-raising difficulties and declining profitability, pose obstacles for smaller public banks. While the transition remains complex, Basel III has steered Indian public sector banking toward long-term resilience and financial sustainability.

6.1 Research Implications and Limitations

This study contributes to the expanding literature on the impact of Basel III regulations on public sector banks, highlighting the distinct ways in which they respond to regulatory capital and leverage requirements. The findings reinforce the hypothesis that PSBs are more capital-driven. The results offer critical policy insights for regulatory authorities and policymakers. Given that public sector banks rely more on capital strength, rather than leverage, focus should be on balancing capital adequacy measures without compromising asset quality. Regulatory frameworks should ensure that increased borrowing does not lead to excessive risk exposure while allowing PSBs to enhance efficiency. For public bank managers, the findings emphasize the importance of effective capital management. Managers must strike a balance between growth opportunities and maintaining financial stability by implementing robust risk management practices.

Additionally, liquidity management remains critical for PSBs. The positive impact of LCR on asset quality highlights the need for banks to maintain adequate liquidity buffers to absorb financial shocks. Strategic liquidity management can help stabilize bank operations while mitigating risks associated with non-performing assets (NPA).

6.2 Limitations and Future Research Directions

The study focuses primarily on Indian public sector banks, limiting the generalizability of findings to other banking systems. Future research can expand the scope to include international banking environments to explore whether similar trends hold across different regulatory frameworks.

Furthermore, while this study analyzes key financial indicators like CAR, LR, and LCR, it does not fully account for external macroeconomic factors, technological advancements, or evolving banking practices, which could further influence PSB performance. Future research should incorporate these dimensions to provide a more holistic understanding of banking resilience under Basel III norms.

REFERENCES

- 1. Jayadev, M. (2013). Basel III implementation: Issues and challenges for Indian banks. *IIMB Management Review*, 25(2), 115-130.
- 2. King, P., and Tarbert, H. (2011). Basel III: an overview. *Banking and financial services policy report, 30*(5), 1-18.
- 3. Naceur, S. B., Marton, K., and Roulet, C. (2018). Basel III and bank-lending: Evidence from the United States and Europe. *Journal of Financial Stability*, *39*, 1-27.
- 4. Gavalas, D. (2015). How do banks perform under Basel III? Tracing lending rates and loan quantity. *Journal* of *Economics and Business*, 81, 21-37.
- 5. Seth, G., Katti, S. and Phani, B.V. (2022), "Stock price reaction on the announcement of Basel implementation: evidence from Indian banks", *RBI Working Paper Series, January*
- 6. Obadire, A.M., Moyo, V. and Munzhelele, N.F. (2022), "Basel III capital regulations and bank efficiency: evidence from selected African countries", *International Journal of Financial Studies, Vol. 10 No. 3*, 57, doi: 10.3390/ijfs10030057.
- 7. Jaiwani, M., and Gopalkrishnan, S. (2023). Are Basel-III norms good for Indian banks? Examining performance, efficiency and resilience variance in private-sector and public-sector banks. *Journal of Economic and Administrative Sciences*.
- 8. Barry, T. A., Lepetit, L., and Tarazi, A. (2011). Ownership structure and risk in publicly held and privately owned banks. *Journal of Banking and Finance*, *35*(*5*), 1327-1340.
- 9. Ozili, P. K. (2021, October). Financial inclusion research around the world: A review. *Forum for social economics (Vol. 50, No. 4, pp. 457-479).* Routledge.
- 10. Pervez, A., & Ali, I. (2024). Robust regression analysis in analyzing financial performance of public sector banks: A case study of India. *Annals of Data Science*, *11*(2), 677-691.
- 11. Hossain, M.Z., Khan, M.A.R. and Sadique, M.S. (2018), "Basel III and perceived resilience of banks in the BRICS economies", *Applied Economics, Vol. 50 No. 19*, pp. 2133-2146, doi: 10.1080/00036846. 2017.1391999.

- 12. Chiaramonte, L. and Casu, B. (2017), "Capital and liquidity ratios and financial distress. Evidence from the European banking industry", *The British Accounting Review, Vol. 49 No. 2*, pp. 138-161, doi: 10.1016/j.bar.2016.04.001.
- 13. Kwan, S. and Eisenbeis, R.A. (1997), "Bank risk, capitalization, and operating efficiency", *Journal of Financial Services Research, Vol. 12 Nos 2-3*, pp. 117-131, doi: 10.1023/A:1007970618648.
- 14. Laeven, L. and Levine, R. (2009), "Bank governance, regulation and risk taking", *Journal of Financial Economics, Vol. 93 No. 2*, pp. 259-275, doi: 10.1016/j.jfineco.2008.09.003.
- 15. Giordana, G.A. and Schumacher, I. (2017), "An empirical study on the impact of Basel III standards on banks' default risk: the case of Luxembourg", *Journal of Risk and Financial Management, Vol. 10 No. 2, 8*, doi: 10.3390/jrfm10020008.
- Sahut, J.-M. and Mili, M. (2011), "Banking distress in MENA countries and the role of mergers as a strategic policy to resolve distress", *Economic Modelling, Vol.* 28 Nos 1–2, pp. 138–146, doi: 10. 1016/j.econmod.2010.09.017.
- 17. Bui, C., Scheule, H. and Wu, E. (2017), "The value of bank capital buffers in maintaining financial system resilience", *Journal of Financial Stability, Vol. 33*, pp. 23-40, doi: 10.1016/j.jfs.2017.10.006.
- 18. Cohen, B.H. and Scatigna, M. (2016), "Banks and capital requirements: channels of adjustment", *Journal of Banking and Finance, Vol.* 69, pp. S56-S69, doi: 10.1016/j.jbankfin.2015.09.022.
- 19. Priharta, A., and Gani, N. A. (2024). Determinants of bank profitability: Empirical evidence from Republic of Indonesia state-owned banks. *Contaduría y administración, 69(3),* 49-65.
- Altunbas, Y., Carbo, S., Gardener, E.P.M. and Molyneux, P. (2007), "Examining the relationships between capital, risk and efficiency in European banking", *European Financial Management, Vol. 13 No. 1*, pp. 49-70, doi: 10.1111/j.1468-036X.2006.00285.
- 21. Mamatzakis, E. and Bagntasarian, A. (2019), "The nexus between underlying dynamics of bank capital buffer and performance", School of Business, Management and Economics, University of Sussex Business School, pp. 1-57
- 22. Mendicino, C., Nikolov, K., Suarez, J. and Supera, D. (2018), "Optimal dynamic capital requirements", *Journal of Money, Credit and Banking, Vol. 50 No.* 6, pp. 1271-1297, doi: 10.1111/jmcb.12490.
- 23. Malherbe, F. (2020), "Optimal capital requirements over the business and financial cycles", *American Economic Journal: Macroeconomics, Vol. 12 No. 3*, pp. 139-174, doi: 10.1257/mac.20160140.
- 24. Goddard, J., Molyneux, P. and Wilson, J.O.S. (2004), "The profitability of European banks: a crosssectional and dynamic panel analysis", *The Manchester School, Vol. 72 No. 3*, pp. 363-381, doi: 10.1111/j.1467-9957.2004.00397.
- 25. Thakor, A.V. (1996), "Capital requirements, monetary policy, and aggregate bank lending: theory and empirical evidence", *The Journal of Finance, Vol. 51 No. 1*, pp. 279-324, doi: 10.1111/j.1540-6261. 1996.tb05210.
- Berger, A.N. and Bonaccorsi di Patti, E. (2006), "Capital structure and firm performance: a new approach to testing agency theory and an application to the banking industry", *Journal of Banking and Finance, Vol. 30 No. 4*, pp. 1065-1102, doi: 10.1016/j.jbankfin.2005.05.015.
- 27. Putri, T. S., Putra, Y. P., and Setiorini, H. (2024). The Influence Of CAR, BOPO, NIM, FDR And DPK On The Profitability Of Commercial Banking Listed On The Indonesian Stock Exchange (BEI). *Jurnal Ekonomi, Manajemen, Akuntansi dan Keuangan, 5(1),* 17-30.
- 28. Hasanuh, N., Sulistiyo, H., Sidik, S., Suartini, S., Ghani, E. K., Chudjuarjeen, S., and Manda, G. S. (2024). An in-depth analysis of how car, credit risk, and liquidity affect profitability.
- 29. Diamond, D.W. and Dybvig, P.H. (1983), "Bank runs, deposit insurance, and liquidity", *Journal of Political Economy, Vol. 91 No. 3*, pp. 401-419, doi: 10.1086/261155.
- Brunnermeier, M.K. and Pedersen, L.H. (2009), "Market liquidity and funding liquidity", *Review of Financial Studies, Vol. 22 No. 6*, pp. 2201-2238, doi: 10.1093/rfs/hhn098.
- Alaoui Mdaghri, A. and Oubdi, L. (2022), "Basel III liquidity regulatory framework and bank liquidity creation in MENA countries", *Journal of Financial Regulation and Compliance, Vol. 30 No. 2*, pp. 129-148, doi: 10.1108/JFRC-01-2021-0002.
- 32. Acharya, V. V., & Mora, N. (2014). A crisis of banks as liquidity providers. *The Journal of Finance*, 70(1), 1–43. https://doi.org/10.1111/jofi.12182
- 33. Diamond, D.W. and Kashyap, A.K. (2016), "Liquidity requirements, liquidity choice, and financial stability", pp. 2263-2303, doi: 10.1016/bs.hesmac.2016.03.011
- Nath, S. D., Biswas, M. R., Maleque, M. A., and Islam, M. M. (2024). Effect of Basel III Liquidity Ratio LCR and NSFR on the Profitability of Commercial Banks in Bangladesh. *International Journal of Economics* and Business Administration (IJEBA), 12(3), 12-28.
- 35. Khan, M.S., Scheule, H. and Wu, E. (2015), "The impact of bank liquidity on bank risk taking: do high capital buffers and big banks help or hinder?", http://ssrn.com/abstract52481887

- 36. Papadamou, S., Sogiakas, D., Sogiakas, V. and Toudas, K. (2021), "The prudential role of Basel III liquidity provisions towards financial stability", *Journal of Forecasting, Vol. 40 No. 7*, pp. 1133-1153, doi: 10.1002/for.2766.
- Nugroho, L., Orban, I., Utami, W., Hidayah, N., and Nugraha, E. (2024). Liquidity Surplus and Profitability: How Does Liquidity Affect Profitability prior to and during COVID-19?(Empirical Indonesian Banking Sector). WSEAS Transactions on Business and Economics, 21, 59-70.
- 38. Blundell-Wignall, A. and Atkinson, P. (2010), "Thinking beyond Basel III", OECD Journal: Financial Market Trends, Vol. 2010 No. 1, pp. 9-33, doi: 10.1787/fmt-2010-5km7k9tpcjmn.
- 39. Bordeleau, E. and Graham, C. (2010), "The impact of liquidity on bank profitability (No. 2010-38)", *Bank of Canada*.
- 40. Safitri, J., and Geraldina, I. (2024). The Impact of Liquidity Strategy on Banking Performance in the ASEAN Region. *Indonesian Journal of Business Analytics*, 4(2), 611-622.
- 41. DeAngelo, H. and Stulz, R.M. (2015), "Liquid-claim production, risk management, and bank capital structure: why high leverage is optimal for banks", *Journal of Financial Economics, Vol. 116 No. 2*, pp. 219-236, doi: 10.1016/j.jfineco.2014.11.011.
- 42. Acosta-Smith, J., Grill, M., & Lang, J. H. (2020). The leverage ratio, risk-taking and bank stability. *Journal of Financial Stability*, 74, 100833. https://doi.org/10.1016/j.jfs.2020.100833
- 43. Saona, P. (2016). Intra-and extra-bank determinants of Latin American Banks' profitability. *International Review of Economics and Finance*, 45, 197-214. http://dx.doi.org.10.1016/j.iref.2016.06.004
- 44. Christensen, I., Meh, C. and Moran, K. (2012), "Bank leverage regulation and macroeconomic dynamic", *SSRN Electronic Journal, pp. 1-40,* doi: 10.2139/ssrn.1999002.
- 45. Petria, N., Capraru, B., and Ihnatov, I. (2015). Determinants of banks profitability: Evidence from EU 27 banking systems. *Procedia Economics and Finance*, 20, 518-524. https://doi.org/10.1016/S2212-5671(15)00104-5
- 46. Kiema, I. and Jokivuolle, E. (2010), "Leverage ratio requirement and credit allocation under Basel III", SSRN Electronic Journal. doi: 10.2139/ssrn.1723145.
- Janda, K. and Kravtsov, O. (2019), "Basel III leverage and capital ratio over the economic cycle in the Czech Republic and its comparison with the CEE region", *European Financial and Accounting Journal, Vol. 13 No.* 4, pp. 5-23, doi: 10.18267/j.efaj.216.
- Paolucci, E. M. G. (2016). The determinants of bank profitability: Empirical evidence from European banking sector. *Journal of Financial Reporting and Accounting*, 14 (1), 86-115. http://dx.doi.org/10.1108/JFRA-05-2015-0060
- 49. Budhathoki, P. B., Rai, C. K., Lamichhane, K. P., Bhattarai, G., and Rai, A. (2020). The impact of liquidity, leverage, and total size on banks' profitability: evidence from Nepalese commercial banks. *Journal of Economics and business*, 3(2).
- 50. Bolívar, F., Duran, M. A., and Lozano-Vivas, A. (2023). Bank business models, size, and profitability. Finance Research Letters, 53, 103605.
- 51. Iannotta, G., Nocera, G., and Sironi, A. (2007). Ownership structure, risk and performance in the European banking industry. *Journal of banking and finance*, *31*(7), 2127-2149.
- 52. McKeown, R. (2017). Costs, size and returns to scale among Canadian and US commercial banks (No. 1382). *Queen's Economics Department Working Paper*.
- 53. Berger, A. N., and Humphrey, D. B. (1994). Bank scale economies, mergers, concentration, and efficiency: *The US experience*.
- 54. Elsas, R., Hackethal, A., and Holzhäuser, M. (2010). The anatomy of bank diversification. *Journal of Banking and Finance*, *34*(6), 1274-1287.
- 55. Barros, L., Baptista, P., and Ferreira, I. C. (2007). Effect of Lactarius piperatus fruiting body maturity stage on antioxidant activity measured by several biochemical assays. *Food and chemical Toxicology*, *45*(9), 1731-1737.
- 56. Hasan, M. S. A., Manurung, A. H., and Usman, B. (2020). Determinants of bank profitability with size as moderating variable. *Journal of applied finance and banking*, *10*(3), 153-166.
- 57. Athanasoglou, P. P., Brissimis, S. N., and Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of international financial Markets, Institutions and Money*, 18(2), 121-136.
- 58. Neupane, B. P. (2020). Profitability determinants of Nepalese commercial banks. *Press Academia Procedia*, *12(1)*, 40-45.
- 59. Cicchiello, A. F., Cotugno, M., Perdichizzi, S., & Torluccio, G. (2022). Do capital buffers matter? Evidence from the stocks and flows of nonperforming loans. *International Review of Financial Analysis*, 84, 102369.
- 60. Basel Committee on Banking Supervision. (2013). *Basel III: International regulatory framework for banks*. *Bank for International Settlements* <u>https://www.bis.org/bcbs/basel3.htm</u>

- 61. Kumar, P. (2024). Basel Capital Regulations Over Pre and Post Basel III Regime: An Indian Scenario. Journal of Commerce & Accounting Research, 13(2).
- 62. Gaur, D., Mohapatra, D. R., and Jena, P. R. (2022). Credit quality of Indian banking sector: Implications of Basel III regulations. *Journal of Asia-Pacific Business*, 23(3), 234-253.
- 63. Pattanaik, S., Kavediya, R., and Hait, A. (2018). Basel III liquidity coverage ratio and the operating target of monetary policy: the unintended discord. *Journal of Banking Regulation*, *19*, 160-173.
- 64. Sidhu, A. V., Rastogi, S., Gupte, R., and Bhimavarapu, V. M. (2022). Impact of liquidity coverage ratio on performance of select Indian banks. *Journal of Risk and Financial Management*, 15(5), 226.
- 65. Roy, S., Misra, A. K., Padhan, P. C., and Rahman, M. R. (2019). Interrelationship among liquidity, regulatory capital and profitability-A study on Indian banks. *Cogent Economics and Finance*, 7(1), 1664845.
- 66. Menicucci, E., and Paolucci, G. (2016). The determinants of bank profitability: empirical evidence from European banking sector. *Journal of financial reporting and Accounting*, 14(1), 86-115.
- 67. Islam, M. S. (2021). What drives bank profitability? A panel data analysis of commercial banks in Bangladesh. *International Journal of Finance and Banking Studies (2147-4486), 10(2), 96-110.*
- 68. Singh, I., and Rastogi, S. (2020). Drivers impacting bank risk in India. *Test Engineering and Management*, 83(5/6), 8005-8011.