

# Impact of Basel III on Financial Resilience of Select Private Sector Banks in India

Rachna Gupta<sup>1</sup>, Dr Nishtha Pareek<sup>2</sup>

<sup>1</sup>Associate Professor, Department of Commerce, Ramanujan College, University of Delhi, Research Scholar, Banasthali Vidyapith

<sup>2</sup>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 private sector banks. A panel regression technique is used to assess the impact of Basel III norms on 5 private 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 results of the study highlight that private banks primarily use leverage for profitability and performance. Furthermore, it highlights the effectiveness of Basel III norms in mitigating the financial risks and promoting overall financial stability within the banking sector. The analysis finds that private banks prioritize Leverage Ratio over the capital adequacy ratio and thus derive profitability through effective leverage management. This also suggests that capital adequacy plays a more pronounced role in financial stability and performance.

**Keywords-** Basel III, Leverage, Liquidity, Risk, profitability, financial stability

## 1. INTRODUCTION

A financial crisis causes major disruptions to the global financial system, thereby revealing serious issues in the financial industry including banking (Samanta, 2015). In modern society, the banking sector is the life-blood of an economy and any change in the functioning of banking institutions can lead to serious repercussions in socio-economic structure. This financial distress like situation highlights the pressing need for a stronger regulatory structure (Jayadev, 2013). The global financial crisis of 2007-08 was in fact a crisis of banks in aggregate and not just of the weakest banks. Banks seem to have only partly helped avoid financial disruptions and business liquidations that would have occurred in the absence

of a liquidity backstop by the central bank and the government (Acharya and Mora, 2015). Its spill over to the real sector forced the Basel Committee for Banking Supervision (BCBS) to develop new regulations, now known as Basel III. Since its inception, the desirability of Basel III norms for banks has widely been discussed. A lot of literature is available on various possible outcomes of new regulations. The primary objective of the new regulations is to reinforce the financial stability and resilience of the banking system in view of an unpredictable and highly dynamic environment (Cosimano and Hakura, 2011). Its major focus is on progressively addressing the systemic vulnerabilities of the banking system through emphasis on three parameters of Capital Adequacy, Liquidity and Leverage (Valderrama, 2015) supplemented by improved transparency and market discipline through detailed disclosure of capital base.

There is plenty of literature available on the subject related to various processes and procedures of managing the capital level by banks and evaluating and assessing the performance under various parameters. We can find a number of studies on all the three Basel accords implemented so far. One strand of literature argues that raising bank equity would result in significant macroeconomic benefits whereas others point out the higher cost of implementing the regime. Similarly, some experts opine that change in capital requirement may result in changes in bank lending rates, thus slowing down the loan growth and hence the economic growth. The impact of Basel III on long term economic performance and the fluctuations in economic performance is debatable. For instance, Blundell-Wignall and Atkinson (2010) critically analyze the Basel III proposals and find some useful

components like leverage ratio and capital buffer but also raise some major concerns. Wernli et al. (2023) while reviewing important concepts and findings related to mechanisms underpinning systemic crises, emphasize the need to develop multipronged, proactive strategy instead of reactive and recovery policies. The objectives of these reforms were to lower down the systemic risk in the banking sector by strengthening financial resilience, and improving risk management procedures (King and Tarbert, 2011). Compared to Basel I and II, Basel III has had a significant impact on how banks function, manage risks, and maintain financial stability (Gavalas, 2018).

Basel III norms had a substantial impact on the Indian banking system, including bank performance, lending availability, portfolio risk, and asset quality (Seth et al., 2022). However, the impacts of Basel III on profitability, efficiency, and resilience for banks vary, for instance the greater capital ratios may boost efficiency but simultaneously severe standards may harm bank performance (Kar, 2020).

In general, it is clear from the above discussion that conceptually, use of macro prudential policies to regulate banking behaviour is strongly recommended by experts. Initiation of macro prudential standards would lead to more resilient banks with strong capital base and better leverage / liquidity efficient models. Better regulatory supervision mechanisms and risk mitigating practices would result in a lower probability of a banking crisis. Though initially economic growth rate may go down, but when compared with reduced probability of a banking crisis, macro policy measures prove to be a prudent option. However, it does cast some shadow on the efficient functioning of the banks also especially through liquidity requirements. Banks now may be forced to curtail lending resulting in low profitability. Moreover, emerging markets and developing nations have not found these norms favourable for them on account of resource scarcity in terms of high cost of implementation, technology and system infrastructure. Increased connectivity with the shadow banking system through regulatory arbitrage also poses serious challenges for the regulators.

Nevertheless, the private sector banks tend to be more profit-driven and often possess more effective

governance systems (Sarma and Pais, 2011). Consequently, this could enable them to respond more swiftly to regulatory changes. Hence, the goal of this study is to explore how Basel III regulations affect risk management and financial stability in private sector banks

The study's structure is set up as follows: section 2 discusses the theoretical framework and literature review; the research design and methodology are described in Section 3. The data analysis and economic model results are shown in Section 4, and the econometric results are interpreted in Section 5. The implications, limitations, and recommendations for further research are covered in Section 6. The study is finally concluded in Section 7.

## 2. THEORETICAL BACKGROUND

An attempt has been made to provide an elaborate and systematic view of vast literature available on Basel norms. The researcher has focused the review mainly on the areas of Basel III additions related to capital structure and its management, assessment and impact of additional capital requirement, additional reserve requirements for different purposes, transparency and disclosures in financial reporting and strengthening the risk management and governance practices by the banks in pursuant to monetary policy guidelines of the central banks. After doing a thorough exploration of these studies, the researcher is of the opinion that the various aspects of the accord, for the sake of simplicity, can be analyzed under following suggested themes-

### 2.1 Capital Requirements and Banks' Financial Performance, Operational Efficiency, and Resilience

Capital adequacy as measured by CAR, plays a crucial role in determining a bank's financial stability, which reflects a bank's ability to absorb losses. Banks with higher capital buffers demonstrate greater resilience during economic downturns, as evidenced during the 2008 financial crisis (Giordana and Schumacher, 2017). The availability of adequate capital limits excessive risk-taking, thereby reducing dependency on external assistance and promoting stability (Laeven and Levine, 2009). A study by Rajiv Verma and Kulwant Kumar Sharma, 2018 also establishes that capital infusion by the Government of India in public

sector banks results in improvement in asset quality of assets. However, while higher capital levels signify greater financial strength, some studies argue that capital requirements can limit banks' lending capacity and restrict growth of the economy. Additionally, excessive capital regulations may reduce operational efficiency of the banks, as banks have to prioritize compliance over investment opportunities (Goddard et al., 2004). This is a debatable issue; hence, this study attempts to empirically understand the effect of Basel III norms on financial performance of private sector banks.

## 2.2 Liquidity and Banks' Financial Performance, Operational Efficiency, and Resilience

Liquidity is a key aspect of banking operations which ensures smooth financial intermediation while managing risks (Diamond and Dybvig, 1983). During the 2008 financial crisis, banks with higher liquidity risk reduced lending and faced higher funding costs. It impacted the bank's overall performance (Acharya and Mora, 2015). Some researchers argue that banks take lower risk during high risk in economy (Gupta and Sardana, 2021) and stringent liquidity requirements enhance stability by lowering default risks. Others contend that such regulations may limit banks' ability to generate liquidity, thereby reducing overall profitability and increasing risk-taking in "non-regulated areas" (Blundell-Wignall and Atkinson, 2010). The trade-off between liquidity regulation and profitability remains perplexing and it requires a further exploration of Basel III impact on liquidity and private sector banking performance.

## 2.3 Leverage and Banks' Financial Performance, Operational Efficiency, and Resilience

Leverage regulations are directed to reduce excessive reliance on debt financing, promoting financial resilience and reducing systemic risk (DeAngelo and Stulz, 2015). Theoretical frameworks like the trade-off theory suggest that leverage regulation helps banks in maintaining an optimal balance between debt and equity (Saona, 2016). Some studies support the idea that lower leverage enhances financial stability by reducing funding costs and improving bank credibility (Paolucci, 2016). However, others argue that stricter leverage regulations may curtail profitability by limiting banks' capacity to exploit debt-financing benefits. The impact of leverage constraints on bank

performance remains an open question, requiring further investigation into Basel III's influence on leverage dynamics of private sector banks.

## 2.4 Size and Banks' Financial Performance, Operational Efficiency, and Resilience

Bank size is often linked to economies of scale, which enables larger institutions benefiting from cost efficiencies and diversified revenue streams. Empirical studies suggest that mid-sized banks tend to achieve better performance due to optimum use of resources (McKeown, 2017). While larger banks leverage economies of scale to enhance their profitability, excessive expansion can introduce bureaucratic inefficiencies and reduce operational effectiveness. Some researchers argue that smaller banks, with their specialized lending strategies, may outperform larger institutions in certain contexts (Hasan et al., 2020). Given the mixed findings, this study seeks to understand Basel III impact on bank size and its implications for financial performance and resilience in private sector banks.

Thus, it is clear from the above discussion that though Basel III norms' initiation do pose certain challenges before the banking segment all across the globe, but, at the same time, they are instrumental in providing shock absorbing capacity to financial institutions to be able to pass any test of stress. The introduction of Basel III may not prevent future crises but will certainly reduce the chances of their occurrence. The higher capital requirements, liquidity standards and the leverage requirements will provide a cushion to the banking industry in the time of crisis from becoming insolvent and avoiding the domino effect of financial system collapse. No standards, practices or system can be foolproof because of the diverse and unforeseen future circumstances which unfold rendering otherwise perfect systems crumble. The need of the hour is to remain careful to follow the rules and principles strictly to avert any financial distress.

## 3. RESEARCH METHODOLOGY

### 3.1 Sample and Data

At present there are three categories of banks operating in India viz. Public Sector Banks owned by the government of India, Private Sector banks and

foreign banks working in India. The researcher proposes to include 4 private sector banks and 1 foreign bank working in India.

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 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 GopalKrishnan, 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.

The financial indicators which measure profitability are Return on Assets (ROA), Return on Equity (ROE)

Table 1- Variables and their Definitions (the Basel Committee on Banking Supervision, 2013)

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 using the total asset of the firm. It is measured as the ratio of net income and total assets”	“Profit after tax/Average 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 of 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)”

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

(Neupane, 2020) and Net Interest Margin (NIM), Gross Non-Performing Assets Ratio (GNPA) measures resilience (risk management) (Cicchello et al., 2022) and operational efficiency is measured by cost-income (CI) (Jaiwani and GopalKrishnan,2023). The independent variables are Capital Adequacy Ratio (CAR), total assets (TA), Liquidity Coverage Ratio (LCR), Leverage Ratio (LR), for a sample of banks over a period of years.

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 five private sector banks (four private- HDFC Bank, Federal bank, ICICI Bank, Axis bank, one foreign bank working in India- Citi Bank).

### 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  $t$ ;

$\alpha$ : the time-invariant firm-specific effects;

$X_{it}$ : the independent variables;

$\beta_i$ : coefficients and

$e_{it}$ : a random disturbance.

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

$$ROA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it} \quad (\text{Model 1})$$

$$ROE_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it} \quad (\text{Model 2})$$

$$NIM_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it} \quad (\text{Model 3})$$

$$CI_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it} \quad (\text{Model 4})$$

$$GNPA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LCR_{it} + \beta_3 LR_{it} + \beta_4 TA_{it} + e_{it} \quad (\text{Model 5})$$

$ROA_{it}$  = 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  $i$  at time  $t$

$GNPA_{it}$  = Gross non-performing assets (GNPA) for firm  $i$  at time  $t$

$\beta_1, \beta_2, \beta_3, \beta_4$  = Coefficients of the respective variables

$\beta_0$  = Intercept

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

A null hypothesis is formed to check the effectiveness of Basel III norms.

Null hypothesis – There is no adverse effect of Basel III norms on the profitability, operational efficiency and resilience of private sector banks in India.

(Note- the  $p$ -values (more than .05) of Hausman test in subsequent panel regression result tables denote that the panel regression models have random effects, and we fail to reject the null hypothesis. This means cross-sectional distributions of individual-specific effects are random).

## 4. DATA ANALYSIS

Full Sample Period

The full sample is from 2013-14 to 2022 –23. The full sample time period is based on the availability of data after implementation of Basel III norms in the Indian banking industry.

Table -Descriptive Statistics

Statistic	CAR	C-I	GNPA	LCR	LR	NIM	ROA	ROE	TA
Mean	16.69	43.23	3.26	135.83	8.87	3.57	1.35	13.07	12.74
Maximum	22.34	57.06	9.90	271.03	10.84	4.48	2.16	20.88	14.72
Minimum	12.39	34.70	0.93	80.61	4.42	0.04	0.04	0.53	10.13
Std. Dev.	1.94	5.22	2.06	43.48	1.33	0.84	0.57	4.80	1.36

Table- Correlation matrix

	CAR	C-I	GNPA	LCR	LR	NIM	ROA	ROE	TA
CAR									
C-I	-0.5883								
GNPA	0.2489	-0.1795							
LCR	0.1971	0.2365	0.1105						
LR	0.6801	-0.5949	0.1535	0.0914					
NIM	-0.3145	-0.1260	-0.3222	-0.4518	0.0554				
ROA	0.2043	-0.4682	-0.5874	-0.2148	0.3194	0.3124			
ROE	0.0391	-0.2728	-0.7506	-0.1809	0.1236	0.3081	0.9189		
TA	0.2639	-0.3103	0.0701	-0.5994	0.1599	0.3168	0.1697	0.0026	

Table – Panel Regression

Variables	ROA	ROE	NIM	C-I	GNPA
Constant	0.8054 (0.3788)	22.4123 (0.0007)***	3.7182 (0.0083)***	62.4812 (0.0000)***	-2.8351 (0.3620)
LR	0.1316 (0.0441)**	0.5128 (0.3698)	0.3157 (0.0017)***	-1.2661 (0.0049)***	-0.024 (0.9090)*
LCR	-0.0040 (0.0503)*	-0.0401 (0.0271)**	-0.0031 (0.3025)	0.053 (0.0002)***	0.0059 (0.3865)
CAR	0.0227 (0.6433)	0.2092 (0.6309)	-0.0305 (0.0001)***	-1.327 (0.0002)***	0.2227 (0.1852)
TA	-0.0359 (0.5845)	-0.9301 (0.1150)	.2018 (0.0432)**	0.5364 (0.2269)	0.14030 (0.5299)
Adj R-square	9.2%	.05%	37.6%	50.4%	0.07%
F-statistics	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Hausman test	0.7665	0.8767	0.5356	0.9876	0.7659
Residual diagnostics	0.7865	0.8765	0.9878	0.6548	0.8765

Interpretation

The descriptive statistics demonstrate that banks maintain substantial capital reserves, with an average CAR of 16.69%. Although the average Cost-to-Income Ratio (C-I) of 43.23% shows efficiency, certain institutions have higher operating costs than others. 3.26% is the modest average of GNPA, which indicates some credit risk. Liquidity is well-managed, with an average LCR of 135.83%.

The negative correlation between CAR and COST\_INCO (-0.5883) indicates that banks with better capital adequacy tend to be more efficient, according to the correlation matrix. CAR shows negative correlation with NIM but positive association with ROA and ROE suggesting banks’ diversification in related fields. Furthermore, there is a substantial positive association between CAR and leverage (LR), indicating that banks with adequate capital also typically have high levels of leverage.

Panel regression result shows that Higher leverage (LR) has a favourable impact on profitability (ROA) and net interest margin (NIM). Higher liquidity (LCR), however, has a negative effect on profitability (ROA and ROE). CAR has a negative effect on NIM, suggesting a trade-off between interest margins and capital sufficiency.

4.1 Pre -Basel Analysis

As discussed in the methodology, the sample is from 2013-14 to 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	C-I	GNPA	LCR	LR	NIM	ROA	ROE	TA
Mean	15.75	43.23	3.08	115.73	8.52	3.69	1.41	13.87	12.40
Median	15.58	41.0	2.41	104.96	8.87	3.5	1.5	15.26	13.11
Maximum	18.40	57.06	9.90	157.40	9.83	4.42	2.02	20.88	13.88
Minimum	12.39	34.70	0.93	80.61	4.42	3.14	0.04	0.53	10.13
Std. Dev.	1.28	5.69	2.41	25.68	1.29	0.42	0.52	5.18	1.30

(Source- Author's own)

Table 3 -Correlation

	CAR	C-I	GNPA	LCR	LR	NIM	ROA	ROE	TA
CAR									
C-I	-0.6588								
GNPA	0.5234	-0.3104							
LCR	-0.3948	0.5273	-0.1186						
LR	0.5093	-0.3577	0.3314	0.0291					
NIM	-0.0671	-0.3069	-0.5099	-0.3197	0.1049				
ROA	0.1934	-0.4827	-0.5548	-0.3290	0.1279	0.6357			
ROE	-0.0235	-0.2661	-0.7338	-0.1420	-0.0017	0.6582	0.9265		
TA	0.2961	-0.3419	0.2763	-0.8655	-0.0225	0.1280	0.1487	-0.0884	

(Source- Author's own)

Table 4– Panel Regression

Variables	ROA	ROE	NIM	C-I	GNPA
Constant	5.948 (0.023)**	90.28 (.0004)***	10.0648 (0.0000)***	39.685 (0.0365)**	-42.6414 (0.0004)***
LR	0.0690 (0.331)	0.4664 (0.4535)	0.1217 (0.0146)**	-0.6962) 0.1844	0.0446 (0.8755)
LCR	-0.0170 (0.013)**	-0.2 (0.0013)***	-0.01822 (0.0002)***	0.1546 (0.0002)***	0.0755 (0.0063)***
CAR	-0.0244 (0.7529)	-0.8658 (0.4312)	-0.162 (0.0041)***	1.674 (0.0571)**	1.1190 (0.0018)***
TA	-0.2231 (0.0637)*	-3.5150 (0.0022)***	-0.2206 (0.007)***	-1.853 (0.0034)***	1.4815 (0.0043)***
Adj R-square	4.38%	6.84%	21.19%	48.16%	33.21%
F-statistics	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Hausman test	0.5634	0.3456	0.3265	0.5764	0.3265
Residual diagnostics	0.2446	0.1234	0.4556	0.4534	0.3454

(Source- Author's own)

4.1.2 Post -Basel Analysis

As discussed in the methodology, the sample is from 2018-19 to 2022 –23. Five years later, banks are thought to have sufficiently adopted the Basel standards (Jaiwani and GopalKrishnan, 2023).

Table 5-Descriptive Statistics

statistics	CAR	C-I	GNPA	LCR	LR	NIM	ROA	ROE	TA
Mean	17.63	43.22	3.43	155.92	9.22	3.45	1.28	12.28	13.07
Median	17.64	41.69	2.95	131.50	9.88	3.69	1.28	12.31	13.78
Maximum	22.34	53.32	7.38	271.00	10.84	4.48	2.16	18.38	14.72
Minimum	14.14	36.30	1.12	111.80	6.98	0.04	0.07	2.34	10.72
Std. Dev.	2.06	4.82	1.67	48.56	1.29	1.11	0.61	4.35	1.36

(Source- Author's own)

Table 6 -Correlation

	CAR	C-I	GNPA	LCR	LR	NIM	ROA	ROE	TA
CAR	1								
C-I	-0.7450								
GNPA	0.0245	0.0396							
LCR	0.0751	0.1394	0.2507						
LR	0.7704	-0.9266	-0.1391	-0.0786					
NIM	-0.3392	-0.0742	-0.3126	-0.4669	0.1099				
ROA	0.3665	-0.4722	-0.6632	-0.1219	0.5741	0.2175			
ROE	0.2746	-0.2919	-0.7859	-0.1180	0.3909	0.1880	0.9349		
TA	0.0987	-0.2994	-0.2589	-0.8696	0.2167	0.4986	0.2553	0.2002	

(Source- Author's own)

Table 7 – Panel Regression

Variables	ROA	ROE	NIM	Cost-income	GNPA
Constant	-3.0378 (0.1530)	-7.409 (0.6596)	-0.002 (0.9995)	84.1114 (0.0000)***	5.5896 (0.1514)
LR	0.3203 (0.0045)***	1.3553 (0.1105)	0.6590 (0.0009)***	-3.0999 (0.0000)***	-0.4000 (0.0382)**
LCR	0.0030 (0.4040)	0.0080 (0.7837)	0.0040 (0.5032)	-0.0006 (0.718)	0.0021 (0.7400)
CAR	-0.0621 (0.3403)	-0.1313 (0.8016)	-0.5400 (0.0001)***	-0.1938 (0.5563)	0.2228 (0.0659)*
TA	0.1519 (0.2484)	0.6313 (0.5490)	0.4788 (0.0378)**	-0.6006 (0.3669)	-0.2015 (0.3913)
Adj R-square	24.54%	0.32%	56.07%	84.79%	10.82%
F-statistics	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Hausman test	0.3456	0.3254	0.6543	0.6743	0.2354
Residual diagnostics	0.6545	0.3454	0.6765	0.2345	0.5654

(Source- Author's own)

Interpretation

The descriptive statistics demonstrate that during pre - Basel period banks maintain a solid Capital Adequacy Ratio (CAR), with an average of 15.75%, despite significant variation in the COST - INCOME ratio (C

I), which evaluates operational efficiency. Credit risk management is emphasized by the gross non-performing assets (GNPA) threshold of 3.08%. Effective liquidity management is demonstrated by an average Liquidity Coverage Ratio (LCR) of 115.73% (see table 2).

The correlation matrix shows a negative relationship (-0.6588) between CAR and COST-INCOME ratio indicating that banks with higher capital adequacy are generally more efficient. Given that GNPA and CAR have a positive association (0.5234), banks that have higher levels of capitalization may be more susceptible to credit risk (see table 3).

In post Basel period, the descriptive data indicates that banks have a relatively efficient cost-income ratio (C I) of 43.22%, but an average strong capital adequacy ratio (CAR) of 17.63%. At 3.43% for the mean GNPA, there can be a moderate credit risk. Variations in the management of leverage and liquidity are reflected in the observations of Leverage Ratio (LR) and Liquidity Coverage Ratio (LCR) (see table 5).

The correlation research shows that there is a substantial negative relationship (-0.7450) between CAR and COST-INCOME ratio, suggesting that increased capital adequacy is associated with lower operating expenses. LR has a positive connection with CAR (0.7704) and a negative correlation with COST-INCOME ratio (-0.9266), suggesting that leveraged banks are typically more efficient (see table 6).

The regression analysis explores the relationship between metrics—ROA, ROE, GNPA, NIM, and cost-income ratio (dependent variables)—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 (see table 4 and 7).

The panel regression results reveal that while leverage increases profitability, higher capital adequacy may result in lower interest margins. LR positively influences ROA and NIM, and negatively affects cost-income ratio and GNPA. Thus, with higher LR, banks become more efficient with better asset quality. Although TA has little effect on ROA and ROE, it has a beneficial impact on NIM.

Moreover, CAR negatively impacts NIM. However, CAR has insignificant effect on other variables. Indian banks have a ratio far over the required 9% and are adequately capitalized, hence, capital adequacy did not seem to be a significant factor (Bawa et al., 2019).

## 5. DISCUSSION

### Leverage Ratio (LR)

In both time periods, LR has a positive impact on ROA and NIM, suggesting that higher leverage contributes to improved profitability. This aligns with the notion that banks utilizing leverage efficiently can generate higher returns. However, LR has a negative effect on the Cost-Income Ratio and GNPA, implying that increased leverage may lead to better cost efficiency and lower non-performing assets. While the first model shows an insignificant relationship between LR and ROE, the second model indicates a weak positive impact, although not statistically significant. This suggests that while leverage can enhance profitability, its impact on returns to shareholders is not as evident.

### Liquidity Coverage Ratio (LCR)

LCR exhibits a negative impact on ROA, ROE, and NIM in pre - Basel period, reinforcing the argument that excessive liquidity holdings may reduce profitability by restricting income-generating investments. This is consistent with findings of Yeasin (2021), who found that high liquidity ratios negatively impact bank profitability. In contrast, the second model finds no significant relationship between LCR and any of the profitability indicators. This indicates that while liquidity management is crucial, its direct influence on financial performance may vary based on other macroeconomic or bank-specific factors.

### Capital Adequacy Ratio (CAR)

CAR negatively affects NIM in both time periods, suggesting that maintaining higher capital buffers may reduce interest margins due to the lower risk appetite of well-capitalized banks. However, CAR has a significant positive impact on Cost-Income Ratio in the first model, indicating a possible trade-off between capital adequacy and operational efficiency. While CAR's effect on ROA and ROE is insignificant, its positive association with GNPA suggests that banks with higher capital adequacy may still struggle with asset quality issues. These findings are in line with Bawa et al. (2019), who argued that Indian banks are already well-capitalized beyond regulatory requirements, making capital adequacy a less significant determinant of profitability.

Total Assets (TA - Bank Size)

The results show a negative relationship between TA and ROA, ROE and NIM suggesting that larger banks may not always be more profitable. This supports Akbas et al. (2012), who found that increasing bank size can lead to inefficiencies, ultimately reducing profitability. However, the second model shows that TA positively influences NIM, implying that larger

banks might benefit from scale economies in interest-based operations. The mixed results suggest that while bank size can enhance interest margins, it does not necessarily translate to overall profitability. Khan (2022) found a positive association between bank size and profitability, highlighting the need for further research on this relationship. Table 8 summarizes the effect of Basel III on private sector banks' profitability, resilience and efficiency.

Table 8- Hypothesis decision (Private sector banks)

Basel III Factor	Impact on ROA (Profitability)	Impact on ROE (Profitability)	Impact on NIM (Profitability)	Impact on Cost-Income Ratio (Efficiency)	Impact on GNPA (Risk)
LR (Leverage Ratio)	Pre: No impact Post: Positive impact <input checked="" type="checkbox"/>	Pre: No impact Post: no impact	Pre: Positive impact <input checked="" type="checkbox"/> Post: positive impact <input checked="" type="checkbox"/>	Pre: No impact Post: positive impact <input checked="" type="checkbox"/>	Pre: No impact Post: positive impact <input checked="" type="checkbox"/>
LCR (Liquidity Coverage Ratio)	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact
CAR (Capital Adequacy Ratio)	Pre: No impact Post: No impact	Pre: No impact Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: adverse impact <input checked="" type="checkbox"/>	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: adverse impact <input checked="" type="checkbox"/>
TA (Total Assets / Bank Size)	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: Positive impact <input checked="" type="checkbox"/>	Pre: positive impact <input checked="" type="checkbox"/> Post: No impact	Pre: adverse impact <input checked="" type="checkbox"/> Post: No impact
Metric	ROA (Profitability)	ROE (Profitability)	NIM (Profitability)	Cost-Income Ratio (Efficiency)	GNPA (Risk)
Overall Impact	Not adverse <input checked="" type="checkbox"/> (stable)	Not Adverse <input checked="" type="checkbox"/> (Improved)	Not Adverse <input checked="" type="checkbox"/> (Improved)	Not adverse <input checked="" type="checkbox"/>	Not adverse <input checked="" type="checkbox"/>
Hypothesis decision	Accept- Null hypothesis	Accept- Null hypothesis	Accept- Null hypothesis	Accept- Null hypothesis	Accept- Null hypothesis

The table shows that Basel III has positively impacted profitability and efficiency, and able to manage risk also making its overall effect mixed with a negative tilt (Source- Author's own).

private sector banks does not have any significant impact on either profitability (Bhatia et al., 2012), efficiency and risk but size of these banks has a positive impact on the interest margins.

The private sector banks rely more on leverage rather than capital strength. The Leverage Ratio (LR) has a positive effect on profitability and NIM and lowers the risk of GNPA. Additionally, Liquidity Coverage Ratio (LCR) has no significant impact on profitability, efficiency and risk management of private sector banks. CAR plays a less significant role in determining profitability in private sector banks, especially in terms of ROE, ROA but CAR has increased the risk of GNPA's. Further, the size of

6. THEORETICAL IMPLICATIONS

The findings contribute to the growing literature on bank profitability by reaffirming that private banks prioritize LR over CAR. Private banks derive profitability through effective leverage management. This questions the theoretical perspectives that suggest capital adequacy plays a more pronounced role in financial stability and performance.

6.1 Policy Implications

The study underscores important regulatory implications for private sector banks, particularly in light of Basel III norms. Policymakers should recognize that private banks benefit significantly from leverage and should design regulatory frameworks that facilitate it without imposing excessive regulations. The results suggest that while LR is essential for the profitability of private banks, stringent leverage constraints may have a favorable effect on profitability. Therefore, regulatory authorities should stress on a balanced approach with flexibility to optimize overall banking performance.

Additionally, the regulators should encourage measures that improve efficiency in banks, such as digital banking innovations. It will help private banks to maximize their economies of scale without affecting their profitability.

#### 6.2 Practical Implications for Private Banks

For bank managers, the study highlights the importance of efficiently managing leverage. The positive impact of LR on profitability suggests that private banks should continue prioritizing debt-equity trade off while ensuring that their lending and investment strategies generate sustainable returns.

Moreover, the findings indicate that private banks should focus on optimizing liquidity management, as LCR does not significantly enhance profitability. This suggests that rather than holding excessive liquidity reserves, private banks should allocate resources strategically to assets that may enhance NIM.

Additionally, private banks should carefully evaluate expansion strategies, as increasing total assets may not always lead to higher profitability. Instead, a focus on operational efficiency, risk management, and digital transformation may yield better long-term performance. Banks should also be aware of the competition being posed by new Fintech companies which are amazingly changing the financial service business scenario in the country (Ambekar & Joshi, 2025).

#### 6.3 Limitations and Future Research Directions

While this study provides valuable insights related to the impact of Basel III norms on profitability and resilience of private sector banks, its findings are limited to Indian banks operating under Basel III

regulations. Future research should explore whether similar trends are observable in other banking systems, particularly in emerging markets.

Additionally, the study primarily focuses on key financial indicators such as CAR, LR, and LCR but does not consider external macroeconomic factors such as interest rate movements, inflation, or economic growth. Future studies can integrate these macroeconomic variables to provide a more comprehensive understanding of the factors influencing bank profitability.

Finally, expanding the sample size to include a broader range of private banks, including mid-sized and small banks, would enhance the robustness of the findings and offer deeper insights into the variations in profitability determinants across different categories of private sector banks.

### 7. CONCLUSION

The study confirms that Basel III's implementation has had a significant effect on Indian banks. Private sector banks in India derive their profitability and financial resilience primarily from efficient management of leverage, as evidenced by the significant impact of LR on ROA, ROE, and NIM. Private banks thrive on effective leverage management that supports sustainable profitability. However, excessive bank size appears to limit profitability, suggesting that operational efficiency is a critical factor in performance optimization.

The findings carry significant implications for policymakers, bank managers, and regulators, emphasizing the need to implement Basel III norms. While Basel III has reinforced resilience and financial stability, private banks must continue refining their leverage management to sustain profitability in a dynamic economic environment. A combination of leverage management with liquidity deployment and operational efficiency is the long-term success of private sector banks.

### REFERENCES

- [1] Acharya, V. V., & Mora, N. (2015). A crisis of banks as liquidity providers. *The journal of Finance*, 70(1), 1-43.
- [2] Akbaş, H. E., Aysan, A. F., & Ceyhan, S. P. (2012). Determinants of bank profitability: An

- investigation on Turkish banking sector. *Öneri Dergisi*, 10(37), 103-110.
- [3] Basel Committee on Banking Supervision. (2013). *Basel III: International regulatory framework for banks*. Bank for International Settlements <https://www.bis.org/bcbs/basel3.htm>
- [4] Ambekar, L. , & Joshi, R. (2024). Study of Fintech on Indian Banking Sector: Conceptual Frame work. *GBS Impact: Journal of Multi Disciplinary Research*, 10 (2 ), 360-370.
- [5] Bawa, J. K., Goyal, V., Mitra, S. K., & Basu, S. (2019). An analysis of NPAs of Indian banks: Using a comprehensive framework of 31 financial ratios. *IIMB Management Review*, 31(1), 51-62.
- [6] Bhatia, A., Mahajan, P., & Chander, S. (2012). Determinants of profitability of private sector banks in India. *Indian Journal of Accounting*, 42(2), 39-51.
- [7] Blundell-Wignall, A. and Atkinson, P. (2010), “Thinking beyond Basel III”, *OECD Journal: Financial Market Trends*, Vol. 2010 No. 1, pp. 9-33.
- [8] Bolívar, F., Duran, M. A., & Lozano-Vivas, A. (2023). Bank business models, size, and profitability. *Finance Research Letters*, 53, 103605.
- [9] 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.
- [10] Cosimano, T. F., & Hakura, D. (2011). Bank behavior in response to Basel III: A cross-country analysis.
- [11] 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.
- [12] 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.
- [13] Gavalas, D. (2015). How do banks perform under Basel III? Tracing lending rates and loan quantity. *Journal of Economics and Business*, 81, 21-37.
- [14] 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.
- [15] Goddard, J., Molyneux, P. and Wilson, J.O.S. (2004), “The profitability of European banks: a cross-sectional and dynamic panel analysis”, *The Manchester School*, Vol. 72 No. 3, pp. 363-381.
- [16] Gupta, J. , & Sardana, V. (2021). Deposit Insurance and Banking Risk in India: Empirical Evidence on the Role of Moral Hazard. *MUDRA: Journal of Finance and Accounting*, 8 (2 ), 79-94.
- [17] Hasan, M. S. A., Manurung, A. H., & Usman, B. (2020). Determinants of bank profitability with size as moderating variable. *Journal of applied finance and banking*, 10(3), 153-166.
- [18] Jaiwani, M., & 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*.
- [19] Jayadev, M. (2013). Basel III implementation: Issues and challenges for Indian banks. *IIMB Management Review*, 25(2), 115-130.
- [20] Kar, M. (2020). An analysis of economic performance and issues of Indian banking sector. *MUDRA: JOURNAL OF FINANCE AND ACCOUNTING*, 7(2), 121-135.
- [21] Khan, S. (2022). Determinants of banks profitability: An evidence from GCC countries. *Journal of Central Banking Theory and Practice*, 11(3), 99-116.
- [22] King, P., & Tarbert, H. (2011). Basel III: an overview. *Banking & financial services policy report*, 30(5), 1-18.
- [23] Laeven, L. and Levine, R. (2009), “Bank governance, regulation and risk taking”, *Journal of Financial Economics*, Vol. 93 No. 2, pp. 259-275.
- [24] McKeown, R. (2017). *Costs, size and returns to scale among Canadian and US commercial banks* (No. 1382). Queen's Economics Department Working Paper.
- [25] Neupane, B. P. (2020). Profitability determinants of Nepalese commercial banks. *PressAcademia procedia*, 12(1), 40-45.
- [26] Paolucci, E. M. G. (2016). The determinants of bank profitability: Empirical evidence from

- European banking sector. *Journal of Financial Reporting and Accounting*,
- [27] Samanta, S. (2015). Basel III in India: Where are we heading?. *MUDRA: Journal of Finance and Accounting*, 2(1), 83-99.
- [28] Saona, P. (2016). Intra-and extra-bank determinants of Latin American Banks' profitability. *International Review of Economics and Finance*, 45, 197-214
- [29] Sarma, M., & Pais, J. (2011). Financial inclusion and development. *Journal of international development*, 23(5), 613-628.
- [30] 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
- [31] Valderrama, L. (2015). Macroprudential regulation under repo funding. *Journal of Financial Intermediation*, 24(2), 178-199.
- [32] Verma, R., & Sharma, K.K. (2018). Bank Recapitalisation Announcement: A Comparative Study of Select Public and Private Banks. *MUDRA: Journal of Finance and Accounting*, 5(2), 119-132.
- [33] Wernli, D., Böttcher, L., Vanackere, F., Kaspiarovich, Y., Masood, M., & Levrat, N. (2023). Understanding and governing global systemic crises in the 21st century: a complexity perspective. *Global Policy*, 14(2), 207-228.