# Analysis of Financial Performance of Indian Banks in Light of Basel III Norms: Emerging Concerns

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**ABSTRACT - The main aim of this paper is to investigate the profitability of Indian public-sector banks during 2008 to 2017 and compare the profitability of banks during pre and post implementation of Basel III capital norms. Return on assets (ROA) and Return on equity (ROE) have been taken as measures of financial performance of public-sector banks. Results reveal that Indian public sector banks have been facing the chronic problem of deteriorating profitability and financial performance of banks has not much improved after implementation of Basel III capital norms due to a progressive decline in ROA and ROE of banks during 2013-2017. Focusing on the profitability of banks is of great concern for Indian banking sector and it requires consistent vigilance. The pressure of enforcement of stringent regulations forced banks to maintain high capital adequacy ratio and this generates the additional requirement of funds resulting into a negative impact on the profitability of banks. In order to improve the profitability, Indian bank managers and central regulator need to frame suitable policies to resist negative shocks and maintain the financial stability of banking system.**

Keywords: Basel III, Capital Norms, Profitability, Financial Performance, Indian public Sector Banks.

## I.    Introduction

The measurement of banks' profitability is well researched and has gained increased attention over the past few years. The recent global financial crisis contemplated the significance of banks' profitability for the stability of the economy as well as banking sector reflecting the need to maintain it under surveillance all the time. Poor financial performance of banks has negative repercussion on an economy which can lead to economic failures and crises. That's why a drastic change in the banking industry has come in the form of new global reforms known as Basel III to make banks more resilient and stable during an economic downturn. The new guidelines involve leverage ratio, liquidity components, and new capital standards for improving the quantity and quality of capital. Basel III guidelines are the milestone in banking reforms applicable to all nations (**Aathira and Shanthi. 2013**). The features of Basel III such as higher risk coverage, thrust on loss-absorbing capital in periods of stress, improving liquidity standards, the creation of capital buffers in good times would help in creating a resilient banking system. But, better implementation of Basel III can be possible when Banks would do best efforts, capable to get a huge amount of funds and required resources, anticipates cost and benefits and analyze future challenges.

In India, Basel III regulations are being implemented with effect from 2013. It is mandatory for banks to comply with the regulatory limits and minimum capital requirements. It is possible that financial status of Indian banking sector has been undergoing a pressure after implementing capital regulations. That's why full attention is essential to banks' performance to avoid the crisis and protect the economy.

The profitability of public-sector banks has become prime importance because of regulatory pressure on banks for achieving Basel III standards. In this way, the financial soundness of banks plays a significant role while implementing the international Basel banking norms as well-capitalized banks can easily implement the new regulations but it is difficult for the financially weaker banks to determine the required capital as per the international norms. Thus, investigating the financial health of Indian banks has become compulsory to compete with the environmental changes because the financial position of the banking sector has always been a concern for both the bankers and stakeholders because the unsound financial position can lead to bankruptcy (Krishan and Kavita, 2017).

The profitability measurement examines the financial performance of public-sector banks by employing the financial indicators: ROA, ROE.

**Return on Assets (ROA)** shows the percentage of how profitable a company's asset is in generating the revenue. ROAs over 5% are generally considered good. Return on Assets (ROA) is a profitability ratio which indicates the net profit (net income) generated on total assets. It is computed by dividing net income by average total assets.

**ROA = (Profit after tax/Total assets) \*100**

It measures overall efficiency of a company in generating profits from its total assets. A low ROA indicates that a bank is asset-intensive and it would need more funds to continue its operations.

**Return on Equity (ROE)** is a ratio relating net profit (net income) to shareholders' equity. The equity refers to share capital reserves and surplus of the bank.

**ROE** = Profit after tax/ (Total equity)

Return on equity is the significant indicator of measuring the financial health of banks. ROE from 10% to 20 % and above is generally considered good and shows higher profitability.

**Impact of Basel III norms on Profitability of Banks**

Basel III reforms will bring about a radical change in the Indian Banking Industry. These norms will make Indian banks less susceptible to a crisis, more stable and stronger. The Basel norms are transparent and conceptually sound and intend to create a strong and stable banking system. Although, Indian banks are actively implementing Basel III norms and the final date for its implementation has been postponed by RBI. Now, banks will get more time for managing their operations to implement international regulations. The RBI is following a consultative process for successful implementation of all the components of Basel III regulations.

On the other hand, developing economy of India may face various challenges in enforcing international banking norms because compliance with Basel III guidelines is not an easy task for Indian banks. The banks will have to revise its capital and liquidity standards and this process may lead to affect the profitability of banks because banks are required to maintain higher capital requirements, it would reduce the lending of banks. Decreasing in bank credit can be the serious challenge faced by Indian banks in Basel III implementation and will generate a huge cost to banks (Roy 2013). The banks need more funds to be kept aside for meeting liquidity standards. The burden of raising additional capital will lead to decrease in ROE (return on equity). The enforcement of Basel III norms may affect the shareholder's rate of return and ROE of the banks. The decreasing in ROE may increase government borrowing

and put extreme pressure on GDP. The higher government borrowings can lead to the negative fiscal condition.

The RBI needs to take effective measure to strengthen the ability of banks for implementation process and anticipate the cost and benefits of Basel III. The formation of effective strategies and proper support from central government and RBI can foster the banks to be Basel III compliant. Improvement in the skills of bank's employees by imparting training and courses is the considerate issue for banks (Kaur and Kapoor 2011).

However, Basel III will generate a higher cost to implement these norms but Basel regulations are intended to decrease the chances of financial failure and benefits of implementing Basel III can be geared up with the adoption of a consistent approach for new standards. The delay in the Basel implementation process can damage the confidence in the banking industry (Chandrasekhar 2010).

Implementing Basel III norms can be a financial burden for banks. The high cost to meet capital norms and cost to borrow funds may decline the profitability and other reasons are heavy investment cost in upgrading technology and validating credit rating models. Therefore, implementing Basel III can be a financial burden for small banks because weaker banks have to raise overall capital due to low profits and immediate stress on banks may lead to close down their operations. There can be a negative impact of implementing Basel III on bank lending and interest rate because banks have to increase interest rate due to increase in external borrowings. The increasing borrowing cost may create bankruptcy if banks do not have sufficient profits. All these issues will directly affect the financial performance of banks resulting a decline in profitability and operating efficiency. On the other hand, public-sector banks in India possess higher government stake so, no more options are available to raise funds. The decreasing asset quality, declining profitability (ROA, ROE), increasing NPAs and poor performance of public banks indicate the chances of bankruptcy. Under these circumstances, how public-sector banks will survive for long as banks have more chances to be insolvent.

There can be both positive and negative impacts of implementing Basel III norms on Indian banks, but the intensity of impact will depend on the size, nature, and location of banks. Implementation of Basel III can raise the government borrowings that can lead to the negative fiscal condition. Decreasing in bank credit can be the other serious challenge faced by Indian banks. It would be wise to implement new norms with keeping in the mind the heavy losses due to a crisis in some economy.

Basel III has a negative impact on small banks and banks with a low capital base as these weak banks are unable to comply with stringent regulations due to lack of funds and low profitability (Mohamed Zaky and Soliman, 2017)

Basel III norms will put a negative impact on return on equity and the financial performance. The public banks will not be able to increase their lending practices and unable to raise the capital. Indian banking sector will face a decline in profitability as they have to raise additional capital to comply with the Basel III (Jain, 2014).

The biggest challenge in Basel implementation is that Indian banks will need huge fund. As per the ICRA, the requirements of the fund have been estimated almost USD 80 billion and USD 50 billion by Fitch Ratings. Now, the challenges are how banks will raise this fund and whether the government will retain majority ownership in banks or not. The burden of raising additional capital will lead to decrease in ROE (return on equity). Basel III norms may affect the shareholder rate of return and ROE of the banks (**Rizvi et.al, 2021**).

Basel III regulations will generate a heavy cost to banks in terms of maintaining higher capital ratios and lending rates will be increased consequently because banks will likely pass on this cost to borrowers. The decreasing in ROE may increase government borrowing and put extreme pressure on GDP (**Jayadev, 2013**).

Thus, keeping above issues in mind, it is desirable to investigate the profitability of banks and identify those banks which are operating under stress due to a pressure of maintaining high capital adequacy ratio. Moreover, the study will identify the financially sound banks that will contribute positively and the financially weaker banks facing negative impact of Basel III.

## II. Review of Literature

**Kalhoefer and Salem (2008)** analyzed the profitability and financial performance of Egyptian banks. The study reported problems in banks' profitability and showed structural weaknesses in both public and private banks. The authors suggested that higher interest rate can increase the revenue and lead to higher profitability.

**Kumbirai and Webb (2010)** explored the performance of South African banking sector for the period of 2005-2009. The results showed a significant change in the profitability of banks due to the global financial crisis in 2007. This led to decline in profitability, low liquidity and decreasing asset quality of banks in South Africa.

**Alpera and Anbar (2011)** investigated the determinants of banks' profitability in Turkey for the period of 2002-2010. The findings revealed that size of assets and non-interest income had a positive and significant impact on the profitability of banks whereas the size of the loan had a negative impact on profitability. The interest rate affects the profitability of banks positively. The authors suggested that profitability of banks can be improved by increasing the non-interest income and decreasing credit/asset ratio.

**Abdel-Baki (2012)** identified various negative effects of implementation of Basel III norms in emerging economies. The authors revealed that if the financial market in emerging economies will be unable to meet the costly norms of Basel III, it will put an extreme burden of debt on government. The external borrowings would raise the bond prices and rate of interest. On the other hand, banks are expected to do the cross-listing of their shares so that the higher cost of implementation does not pass on to the customers but this will create a scenario of liquidity crunch and make banks unable to raise capital. These are the serious threats can put on banks in emerging economies due to the implementation of international regulations.

**Di Biase (2013)** investigated the impact of new capital regulation under Basel III on bank lending rates in Italian banking sector. The author examined that increase in capital level can bring negative effect in the performance of return on equity (ROE) of Italian banks. In order to measure this author developed a model including the period of 2005-2010. The findings showed that the negative effects of new capital norms on the lending rate can foster Italian banks to increase the interest rate charged to borrowers or decrease the volume of total lending. The study found positive evidence that Italian banks can adjust the higher capital norms by engaging a combination of commercial actions with no negative effects on lending activities and its cost for borrowers. Based on the findings, these results are extremely significant in examining the long-term effect of Basel III on the economy of Italy.

**Brindadevi (2013)** analyzed the profitability of Indian private sector banks by using financial indicators such as interest spread, net profit margin, return on a long-term fund, return on net worth & return on asset. The author recommended that measurement of profitability is the most significant measure of the success of banking business. A profitable banking business is capable to reward its owners with a higher return.

**Adam (2014)** measured the financial performance of Erbil Bank in Iraq for the period 2009-2013. The author used several financial indicators to measure the financial position of the bank. The study found out that overall performance of Erbil Bank is satisfactory and improving in terms of asset quality and profitability ratio. The author recommended the development of some specific banking operations which can boost the bank's performance and improve the profitability.

**Islam (2014)** attempted to examine the financial performance of National Bank Limited Bangladesh for the period of 2008-2013 and identified the differences in performance of banks over two periods (2008-10 & 2011-13). The author concluded that performance of banks depends on the ability of top management in preparing strategic plans and the proper implementation of its strategies. The study suggested specific areas for banks to

work on that can improve their performance and ensure sustainable growth.

**Titko et.al (2015)** explored the drivers of bank profitability in Latviaand Lithuania over the period 2008–2014. The performance of banks is measured by using financial and non-financial indicators. The authors concluded that profitability is driven by asset quality, efficient management, and sound banking operations.

**MensahMawutor and Fred (2015)** measured the profitability of banks in Ghana over the period 2006-2011. The study used return on assets and size of the firm as dependent variable and leverage ratio, credit risk ratio, profitability ratio and liquidity ratio as an independent variable. The findings revealed that 60.74% of the variation in the profitability of the banks explained by the independent variables such as the liquidity level, leverage and credit risk.

**Maria and Eleftheria (2016)** explored the effects of new Basel III requirements on the Greek banks for the period of 9 years (2004-2013). The study is based on the global financial crisis in 2007 and debt crisis in European nations. The study found that higher capital requirements will affect the performance of banks. The liquidity and leverage ratio and the performance indicators (ROA, ROE) were positively associated during the crisis. This indicates that higher leverage ratio can increase the solvency risk and higher liquidity helped banks to crack the possible opportunities during the period of study.

**Torbire and Zaagha (2016)** aimed to highlight the impact of capital adequacy indicators on the measures of financial performance such as NIM, ROA, and EPS of 15 Nigerian banks using the 4 years data (2008-2012). The results depicted that capital adequacy determines and stimulate the financial position of banks in Nigeria. The capital adequacy strongly impacted the financial indicators of banks in Nigeria. The authors suggested that managers should take corrective actions for the introduction of short-term investment in the portfolio of banks to improve the financial position of banks.

**Mehta and Bhavani (2017)** measured the impact of specific variables on bank's profitability of banks in UAE. The study was conducted on 19 banks for the period of eight years (2006-2013). The results indicated that maintaining a high capital adequacy ratio, improving asset quality are the variables that directly impact the profitability of banks. The authors concluded that profitability of banks can be increased by engaging in non-traditional sources of revenue. Apart from that, authors recommended a profitability-enhancing model which can be used by banks to enhance their performance.

**Hallunovi (2017)** explored the factors that affect the profitability of banks in Albania. A survey was conducted on banks in Albania for the period 2009-2014. The results

of the study demonstrated the positive relationship between bank size and profitability and statistically significant with 1% level of significance. The study concluded that credit risk has a negative relation to profitability whereas inflation and exchange rate have a positive relationship with profitability (ROA/ROE).

**Nuhiu et.al (2017)** attempted to measure the determinants of profitability of banks which affect the financial performance of commercial banks in Kosovo. The authors used various financial indicators such as return on average equity (ROAE), return on average assets (ROAA) and net interest margin (NIM). The study concluded that internal factors such as asset quality, capital adequacy and management efficiency affect the profitability of banks in Kosovo.

**Islam and Hasan Rana (2017)** attempted to investigate the determinants of profitability of fifteen private banks in Bangladesh for the period of 2005–2015. The study focused on the internal factors that affected bank profitability. The results depicted that non-performing loan and operating expenses had a significant impact on banks' profitability because higher non-performing loans lead to less profit. The authors concluded that high non-performing loans are the challenging threat to the profitability of banks.

**Rekik and Kalai (2018)** analyzed the determinants of profitability in conventional banks in Tunisia as well as 13 different countries. The study covered the data from 110 banks over the period 1999-2012. The findings showed that cost efficiency has not more impact on profitability than profit efficiency. It was concluded that profitability of banks is significant as the soundness of banking institutions is directly related to the soundness of entire economy.

**Makkar and Hardeep (2018)** attempted to measure the profitability of banks and identified the key factors which influence the profitability of 46 Indian commercial banks over the period of 15 years (2001-2016). The findings revealed that liquidity, solvency, and efficiency are the significant factors that influenced the profitability of Indian commercial banks. The authors concluded that profitability of public sector banks is satisfactory as compared to the profitability of private sector banks. Moreover, the authors suggested that the banks with a low return on assets should focus on improving their financial performance to boost their level of profitability to comply with Basel norms.

**Krishan and Kavita (2018)** opined that the Basel III norms have been considered as a revolution in the banking industry and intend to increase the shocks absorbing capacity of banks by ensuring effective management of risks. But, implementation of Basel III will depend on various factors and vary country to country. On the basis of single factor, it cannot be concluded that Basel III norms have implemented in any nation because process of Basel

III has been regarded as a long journey as it would require additional fund, capable human and other resources.

**Ramesh (2019)** recommended that Basel capital norms has a significant impact on return on assets whereas insignificant impact on return on equity. The banks maintain adequate capital in relation to the risk level of banks because there was found a significant relationship between the amount of capital and risk.

**Jangra (2020)** suggested that banks with low operational efficiency should focus on improving their financial performance to boost their level of efficiency to comply with Basel norms. Thus, financial health of banks plays significant role in implementing financial regulations as poor financial performance of banks may lead to bankruptcy. **Jadhav et.al (2021)** analyzed the relation between capital adequacy ratio and bank's profitability. The findings concluded that banks should develop a reliable framework for efficient capital management that can bring overall efficiency in banking operations.

**Rezq Aljaber and Hassan Al-Tamimi (2021)** suggested that banks should review current implementation processes and should be more involved in setting a framework for implementing regulations to ensure the effective implementation of Basel

### Objectives of the study

The present study investigates the profitability of Indian public-sector banks after the implementation of Basel III and compares the profitability of banks during pre and post implementation of Basel III capital norms.

On the basis of objectives of the study, following hypotheses have been formulated:

H1: There are no significant differences between the mean of ROA of banks during pre and post-Basel III periods.

H2: There are no significant differences between the mean values of ROE of banks during pre and post-Basel III periods.

## III.    Research Methodology

The present study is an attempt to compare the profitability of banks during pre and post implementation of Basel III capital regulations. In order to achieve the objective of this study, descriptive and analytical approaches have been used. The selected variables such as ROA (return on assets) and ROE (return on equity) have been taken from the annual reports of 21 public-sector banks for the period of last 10 years (2008-2017). Moreover, the present study is based on secondary sources such as annual reports and financial statements of 21 public-sector banks which have been accessed from the official website of the respective bank. In order to examine the financial performance of banks after implementing Basel III, the study has been conducted for the period of 10 years i.e. March 2008 to March 2017. The period of 10 years has been divided into two phases to evaluate the changes in selected variables after implementation of Basel III: Pre-Basel III Phase/Period: 2008-2012 and Post-Basel III Phase/Period: 2013-2017. The analysis of profitability of the banks was carried out through descriptive statistics, and histogram, chart, and graphs. Further, the study used paired t-test for testing the hypotheses.

## IV.    Data Analysis

The present study attempted to examine the profitability of public sector banks after the implementation of Basel III norms and compare the profitability of banks during pre and post-Basel III periods. ROA (return on assets) and ROE (return on equity) have been selected as profitability indicators which represent the financial performance of banks.

10 years period from 2008 to 2017 has been divided into two regimes namely Pre-Basel III (2008-2012) and post Basel III from 2013 to 2017.  ROA of public-sector banks has been measured before and after implementing Basel III norms.

**Table 1.1: ROA % (Return on Assets) of Public-Sector Banks before Implementing Basel III Capital Norms**

| Public-sector banks | 2008 | 2009 | 2010 | 2011 | 2012 | Mean | Maximum | minimum | S.D |
|---|---|---|---|---|---|---|---|---|---|
| Allahabad bank | 1.17 | 0.78 | 0.99 | 0.94 | 1.02 | 0.98 | 1.17 | 0.78 | 0.140 |
| Andhra bank | 1.12 | 1.09 | 1.39 | 1.36 | 1.19 | 1.23 | 1.39 | 1.09 | 0.137 |
| Bank of Baroda | 0.8 | 0.98 | 1.1 | 1.18 | 1.12 | 1.03 | 1.18 | 0.8 | 0.150 |
| Bank of India | 1.25 | 1.33 | 0.7 | 0.82 | 0.72 | 0.96 | 1.33 | 0.7 | 0.302 |
| Bank of Maharashtra | 0.68 | 0.72 | 0.7 | 0.47 | 0.55 | 0.62 | 0.72 | 0.47 | 0.108 |
| Canara Bank | 0.86 | 0.94 | 1.3 | 1.42 | 0.95 | 1.09 | 1.42 | 0.86 | 0.248 |
| Central Bank of India | 0.54 | 0.45 | 0.66 | 0.7 | 0.26 | 0.52 | 0.7 | 0.26 | 0.176 |
| Corporation Bank | 1.38 | 1.28 | 1.28 | 1.21 | 1.06 | 1.24 | 1.38 | 1.06 | 0.118 |
| Dena Bank | 1.06 | 1.02 | 1.01 | 1 | 1.08 | 1.03 | 1.08 | 1 | 0.034 |
| Indian Bank | 1.64 | 1.62 | 1.67 | 1.53 | 1.31 | 1.55 | 1.67 | 1.31 | 0.146 |
| Indian Overseas Bank | 1.18 | 1.09 | 0.53 | 0.59 | 0.53 | 0.78 | 1.18 | 0.53 | 0.32 |
| Oriental Bank of Commerce | 0.38 | 0.8 | 0.82 | 0.93 | 0.67 | 0.72 | 0.93 | 0.38 | 0.215 |

| Punjab National Bank | 1.15 | 1.39 | 1.44 | 1.34 | 1.19 | 1.30 | 1.44 | 1.15 | 0.126 |
| Punjab & Sind Bank | 1.49 | 1.26 | 1.05 | 0.9 | 0.64 | 1.06 | 1.49 | 0.64 | 0.32 |
| Syndicate Bank | 0.79 | 0.7 | 0.58 | 0.66 | 0.77 | 0.7 | 0.79 | 0.58 | 0.08 |
| UCO bank | 0.52 | 0.59 | 0.87 | 0.66 | 0.69 | 0.66 | 0.87 | 0.52 | 0.131 |
| Union Bank of India | 1.26 | 1.27 | 1.25 | 1.05 | 0.79 | 1.12 | 1.27 | 0.79 | 0.207 |
| United Bank of India | 0.58 | 0.29 | 0.41 | 0.58 | 0.66 | 0.50 | 0.66 | 0.29 | 0.150 |
| Vijaya Bank | 0.64 | 0.42 | 0.76 | 0.72 | 0.66 | 0.64 | 0.76 | 0.42 | 0.131 |
| State Bank of India | 1.01 | 1.04 | 0.88 | 0.71 | 0.88 | 0.90 | 1.04 | 0.71 | 0.130 |
| IDBI | 0.55 | 0.49 | 0.44 | 0.65 | 0.75 | 0.57 | 0.75 | 0.44 | 0.124 |

**Source: Compiled from the annual reports of the banks**

Table 1.1shows the ROA of public-sector banks during Pre-Basel III regime, The ROA of all public-sector banks was positive and Indian bank secured highest mean of ROA (1.55%) followed by Punjab national bank (1.30) and Dena bank (1.24) showing the highest ROA earned by banks whereas Central bank of India (0.52) recorded lowest ROA mean followed by IDBI (0.57) and Bank of Maharashtra (0.62). During pre-Basel III, ten public-sector banks have attained ROA more than 1% and 9 public banks had ROA less than 1% but these banks maintained positive ROA. This shows that Public banks were financially sound even before implementing the stringent capital regulations of Basel III. The small value of standard deviation shows that the values were closer to the mean value which reflects low variations in ROA of banks.

**Table1.2: ROA of Public-Sector Banks after Implementing Basel III**

| Public-sector Banks | 2013 | 2014 | 2015 | 2016 | 2017 | Mean | Maximum | Minimum | S. D |
|---|---|---|---|---|---|---|---|---|---|
| Allahabad bank | 0.57 | 0.53 | 0.28 | -0.32 | -0.13 | 0.18 | 0.57 | -0.32 | 0.397 |
| Andhra bank | 0.99 | 0.29 | 0.38 | 0.28 | 0.08 | 0.40 | 0.99 | 0.08 | 0.345 |
| Bank of Baroda | 0.82 | 0.69 | 0.48 | -0.8 | 0.2 | 0.27 | 0.82 | -0.8 | 0.646 |
| Bank of India | 0.65 | 0.51 | 0.27 | -0.94 | -0.24 | 0.05 | 0.65 | -0.94 | 0.648 |
| Bank of Maharashtra | 0.74 | 0.3 | 0.33 | 0.07 | 0.09 | 0.30 | 0.74 | 0.07 | 0.269 |
| Canara Bank | 0.77 | 0.54 | 0.55 | 0.52 | 0.2 | 0.51 | 0.77 | 0.2 | 0.203 |
| Central Bank of India | 0.44 | 0.47 | 0.21 | 0.48 | 0.8 | 0.48 | 0.8 | 0.21 | 0.210 |
| Corporation Bank | 0.88 | 0.29 | 0.28 | -0.23 | 0.23 | 0.29 | 0.88 | -0.23 | 0.394 |
| Dena Bank | 0.86 | 0.51 | 0.22 | -0.75 | 0.67 | 0.30 | 0.86 | -0.75 | 0.633 |
| Indian Bank | 1.02 | 0.67 | 0.54 | 0.36 | 0.67 | 0.65 | 1.02 | 0.36 | 0.241 |
| Indian Overseas Bank | 0.24 | 0.23 | -0.16 | -1.03 | -1.21 | -0.38 | 0.24 | -1.21 | 0.692 |
| Oriental Bank of Commerce | 0.7 | 0.54 | 0.34 | 0.07 | -0.46 | 0.23 | 0.7 | -0.46 | 0.455 |
| Punjab National Bank | 1 | 0.64 | 0.53 | -0.61 | 0.19 | 0.35 | 1 | -0.61 | 0.609 |
| Punjab & Sind Bank | 0.44 | 0.35 | 0.13 | 0.34 | 0.2 | 0.29 | 0.44 | 0.13 | 0.124 |
| Syndicate Bank | 1.01 | 0.73 | 0.55 | -0.54 | 0.12 | 0.37 | 1.01 | -0.54 | 0.604 |
| UCO bank | 0.33 | 0.7 | 0.48 | -1.25 | -0.75 | -0.09 | 0.7 | -1.25 | 0.852 |
| Union Bank of India | 0.79 | 0.52 | 0.49 | 0.35 | 0.13 | 0.45 | 0.79 | 0.13 | 0.242 |
| United Bank of India | 0.36 | -1.01 | 0.21 | -0.22 | 0.16 | -0.1 | 0.36 | -1.01 | 0.551 |
| Vijaya Bank | 0.57 | 0.35 | 0.33 | 0.28 | 0.49 | 0.40 | 0.57 | 0.28 | 0.121 |
| State Bank of India | 0.97 | 0.65 | 0.68 | 0.46 | 0.41 | 0.63 | 0.97 | 0.41 | 0.221 |
| IDBI | 0.61 | 0.34 | 0.25 | -1 | 1.38 | 0.31 | 1.38 | -1 | 0.859 |

**Source: Compiled from the annual reports of the banks**

Table 1.2 indicates that the highest ROA mean was secured by Indian bank (0.65) among the twenty one public banks, followed by SBI (0.63) and Canara bank (0.51). During post Basel III regime, ROA has been observed negative for banks like UCO, United bank and Indian Overseas Bank. Most of the banks have negative ROA and faced decreasing trend in ROA. In 2017, the ROA of public-sector banks were ranging between -1.21 – 1.38 and ROA of some banks has fallen in 2017 as compared to 2016, these banks are Allahabad Bank, Bank of India, Indian overseas bank, Oriental Bank of Commerce and UCO bank secured negative ROA in 2017 whereas some of the banks confronted sudden recovery in ROA and recorded positive ROA in 2017 as compared to 2016. These banks are Bank of Baroda, Corporation bank, Dena bank, Punjab national bank, Syndicate bank and united bank.  There were found more variations in ROA of UCO bank and IDBI as these banks have highest standard deviation. All banks have faced rapid decline in ROA over the period of five years.

**Table1.3: Comparison of ROA Mean Value of Two Periods: Pre-and Post-Basel III**

| Public-sector banks | Pre-Basel III ROA (2008-2012) | Post Basel III ROA (2013-2017) |
|---|---|---|
| **Allahabad bank** | 0.98 | 0.186 |
| **Andhra bank** | 1.23 | 0.404 |
| **Bank of Baroda** | 1.036 | 0.278 |
| **Bank of India** | 0.964 | 0.05 |
| **Bank of Maharashtra** | 0.624 | 0.306 |
| **Canara Bank** | 1.094 | 0.516 |
| **Central Bank of India** | 0.522 | 0.48 |
| **Corporation Bank** | 1.242 | 0.29 |
| **Dena Bank** | 1.034 | 0.302 |
| **Indian Bank** | 1.554 | 0.652 |
| **Indian Overseas Bank** | 0.784 | -0.386 |
| **Oriental Bank of Commerce** | 0.72 | 0.238 |
| **Punjab National Bank** | 1.302 | 0.35 |
| **Punjab & Sind Bank** | 1.068 | 0.292 |
| **Syndicate Bank** | 0.7 | 0.374 |
| **UCO bank** | 0.666 | -0.098 |
| **Union Bank of India** | 1.124 | 0.456 |
| **United Bank of India** | 0.504 | -0.1 |
| **Vijaya Bank** | 0.64 | 0.404 |
| **State Bank of India** | 0.904 | 0.634 |
| **IDBI** | 0.576 | 0.316 |

**Source: Compiled from the annual reports of the banks**

Table 1.3 depicts the comparison between the mean values of ROA during the pre-and post-Basel III years. It can be seen that ROA mean value of public-sector banks were higher in Pre-Basel III era as compared to Post Basel III period. The ROA of all public-sector banks has declined sharply in Post Basel III years.

This is the serious concern for Indian public-sector banks and there can be several reasons behind it such as banks are operating under the pressure of maintaining the higher capital ratio. So, the level of ROA of banks has declined in last five years. There were seven Public-sector banks namely Andhra, Canara, Indian overseas bank, Oriental bank of commerce, Punjab & Sind, Union and State Bank of India recorded sharp decline in ROA in 2017.

**Figure 1.1: Comparison of ROA of Public-Sector Banks during Pre-and Post-Basel III**
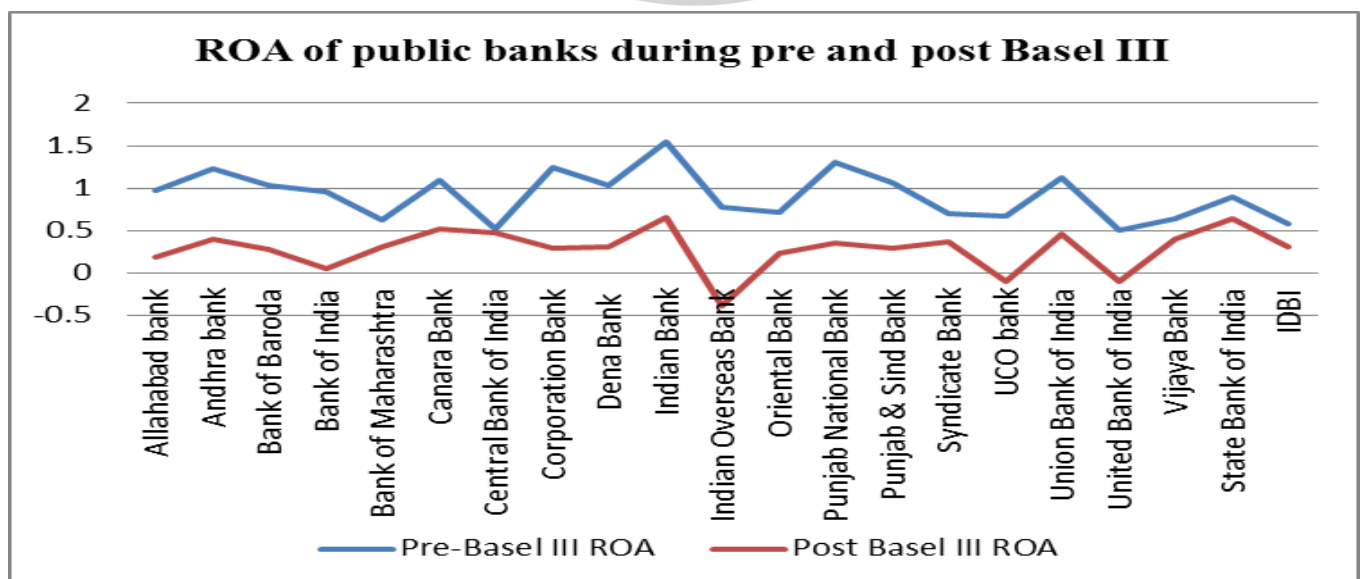


**Source: Compiled from the annual reports of the banks**

As shown in figure 1.1, ROA of public sector banks during pre-Basel III period was higher as compared to ROA of banks during post-Basel III period. This reflects that profitability of banks has progressively deteriorated after the implementation of Basel III.

There found differences between mean values of ROA of public-sector banks during Pre-and Post-Basel III regime. Paired T-test has been used to compare the mean of ROA at two different periods. Paired T-test has been applied as data were normally distributed.

**Table1.4: Paired T-test for Two Sample Means of ROA**

|  | Pre-Basel III ROA Mean | Post Basel III ROA Mean |
|---|---|---|
| Mean | 0.9175 | 0.283 |
| Variance | 0.083 | 0.0615 |
| Observations | 21 | 21 |
| Df | 20 |  |
| t Stat | 9.776 |  |
| P(T>=t) two-tail | 0.02 |  |
| t Critical two-tail | 2.085 |  |

H1: There are no significant differences between the mean of ROA of banks during pre and post-Basel III periods.

The computed t-value of ROA of selected banks shows that there were found significant differences between the mean of ROA of banks over two periods pre-and post-Basel III regime. As seen in table 1.4 the value of t statistics (9.776>2.085) is higher than the critical value which rejects the null hypothesis H1revealing the significant differences in the ROA of public banks over two periods.

**Return on Equity (ROE)**

Return on equity is the significant indicator of measuring the financial health of banks. ROE from 10% to 20 % and above is generally considered good and shows higher profitability. ROE of banks has been analyzed during pre-and post-Basel III.

**Table 1.5: ROE(Return on Equity)of Public-Sector Banks during Pre-Basel III Regime**

| Public-sector banks | 2008 | 2009 | 2010 | 2011 | 2012 | Mean | S.D | Max. | Min. |
|---|---|---|---|---|---|---|---|---|---|
| Allahabad bank | 18.57 | 15.43 | 20.5 | 18.61 | 19.35 | 18.49 | 1.88 | 20.5 | 15.43 |
| Andhra bank | 17.88 | 17.93 | 23.71 | 19.23 | 17.79 | 19.30 | 2.53 | 23.71 | 17.79 |
| Bank of Baroda | 15.07 | 19.48 | 22.19 | 21.48 | 19.11 | 19.46 | 2.78 | 22.19 | 15.07 |
| Bank of India | 22.76 | 25.51 | 14.76 | 8.9 | 15.63 | 17.51 | 6.64 | 25.51 | 8.9 |
| Bank of Maharashtra | 18.6 | 21.93 | 21.43 | 15.85 | 9.97 | 17.55 | 4.89 | 21.93 | 9.97 |
| Canara Bank | 18.86 | 20.64 | 24.09 | 22.43 | 18.75 | 20.95 | 2.31 | 24.09 | 18.75 |
| Central Bank of India | 17.72 | 16.38 | 24.25 | 23.62 | 5.96 | 17.58 | 7.37 | 24.25 | 5.96 |
| Corporation Bank | 17.38 | 18.23 | 20.26 | 20.7 | 18.2 | 18.95 | 1.44 | 20.7 | 17.38 |
| Dena Bank | 27.12 | 24.05 | 23.55 | 22.9 | 20.72 | 23.66 | 2.31 | 27.12 | 20.72 |
| Indian Bank | 21.95 | 22.72 | 23.39 | 21.62 | 20.36 | 22.08 | 1.14 | 23.39 | 20.36 |
| Indian Overseas Bank | 25.35 | 22.31 | 11.13 | 13.13 | 11.6 | 16.70 | 6.63 | 25.35 | 11.13 |
| Oriental Bank of Commerce | 6.11 | 14.03 | 15.49 | 14.71 | 10.72 | 12.21 | 3.86 | 15.49 | 6.11 |
| Punjab National Bank | 19 | 23.52 | 24.59 | 22.13 | 21.05 | 22.05 | 2.17 | 24.59 | 19 |
| Punjab & Sind Bank | 25.19 | 30.65 | 21.06 | 14.6 | 15.91 | 21.48 | 6.64 | 30.65 | 14.6 |
| Syndicate Bank | 21.94 | 19.86 | 15.57 | 15.74 | 17.88 | 18.19 | 2.73 | 21.94 | 15.57 |
| UCO bank | 16.58 | 19.95 | 28.02 | 18.06 | 19.38 | 20.39 | 4.45 | 28.02 | 16.58 |
| Union Bank of India | 24.7 | 24.79 | 23.55 | 18.79 | 14.85 | 21.33 | 4.37 | 24.79 | 14.85 |
| United Bank of India | 11.98 | 7.83 | 11.11 | 14.7 | 16.42 | 12.40 | 3.32 | 16.42 | 7.83 |
| Vijaya Bank | 17.15 | 11.32 | 19.04 | 15.76 | 16.37 | 15.92 | 2.85 | 19.04 | 11.32 |
| State Bank of India | 17.82 | 15.07 | 14.04 | 12.84 | 14.36 | 14.82 | 1.85 | 17.82 | 12.84 |
| IDBI | 11.2 | 12.1 | 13.1 | 14.9 | 15.1 | 13.28 | 1.70 | 15.1 | 11.2 |

**Source: Compiled from the annual reports of the banks**

The table 1.5 presents the ROE of public-sector banks before implementing Basel III norms. During Pre-Basel III years, ROE of all public-sector banks were observed positive showing the strong financial health of banks. Dena bank (23.66) recorded highest ROE followed by Indian bank (22.08) and Punjab national bank (22.05) and Oriental bank of commerce (12.21) had lowest ROE mean followed by United bank (12.40) and IDBI (13.28). During pre-Basel III era, seven public-sector banks maintained ROE more than 20% and 4 public banks had ROE less than 15% although these banks were financially sound. The profitability of Public-sector banks was higher during pre-Basel III regime. The smaller value of S.D. for some banks like Indian Bank, Allahabad Bank, Corporation Bank, State Bank of India and IDBI shows low variations in ROE.

**Table 1.6:ROE(Return on Equity)of Public-Sector Banks during Post Basel III Norms**

| Public-sector banks | 2013 | 2014 | 2015 | 2016 | 2017 | Mean | S.D | Maximum | Minimum |
|---|---|---|---|---|---|---|---|---|---|
| Allahabad bank | 11.29 | 10.7 | 5.46 | -6.41 | -2.71 | 3.66 | 7.95 | 11.29 | -6.41 |
| Andhra bank | 16.19 | 5.02 | 6.99 | 5.4 | 1.68 | 7.05 | 5.45 | 16.19 | 1.68 |
| Bank of Baroda | 14.59 | 13 | 9.21 | -17.64 | 4.53 | 4.73 | 13.09 | 14.59 | -17.64 |
| Bank of India | 13.62 | 11.82 | 6.7 | -25.39 | -6.22 | 0.10 | 16.22 | 13.62 | -25.39 |
| Bank of Maharashtra | 15.13 | 5.82 | 6.68 | 1.24 | -20.09 | 1.75 | 13.20 | 15.13 | -20.09 |
| Canara Bank | 14.03 | 10.59 | 11.06 | 10.69 | 4.15 | 10.10 | 3.61 | 14.03 | 4.15 |
| Central Bank of India | 8.58 | 8.91 | 3.87 | 10.87 | -17.15 | 3.01 | 11.56 | 10.87 | -17.15 |
| Corporation Bank | 16.27 | 5.72 | 5.68 | -4.64 | 4.66 | 5.53 | 7.409 | 16.27 | -4.64 |
| Dena Bank | 17.62 | 9.82 | 4.08 | -13.54 | -13.5 | 0.89 | 14.00 | 17.62 | -13.54 |
| Indian Bank | 16.07 | 10.55 | 8.25 | 5.41 | 9.97 | 10.05 | 3.913 | 16.07 | 5.41 |
| Indian Overseas Bank | 4.91 | 4.51 | -3.21 | -21.31 | -27.52 | -8.52 | 15.02 | 4.91 | -27.52 |
| Oriental Bank of Commerce | 11.46 | 9.16 | 6 | 1.17 | -8.4 | 3.87 | 7.87 | 11.46 | -8.4 |
| Punjab National Bank | 16.48 | 10.17 | 8.48 | -10.87 | 3.52 | 5.55 | 10.28 | 16.48 | -10.87 |
| Punjab & Sind Bank | 10.03 | 7.83 | 2.76 | 6.8 | 3.89 | 6.26 | 2.951 | 10.03 | 2.76 |
| Syndicate Bank | 22.78 | 16.73 | 13.22 | -14.38 | 3.02 | 8.27 | 14.55 | 22.78 | -14.38 |
| UCO bank | 9.08 | 16.83 | 10.08 | -26.46 | -20.94 | -2.28 | 19.87 | 16.83 | -26.46 |
| Union Bank of India | 15.05 | 10.41 | 10.11 | 6.99 | 2.91 | 9.04 | 4.497 | 15.05 | 2.91 |
| United Bank of India | 9.12 | -29.12 | 5.62 | -5.56 | 3.87 | -3.21 | 15.46 | 9.12 | -29.12 |
| Vijaya Bank | 14.88 | 8.54 | 7.6 | 6.13 | 11.1 | 9.65 | 3.438 | 14.88 | 6.13 |
| State Bank of India | 15.94 | 10.49 | 11.17 | 7.74 | 6.97 | 10.46 | 3.539 | 15.94 | 6.97 |
| IDBI | 10.16 | 5.42 | 3.92 | -16.41 | -26.28 | -4.63 | 15.81 | 10.16 | -26.28 |

**Source: Compiled from the annual reports of the banks**

As shown in table 1.6, there found sharp decline in ROE of public-sector banks after implementing Basel III. The highest ROE was accounted by SBI (10.46) followed by Canara bank (10.10) and Indian bank (10.05). After implementing Basel III, ROE of such banks like UCO, United bank, Indian overseas bank and IDBI were negative and very low. The low ROE was recorded by Bank of India, followed by Dena bank and Bank of Maharashtra. There were more variations in ROE of Bank of India as bank has highest standard deviation. All public-sector banks have recorded sharp decline in ROE over the period of five years.

**Table 1.7: Comparison of ROE Mean during Pre-and Post-Basel III**

| Public-sector banks | Pre-Basel III ROE Mean (2008-2012) | Post Basel III ROE Mean (2013-2017) |
|---|---|---|
| Allahabad bank | 18.492 | 3.666 |
| Andhra bank | 19.308 | 7.056 |
| Bank of Baroda | 19.466 | 4.738 |
| Bank of India | 17.512 | 0.106 |
| Bank of Maharashtra | 17.556 | 1.756 |
| Canara Bank | 20.954 | 10.104 |
| Central Bank of India | 17.586 | 3.016 |
| Corporation Bank | 18.954 | 5.538 |
| Dena Bank | 23.668 | 0.896 |
| Indian Bank | 22.008 | 10.05 |

| | | |
|---|---|---|
| **Indian Overseas Bank** | 16.704 | -8.524 |
| **Oriental Bank of Commerce** | 12.212 | 3.878 |
| **Punjab National Bank** | 22.058 | 5.556 |
| **Punjab & Sind Bank** | 21.482 | 6.262 |
| **Syndicate Bank** | 18.198 | 8.274 |
| **UCO bank** | 20.398 | -2.282 |
| **Union Bank of India** | 21.336 | 9.094 |
| **United Bank of India** | 12.408 | -3.214 |
| **Vijaya Bank** | 15.928 | 9.65 |
| **State Bank of India** | 14.826 | 10.462 |
| **IDBI** | 13.28 | -4.638 |

**Source: Compiled from the annual reports of the banks**

Table 1.7 reveals that mean values of ROE of public-sector banks were higher in Pre-Basel III regime in comparison of Post Basel III years. The ROE of all public banks has fallen very rapidly in Post Basel III years. During Post Basel III, some of banks were recorded negative ROE. Apart from that, Profitability of banks was higher in pre-Basel III years. After 2013, the level of ROE of banks has fallen in last five years. As compared to Pre- Basel III, there was not even a single bank in post Basel III period which had earned little rise in ROE. The condition of ROE of public-sector banks was worst after the Basel III compliance. The ROE has declined very sharply and most of the banks faced negative ROE.

The figure 1.2 shows that the ROE of Public-sector banks during Pre-and post-Basel III. No public-sector bank was found with higher ROE in Post Basel III years. The Indian overseas bank, UCO Bank, United Bank and IDBI had negative ROE after implementing Basel III. There were more variations in ROE of public-sector banks during Post Basel III years. The profitability of banks has declined after implementation of Basel III.

**Figure 1.2: Mean Value of ROE for Two Periods: Pre-and Post-Basel III**
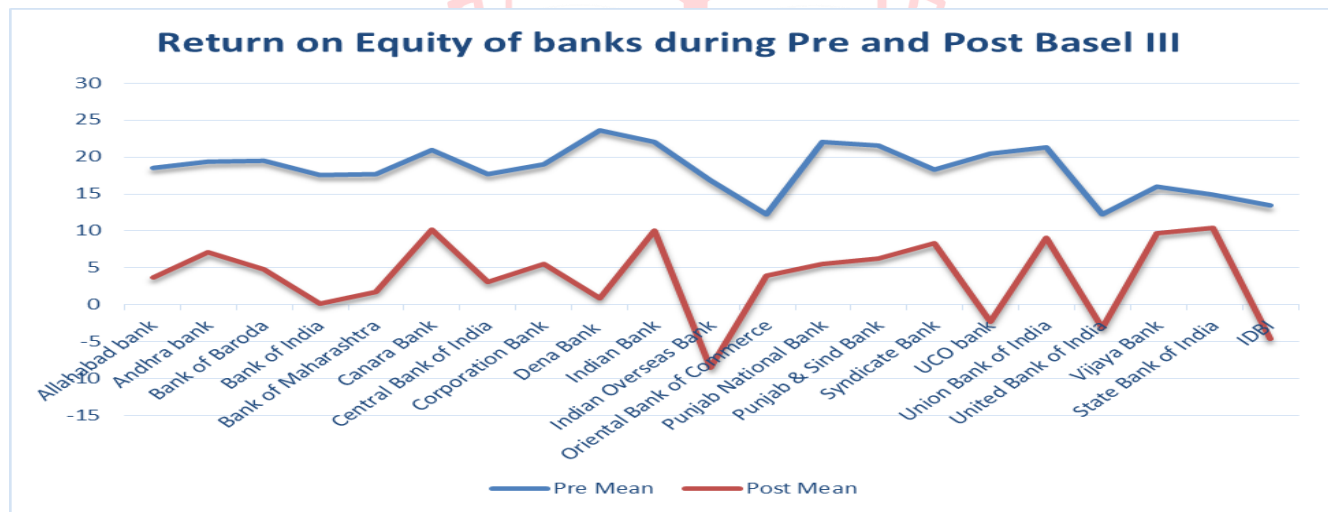


**Source: Compiled from the annual reports of the banks**

There found differences between the mean of ROE of banks during Pre-and Post-Basel III regime. Paired T-test has been employed to compare the mean value of ROE of public-sector banks.

**Table 1.8: t-Test: Paired Two Sample for ROE Means**

| | Pre-Basel III Mean ROE | Post Basel III Mean ROE |
|---|---|---|
| Mean | 18.301 | 3.87 |
| Variance | 10.46 | 28.25 |
| Observations | 21 | 21 |
| Df | 20 | |
| t Stat | 12.73 | |
| P(T>=t) two-tail | 0.01 | |
| t Critical two-tail | 2.08 | |

H2: There are no significant differences between the mean values of ROE of banks during pre and post-Basel III periods.

The t-value as seen in Table 1.8 describes that there are significant differences between the mean of ROE of banks during pre- and post-Basel III years. Based on the table, t statistics (12.73 >2.085) is higher than the critical value which forms a basis for rejecting the null hypothesis H2revealing the significant differences in the ROE of public-sector banks over the two phases of Basel III.

The results of T-test reject the null hypothesis H2. There were found significant differences in ROE of public-sector banks during two periods of Basel III.  It can be seen that mean value of the ROE over two regimes of Basel III is not equal and mean value of ROE during Pre-Basel III is higher than Post Basel III years.

**Table 1.9: Financial status of public-sector banks in 2017**

| Banks with positive ROA | Banks with negative ROA | Banks with sharp decline in ROA | | |
|---|---|---|---|---|
| Bank of Baroda | Allahabad Bank | Andhra Bank | | |
| Bank of Maharashtra | Bank of India | Canara Bank | | |
| Central Bank | Indian Overseas Bank | Punjab & Sind Bank | | |
| Corporation Bank | Oriental Bank of Commerce | Union Bank | | |
| Dena Bank | UCO Bank | State Bank of India | | |
| Indian Bank | | | | |
| Punjab National Bank | | | | |
| Syndicate Bank | | | | |
| United Bank | | | | |
| Vijaya Bank | | | | |
| IDBI | | | | |

**Source: Compiled from the annual reports of the banks**

In 2017, the banks such as Allahabad Bank, Bank of India, Indian overseas bank, Oriental Bank of Commerce and UCO Bank obtained negative ROA whereas some of the banks recorded little recovery in ROA and have positive ROA these banks are Bank of Baroda, Corporation Bank, Dena Bank, Punjab National Bank, Syndicate Bank and United Bank.

**Table 1.10: Financial status of public-sector banks in 2017**

| Banks with positive ROE | Banks with negative ROE | Banks with Positive and declining ROE |
|---|---|---|
| Indian Bank | Allahabad Bank | Andhra Bank |
| Punjab National Bank | Bank of India | Canara Bank |
| Syndicate Bank | Indian Overseas Bank | Punjab & Sind Bank |
| Corporation Bank | Oriental Bank of commerce | Union Bank of India |
| United Bank of India | UCO Bank | State Bank of India |
| Vijaya Bank | Bank of Maharashtra | |
| Bank of Baroda | Central Bank of India | |
| | Dena Bank | |
| | IDBI | |

**Source: Compiled from the annual reports of the banks**

In 2017, only seven public sector banks had positive ROE and five banks namely Andhra bank, Canara Bank, Punjab & Sind Bank, Union bank and State bank of India had positive ROE but these banks observed a sharp decline in ROE. Moreover, nine public sector banks recorded negative ROE.

Indian public-sector banks are not financially strong and stable due to low ROA and ROE recorded by all banks during post-Basel III regime. During post-Basel III regime, decreasing trend in ROA and ROE has been observed at increasing rate. There can be several reasons for this progressive deterioration in ROA and ROE such as the regulatory pressure of maintaining the higher capital ratio.

## V.    Conclusion

On the basis of findings, it is concluded that ROA and ROE of public-sector banks were recorded higher before implementing Basel III norms (2008-2012). After implementing Basel III capital standards, the financial health of all public-sector banks is degrading due to weak and dissatisfactory financial performance of banks. Only these seven banks namely Indian bank, Punjab National bank, Syndicate Bank, Vijaya Bank, Corporation Bank, Bank of Baroda and United Bank of India are financially stable and strong due to positive ROE and ROA of banks. These banks have reasonable profits to implement international regulations. Thus, the financial status of these banks is strong and sound. The financially strong banks are always capable to face the unexpected distress and crises. Fourteen public-sector banks are found financially unsound and unstable due to low ROA and ROE. The financial position of these banks is weak due to poor financial performance (negative ROA, ROE). This is an alarming situation for Indian public sector banks. In this way, poor health of banks means low lending and credit growth which lead to slow economic growth. Thus, weaker banks will have to restructure its operations if they want to sustain in the new regulatory environment (**Boora and Jangra, 2019**).

## VI.    Recommendations

The results of this research are in line with the government decisions regarding the health of public-banks. Thus, keeping these factors in minds such as poor asset quality, weak financial position and low profitability of most of the public-sector banks, the Indian government has announced to infuse huge capital in public-sector banks means banks will be recapitalized soon. Apart from the recapitalization, the government can reduce its stake below 75% in public-sector banks. The government has also taken the decision of merger of six banks in State Bank of India due to low profitability and poor financial performance of banks. All these remedial steps are being taken by the government so that Indian public-sector banks can recover its deteriorating profitability which would positively contribute in complying with Basel III norms. However, the attainment of higher profitability would ensure more credit growth and public-sector banks would have better management of earnings, assets, capital which would easily absorb the risk exposure. Conclusively, the study can be useful for bankers, decision makers and particularly for the investors looking for profitable opportunities in Indian banking sector.

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