

Impact of Institutional Variables on Non-Performing Assets of Scheduled Commercial Banks during Pre and Post Crisis Period in India

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Abstract - This study addresses the contemporary issues of non-performing assets of Indian banking sector. The objectives of the present study are to find out an association between institutional variables and NPAs of scheduled commercial banks during pre and post crisis; and to find out the impact of institutional variables on Gross NPAs Ratio and Net NPAs Ratio of scheduled commercial banks during pre and post crisis. The study period is 2000-01 to 2019-20. It is divided in to pre-crisis period (2000-01 to 2007-08) and post-crisis period (2009-10 to 2019-20) to know the impact of institutional variables on NPAs of Indian banks. The secondary data was collected from the Reserve Bank of India (RBI) website and applied a multiple regression was used to establish an empirical relationship between institutional variables and NPAs of scheduled commercial banks. The results were drawn by using the Statistical Package for Social Sciences (SPSS) 20.0. It can be observed that there is a statistically insignificant relationship between Gross and Net NPAs Ratio of SCBs; and Cash Reserve Ratio and also Gross and Net NPAs Ratio of SCBs and Repo Rate during pre and post crisis period. So the Cash Reserve Ratio and Repo Rate should be maintained at an optimal level from time to time based on the liquidity position of the economy and inflation to control the NPAs of commercial banks.

Key words: Institutional Variables – Scheduled Commercial Banks – NPAs – Regression Analysis - Repo Rate.

I. INTRODUCTION

The banking sector is a backbone for economic development any country, no exception to India. If this sector functions smoothly, the Indian economic condition is in healthy position. This sector major function is to collect deposits from natural and artificial persons and lend for the same. In other words, it is an intermediary between depositors and borrowers. The amounts received by the banks from the borrowers by way of interest on loan and principle amount are recycling for resources. If the banks are failed to collect interest and principal amount from the borrowers or borrowers are failed to repay their interest on loan and principal amount then this will be treated as non-performing assets (NPA) as per Reserve Bank of India (RBI). An account is recognized as non-performing asset when a borrower is unable to repay his / her / its dues for more than 90 days. Once an account is dabbed as non-performing asset, banks have to begin the process of provisioning for it. Then the banks will suffer with the scarcity of resources and it leads to decrease the Indian economic development or it is an alarm for crisis.

Indian Banks' Bad Loans

Total bad loans of India's 38 listed commercial banks have crossed Rs. 7.5 lakh crore at the end of December, 2020. This chunk now accounts for nearly 11 per cent of the total loans given by the banking industry. Over 90 per cent of these sticky assets are on the books of Government-owned banks. These banks constitute about 70 per cent of the total banking industry, in terms of assets, meaning the Government will have to bear the burden of massive capital requirements of crisis-ridden industry. Higher bad loans require banks to set aside more money in terms of provisions. The provision amount varies on a case to case basis. In recent years, Non-Performing Assets (NPAs) have emerged as a major headache for the government and the RBI. The Government hasn't succeeded so far to infuse the required capital for state-run banks.

Indeed, the Government has taken steps to address the bad loan problem like the NPAs ordinance giving the RBI more power to direct banks to take action against the loan defaulters and the passage of Insolvency and Bankruptcy Code (IBC). Though these steps are welcome, these are unlikely to help overcome the band loan problem in the immediate

future. It will take years before banks can get rid of NPAs accumulated over the years on account of multiple internal and external factors.

Classification of Non-Performing Assets

As per the RBI guidelines banks should classify NPAs in the following manner based on the period for which the asset has remained Non-Performing and the realisability of the dues with effect from March 31, 2005.

| Sl. No. | Category of NPAs | Duration |
|---------|--------------------|---|
| 1. | Substandard assets | Less than or equal to 12 months |
| 2. | Doubtful assets | Period of 12 months |
| 3. | Loss assets | Identified by the bank or internal or external auditors or the RBI inspection but the amount has not been written off wholly. |

Source: RBI

Definitions of NPAs

As per the Reserve Bank of India the definition of NPAs is “an asset, including a leased asset, becomes NPAs when it ceases to generate income for the bank.

A non performing asset is a loan or an advance where;

| Sl. No. | Asset | Duration |
|---------|---|--|
| 1. | Interest and / or installment of principal remain overdue in respect of term loan | More than 90 days |
| 2. | Account remain out of order | More than 90 days |
| 3. | Bill remains overdue | More than 90 days |
| 4. | The installment of principal or interest thereon remains overdue | A. two crop seasons for short duration crops B. One crop season for long duration crops |
| 5. | The amount of liquidity facility remains outstanding in respect of securitization transaction | More than 90 days |
| 6. | In respect of derivative transactions overdue from the specified due date for payment | Unpaid for a period of 90 days |

| | | |
|----|--|--|
| 7. | If the interest due and charged during any quarter is not serviced fully | Within 90 days from the end of the quarter |
|----|--|--|

Source: RBI

Measures for Controlling Non-Performing Assets

The following measures have been taken by the RBI to reduce or eradicate the NPAs of Indian banks.

1. Debt Recovery Tribunals (DRTs)
2. Lok Adalats (LA)
3. Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI)
4. Insolvency and Bankruptcy Code (IBC)
5. Special Mention Accounts (SMA)
6. Prompt Corrective Action (PCA)
7. Credit Risk Management (CRM)
8. Tightening Credit Monitoring (TCM)
9. Amendments to Banking Law (BL) to give RBI more power
10. More "Hair-Cut" (HC) for Banks
11. Stricter NPAs Recovery
12. Corporate Governance Issues
13. Accountability

Even though the above measures have been implemented there is no significant impact on non-performing assets of Indian banks.

After economic reforms 1991, the country has face two NPA problems, one was happen during 1997-2002 and second is going on after the global financial crisis of 2008. The NPAs is started on 2010. It led to decline of economic growth extended to the priority sector (Singh, 2016; Sengupta and Vardhan, 2017). The primary causes of NPA increases due to deficiencies in procedures followed in PSBs and private sector banks in India. These banking could not take adequate steps to collect the NPA. The reasons are majority of the borrowers are political influence, breakdown of legal system (Financial Stability Report, December 2018).

II. LITERATURE REVIEW

The problem of non-performing assets has been a major problem for the banking sector and policymakers. There are various research studies have been made to understand the causes for non-performing assets and also measures that should be taken to resolve the problem in its nascent stage and reforms that have come into effect to decrease non-performing assets. **Karunakar et al. (2008)** discussed the various factors that boost non-performing assets, their size and effect on Indian banking sector and suggested measures to control the curse on the banking sector. **Rajeev and Mahesh (2010)** highlighted the issue of non-performing assets after the global financial crisis and suggested that mere recognition of the problem and self-monitoring can help to recovery of loans. **Thomas and Vyas (2016)** studied on loan recovery strategy of Indian banks and suggested preventive and corrective measures and also corrective measures like legal, regulatory and non-legal that are to be taken to recover loans. **Sengupta and Vardhan (2017)** compared the two banking crisis episodes post-liberalization – one that took place in the late 1990s and the other that commenced after the 2008 global financial crisis that raised the issue of non-performing assets. They suggested that strong governance, proactive banking regulations and a strong legal framework for resolution of non-performing assets would assist in solving the problem of non-performing assets. **Sharma (2018)** emphasized the role of the banking sector as an instrument of economic growth and development. He discussed in his paper that how banks are burdened due to increasing non-performing assets especially in the case of public sector banks. He also stated that a number of preventive measures that would curtail the level of non-performing assets. **Kumar et. al., (2018)** find out the major reasons behind accumulating non-performing assets are industrial sickness, change in government policies, poor credit appraisal system, willful defaults and defect in the lending process. **Khizer Ali et al., (2011)** found that efficient asset management and economic growth establish positive and significant relation with profitability in both models (measured by ROA & ROE). The high credit risk and capitalization lead to lower profitability measured by return on assets (ROA). The operating efficiency tends to exhibit the higher profitability level as measured by return on equity. **Jayasree M. and Radhika R. (2011)** found that the level of NPAs have been

increased in new private sector banks and foreign banks during 2005 to 2009 and NPAs show negative impact on the profitability of banks. **Sofoklis and Eftychia (2011)** found that inflation, unemployment rate, external debt to gross domestic product, money supply and investment with construction expenditure jointly with country's (Greek) crises specific variables influences the credit risk of banking system on the basis of univariate regression. **Saikat Ghosh Roy (2014)** result indicates that the GDP growth, change in exchange rate and global volatility have major effects on the NPA level of Indian banking sector. **Krishna Prasanna P et al., (2014)** conclude that among bank specific variables inefficiency ratio had significant positive impact on the non-performing advances. Bank size and performance indicators had significant negative impact indicating efficient operational management at bank level helps to reduce nonperforming advances. **Satyajit Dhar and Avijit Bakshi (2015)** results imply that banks should give adequate attention to variables such as advances to the sensitive sector, net interest margin and capital adequacy ratios to control the problems of loan losses. Our results support the view that the factors which are responsible for loan losses are generally country-specific, due to variations in regulatory frameworks and the roles of central banks. **Mahmoud Abdelaziz Touny and Mohamed Abdelhameed Shehab (2015)** suggested that inflation rate has a negative impact on NPLs, whereas improvement in macroeconomic and financial conditions seems to have a negative impact on the level of NPLs. **Gokul Kumar et al. (2017)** conducted Granger Causality Test confirmed the association of CAR, CRR, RRR, IR, MS, UR and GDPGR with the non-performing assets whereas the remaining variables such as PLR and RR portrayed a negative relationship with the non-performing assets. Further the Johansen Co-integration Test results witnessed that all the institutional-specific and macroeconomic variables are co-integrated with the non-performing assets of SBI and Associate Banks in India. **Jayaraman T.K. et al., (2018)** results reveal that real GDP, gross advances, total expenditures and price level are important determinants of NPA in India's commercial banks. **Manvir Kaur and Rohit Kumar (2018)** study found that Bank specific determinants and macro determinant influence the level of gross non-performing assets of public sector banks. **Kandela Ramesh (2019)** Using the random effect model, it is found that credit-deposit ratio, loan maturity, and return on assets have a negative relationship with NNPA's. These factors have an association with a lower level of NPAs. Operating

expenses and capital adequacy ratio have an insignificant effect on NNPA. On the other hand, factors such as priority sector loans, collateral values, and non-interest income have a positive impact on NNPA. **Varuna Agarwala and Nidhi Agarwala (2019)** found that assessment of private sector banks reveals that the growth rate of NPAs is low as compared to the nationalized banks, as well as the SBI and its associates. The nationalized banks and the associate banks of SBI failed to handle the issue of poor loans effectively due to which the growth in such loans has been phenomenally high. **Sudarsan K and Santosh Kathari (2019)** found that there is a statistically significant relationship between Gross Domestic Product (GDP) and NPAs (both GNPA and NNPA) and Inflation Rate and NPAs (both GNPA and NNPA) of Public and Private Sector Banks. But interesting one is the Unemployment rate is statistically insignificant relationship with Net NPAs of Foreign Banks. **Jaslene Kaur Bawa et al. (2019)** found that, a negative significant relationship between intermediation cost ratio, Return on Assets and NPAs. Asset growth, lagged NPAs, and total liabilities by total assets are positively related to NPAs.

III. RESEARCH GAP

The above literature indicates that there are few studies in the area of non-performing assets of Indian banking sector. But there is no study on impact of institutional variables on non-performing assets during pre and post crisis of scheduled commercial banks in India. So there is a dire need to study about the impact of institutional variables on non-performing assets of scheduled commercial banks during pre and post crisis in India. This study also addresses the contemporary issues of non-performing assets of Indian banking sector.

IV. OBJECTIVES OF THE STUDY

The following are the objectives of the present study.

- To find out an association between institutional variables and NPAs of scheduled commercial banks during pre and post crisis; and
- To find out the impact of institutional variables on Gross NPAs Ratio and Net NPAs Ratio of scheduled commercial banks during pre and post crisis.

Hypothesis of the Study

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

Hypothesis 1

H₀: There is no significant relationship between institutional variables and Gross NPAs of scheduled commercial banks during pre and post crisis.

Hypothesis 2

H₀: There is no significant relationship between institutional variables and Net NPAs of scheduled commercial banks during pre and post crisis.

V. RESEARCH METHODOLOGY

The present study depends upon the secondary data. The study period is 2000-01 to 2019-20. It is divided in to pre-crisis period (2000-01 to 2007-08) and post-crisis period (2009-10 to 2019-20) to know the impact of institutional variables on NPAs of Indian banks. The secondary data was collected from the Reserve Bank of India (RBI) website (www.rbi.org). The data was analyzed by applying multiple regression as a major statistical tool. Multiple regression was used to establish an empirical relationship between institutional variables and NPAs of scheduled commercial banks. The results were drawn by using the Statistical Package for Social Sciences (SPSS) 20.0.

To draw the inferences for the present study, scheduled commercial banks' Gross and Net NPAs ratio considered as a dependent variable and institutional variable such as Cash Reserve Ratio (CRR), Repo Rate, Reverse Repo Rate, Bank Rate and Statutory Liquidity Ratio (SLR) are considered as independent variables.

The following regression equation is used for institutional variables and Gross NPAs of scheduled commercial banks ratio.

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e$$

Where; Y = Total Gross NPAs Ratio to Total Advances

X₁ = Cash Reserve Ratio (CRR)

X₂ = Repo Rate

X_3 = Reverse Repo Rate

X_4 = Bank Rate

X_5 = Statutory Liquidity Ratio (SLR)

The following regression equation is used for Institutional Variables and Net NPAs of scheduled commercial banks ratio.

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e$$

Where; Y = Total Net NPAs Ratio to Total Advances

X_1 = Cash Reserve Ratio (CRR)

X_2 = Repo Rate

X_3 = Reverse Repo Rate

X_4 = Bank Rate

X_5 = Statutory Liquidity Ratio (SLR)

VI. DATA ANALYSIS

In this part we can know the relationship between Institutional Variables and Gross Non-Performing Assets (GNPAs) and also Institutional Variables and Net Non-Performing Assets (NNPAs) during pre and post crisis periods.

Institutional Variables and Gross NPAs during Pre Crisis (2000-01 to 2007-08)

Regression Results of Institutional Variables and SCBs Gross NPAs Ratio

Table-1: Descriptive Statistics

| Measure | Cash Reserve Ratio (CRR) (X_1) | Repo Rate (X_2) | Reverse Repo Rate (X_3) | Bank Rate (X_4) | SLR (X_5) | SCBs Gross NPAs Ratio (Y) |
|--------------------|------------------------------------|---------------------|-----------------------------|---------------------|---------------|---------------------------|
| Mean | 5.37 | 7.09 | 5.43 | 6.09 | 24.87 | 6.33 |
| Standard Deviation | 0.92 | 0.83 | 0.69 | 0.18 | 0.35 | 3.62 |
| Kurtosis | 4.97 | -0.51 | -1.13 | 3.20 | 8.0 | -1.79 |

| | | | | | | |
|----------|------|------|------|------|-------|-------|
| Skewness | 2.05 | 0.33 | 0.18 | 1.95 | -2.82 | 0.21 |
| Range | 3.00 | 2.50 | 2.00 | 0.50 | 1.00 | 9.20 |
| Minimum | 4.50 | 6.00 | 4.50 | 6.00 | 4.00 | 2.20 |
| Maximum | 7.50 | 8.50 | 6.50 | 6.50 | 25.00 | 11.40 |

Table-2: Correlation Matrix for Variables of Study

Correlations

| | Cash Reserve Ratio | Repo Rate | Reverse Repo Rate | Bank Rate | SLR |
|-----------------------|--------------------|-----------|-------------------|-----------|-------|
| SCBs Gross NPAs Ratio | -0.516 | 0.391 | 0.054 | 0.751 | 0.461 |

** . Correlation is significant at the 0.01 level (2-tailed).

Table-3: Results of Multiple Regression Analysis

Model Summary

| Model | R | R Square | Adjusted R Square | F Change | Sig. F Change | Durbin-Watson |
|-------|-------|----------|-------------------|----------|---------------|---------------|
| 1 | 0.998 | 0.996 | 0.988 | 113.42 | .009 | 3.518 |

Source: Author Own Calculation through SPSS.

Table -4: Regression Coefficients

| Variable | Un-standardized Coefficients B | Standardized Coefficients Beta | t-value | Sig. | H ₀ : Rejected / Accepted | VIF |
|--------------------|--------------------------------|--------------------------------|---------|-------|--------------------------------------|-------|
| (Constant) | -189.14 | | -12.285 | 0.007 | | |
| Cash Reserve Ratio | -0.481 | -0.123 | -1.843 | 0.207 | Accepted | 2.523 |
| Reverse Rate | 0.828 | 0.190 | 2.101 | 0.170 | Accepted | 4.670 |
| Rev Repo Rate | -3.757 | -0.716 | -8.690 | 0.013 | Rejected | 3.863 |
| Bank Rate | 18.653 | 0.957 | 11.563 | 0.007 | Rejected | 3.895 |

| | | | | | | |
|--|-------|-------|-------|-------|----------|-------|
| SLR | 3.978 | 0.388 | 8.456 | 0.014 | Rejected | 1.197 |
| Dependent Variable: SCBs' Gross NPAs Ratio | | | | | | |

Table - 3 indicates the model summary of multiple regression analysis which is carried out through SPSS. The result of the model shows that the value of *R* is 0.998, which indicates a high correlation between SCBs' Gross NPAs Ratio and Institutional Variables. The value of *R* square is 0.996. The *p* value of the model is .009 which is less than .05 indicating that the regression model is statistically significant and a fit model. The value of Durbin-Watson statistic is 3.51 which is free from autocorrelation problem.

Table - 4 illustrates the results of regression analysis for SCBs Gross NPAs Ratio and Institution variables, it is to be noted that Institutional Variable includes Cash Reserve Ratio, Repo Rate, Rev Repo Rate, Bank Rate and Statutory Liquidity Ratio. Results of multiple regression reveals that the *p* value of Cash Reserve Ratio is 0.207, which is more than .05 at 5 % level of significance. This indicates that there is a statistically insignificant relationship between Gross NPAs Ratio and Cash Reserve Ratio. The *p* value of Repo Rate is 0.170, which is more than .05 at 5 % level of significance. This indicates that there is a statistically insignificant relationship between Gross NPAs Ratio and Repo Rate. The *p* value of Reverse Repo Rate is 0.013, which is less than .05 at 5 % level of significance. This indicates that there is a statistically significant relationship between Gross NPAs Ratio and Reverse Repo Rate. The *p* value of Bank Rate is 0.007, which is less than .05 at 5 % level of significance. This indicates that there is a statistically significant relationship between Gross NPAs Ratio and Bank Rate. The *p* value of Statutory Liquidity Ratio is 0.014, which is less than .05 at 5 % level of significance. This indicates that there is a statistically significant relationship between Gross NPAs Ratio and Statutory Liquidity Ratio.

The following regression equation was obtained:

$$Y = -189.14 - 0.48X_1 + 0.82X_2 - 3.75X_3 + 18.65X_4 + 3.97X_5 + e.$$

Institutional Variables and Gross NPAs during Post Crisis (2008-09 to 2019-20)

Regression Results of Institutional Variables and SCBs Gross NPAs Ratio

Table-5: Descriptive Statistics

| Measure | Cash Reserve Ratio (CRR) (X ₁) | Repo Rate (X ₂) | Reverse Repo Rate (X ₃) | Bank Rate (X ₄) | SLR (X ₅) | SCBs Gross NPAs Ratio (Y) |
|--------------------|--|-----------------------------|-------------------------------------|-----------------------------|-----------------------|---------------------------|
| Mean | 4.47 | 6.71 | 5.92 | 7.08 | 21.88 | 5.31 |
| Standard Deviation | 0.80 | 1.21 | 1.19 | 1.30 | 2.13 | 3.29 |
| Kurtosis | 0.60 | -1.01 | 1.34 | -1.40 | -1.18 | -1.13 |
| Skewness | 1.48 | -0.07 | -0.95 | 0.64 | -0.19 | 0.77 |
| Range | 2.00 | 3.75 | 4.25 | 3.35 | 6.50 | 8.90 |
| Minimum | 4.00 | 4.75 | 3.25 | 5.65 | 18.50 | 2.30 |
| Maximum | 6.00 | 8.50 | 7.50 | 9.00 | 25.00 | 11.20 |

Table-6: Correlation Matrix for Variables of Study

Correlations

| | Cash Reserve Ratio | Repo Rate | Reverse Repo Rate | Bank Rate | SLR |
|------------------------------|--------------------|-----------|-------------------|-----------|--------|
| SCBs Gross NPAs Ratio | -0.565 | -0.405 | -0.088 | -0.318 | -0.927 |

** . Correlation is significant at the 0.01 level (2-tailed).

Table-7: Results of Multiple Regression Analysis

Model Summary

| Model | R | R Square | Adjusted R Square | F Change | Sig. F Change | Durbin-Watson |
|-------|-------|----------|-------------------|----------|---------------|---------------|
| 1 | 0.972 | 0.945 | 0.891 | 17.338 | .004 | 2.638 |

Source: Author Own Calculation through SPSS.

Table -8: Regression Coefficients

| Variable | Un-standardized Coefficients B | Standardized Coefficients Beta | t-value | Sig. | H ₀ : Rejected/Accepted | VIF |
|------------|--------------------------------|--------------------------------|---------|-------|------------------------------------|-----|
| (Constant) | 18.816 | | 1.663 | 0.157 | | |

| | | | | | | |
|--|--------|--------|--------|-------|----------|-------|
| Cash Reserve Ratio | -1.758 | -0.432 | -1.139 | 0.306 | Accepted | 2.523 |
| Repo Rate | -6.362 | -2.352 | -1.872 | 0.120 | Accepted | 4.670 |
| Reverse Repo Rate | 6.239 | 2.265 | 1.982 | 0.104 | Accepted | 3.863 |
| Bank Rate | -0.717 | -0.284 | -0.783 | 0.469 | Accepted | 3.895 |
| SLR | 0.240 | 0.155 | 0.305 | 0.773 | Accepted | 1.197 |
| Dependent Variable: SCBs' Gross NPAs Ratio | | | | | | |

Table - 7 indicates the model summary of multiple regression analysis which is carried out through SPSS. The result of the model shows that the value of R is 0.972, which indicates a high correlation between SCBs' Gross NPAs Ratio and Institutional Variables. The value of R square is 0.945. The p value of the model is .004 which is less than .05 indicating that the regression model is statistically significant and a fit model. The value of Durbin-Watson statistic is 2.63 which is free from autocorrelation problem.

Table - 8 illustrates the results of regression analysis for SCBs' Gross NPAs Ratio and Institutional Variables, it is to be noted that Institutional Variable includes Cash Reserve Ratio, Repo Rate, Rev Repo Rate, Bank Rate and Statutory Liquidity Ratio. Results of multiple regression reveals that the p value of all Institutional Variables are more than 0.05 at 5 % level of significance. This indicates that there is a statistically insignificant relationship between dependent variable and independent variables.

The following regression equation was obtained:

$$Y = 18.81 - 1.75X_1 - 6.36X_2 + 6.23X_3 - 0.71X_4 + 0.24X_5 + e$$

Institutional Variables and Net NPAs during Pre Crisis (2000-01 to 2007-08)

Regression Results of Institutional Variables and SCBs Net NPAs Ratio

Table-9: Descriptive Statistics

| Measure | Cash Reserve Ratio (CRR) (X ₁) | Repo Rate (X ₂) | Reverse Repo Rate (X ₃) | Bank Rate (X ₄) | SLR (X ₅) | SCBs Net NPAs Ratio (Y) |
|--------------------|--|-----------------------------|-------------------------------------|-----------------------------|-----------------------|-------------------------|
| Mean | 5.37 | 7.09 | 5.43 | 6.09 | 24.87 | 2.95 |
| Standard Deviation | 0.92 | 0.83 | 0.69 | 0.18 | 0.35 | 2.06 |
| Kurtosis | 4.97 | -0.51 | -1.13 | 3.20 | 8.00 | -1.25 |
| Skewness | 2.05 | 0.33 | 0.18 | 1.95 | -2.82 | 0.66 |
| Range | 3.00 | 2.50 | 2.00 | 0.50 | 1.00 | 5.20 |
| Minimum | 4.50 | 6.00 | 4.50 | 6.00 | 24.00 | 1.00 |
| Maximum | 7.50 | 8.50 | 6.50 | 6.50 | 25.00 | 6.20 |

Table-10: Correlation Matrix for Variables of Study

Correlations

| | Cash Reserve Ratio | Repo Rate | Reverse Repo Rate | Bank Rate | SLR |
|---------------------|--------------------|-----------|-------------------|-----------|-------|
| SCBs Net NPAs Ratio | -0.434 | 0.510 | 0.170 | 0.840 | 0.381 |

** . Correlation is significant at the 0.01 level (2-tailed).

Table-11: Results of Multiple Regression Analysis

Model Summary

| Model | R | R Square | Adjusted R Square | F Change | Sig. F Change | Durbin-Watson |
|-------|-------|----------|-------------------|----------|---------------|---------------|
| 1 | 0.997 | 0.994 | 0.978 | 113.42 | 0.016 | 3.073 |

Source: Author Own Calculation through SPSS.

Table -12: Regression Coefficients

| Variable | Un-standardized Coefficients B | Standardized Coefficients Beta | t - value | Sig. | H ₀ :Rejected / Accepted | VIF |
|------------|--------------------------------|--------------------------------|-----------|-------|-------------------------------------|-----|
| (Constant) | -92.929 | | -7.888 | 0.016 | | |

| | | | | | | |
|---|--------|--------|------------|-------|----------|-------|
| Cash Reserve Ratio | -0.270 | -0.121 | - 1.352 | 0.309 | Accepted | 2.523 |
| Repo Rate | 0.734 | 0.296 | 2.435 | 0.135 | Accepted | 4.670 |
| Reverse Repo Rate | -1.951 | -0.652 | - 5.896 | 0.028 | Rejected | 3.863 |
| Bank Rate | 10.611 | 0.954 | 8.597 | 0.013 | Rejected | 3.895 |
| SLR | 1.530 | 0.262 | 4.251 | 0.051 | Rejected | 1.197 |
| Dependent Variable: SCBs Net NPAs Ratio | | | | | | |

Table - 11 indicates the model summary of multiple regression analysis which is carried out through SPSS. The result of the model shows that the value of *R* is 0.997, which indicates a high correlation between SCBs Net NPAs Ratio and Institutional Variables. The value of *R* square is 0.994. The *p* value of the model is .016 which is less than .05 indicating that the regression model is statistically significant and a fit model. The value of Durbin-Watson statistic is 3.07 which is free from autocorrelation problem.

Table - 12 illustrates the results of regression analysis for SCBs Net NPAs Ratio and Institution variables, it is to be noted that Institutional Variable includes Cash Reserve Ratio, Repo Rate, Reverse Repo Rate, Bank Rate and Statutory Liquidity Ratio. Results of multiple regression reveals that the *p* value of Cash Reserve Ratio is 0.309, which is more than .05 at 5 % level of significance. This indicates that there is a statistically insignificant relationship between Net NPAs Ratio and Cash Reserve Ratio. The *p* value of Repo Rate is 0.135, which is more than .05 at 5 % level of significance. This indicates that there is a statistically insignificant relationship between Net NPAs Ratio and Repo Rate. The *p* value of Reverse Repo Rate is 0.028, which is less than .05 at 5 % level of significance. This indicates that there is a statistically significant relationship between Net NPAs Ratio and Reverse Repo Rate. The *p* value of Bank Rate is 0.013, which is less than .05 at 5 % level of significance. This indicates that there is a statistically significant relationship between Net NPAs Ratio and Bank Rate. The *p* value of Statutory Liquidity Ratio is 0.05, which is less than .05 at 5 % level of significance. This indicates that there is a statistically significant relationship between Net NPAs Ratio and Statutory Liquidity Ratio.

The following regression equation was obtained:

$$Y = -92.929 - 0.27X_1 + 0.73X_2 - 1.95X_3 + 10.61X_4 + 1.53X_5 + e$$

Institutional Variables and Net NPAs during Post Crisis (2008-09 to 2019-20)

Regression Results of Institutional Variables and SCBs Net NPAs Ratio

Table-13: Descriptive Statistics

| Measure | Cash Reserve Ratio (CRR) (X ₁) | Repo Rate (X ₂) | Reverse Repo Rate (X ₃) | Bank Rate (X ₄) | SLR (X ₅) | SCBs Net NPAs Ratio (Y) |
|--------------------|--|-----------------------------|-------------------------------------|-----------------------------|-----------------------|-------------------------|
| Mean | 4.47 | 6.71 | 5.92 | 7.08 | 21.88 | 2.73 |
| Standard Deviation | 0.80 | 1.21 | 1.19 | 1.30 | 2.13 | 1.81 |
| Kurtosis | 0.60 | -1.01 | 1.34 | -1.40 | -1.18 | -0.88 |
| Skewness | 1.48 | -0.74 | -0.95 | 0.64 | -0.19 | 0.79 |
| Range | 2.00 | 3.75 | 4.25 | 3.35 | 6.50 | 5.00 |
| Minimum | 4.00 | 4.75 | 3.25 | 5.65 | 18.50 | 1.00 |
| Maximum | 6.00 | 8.50 | 7.50 | 9.00 | 25.00 | 6.00 |

Table-14: Correlation Matrix for Variables of Study

Correlations

| | Cash Reserve Ratio | Repo Rate | Reverse Repo Rate | Bank Rate | SLR |
|---------------------|--------------------|-----------|-------------------|-----------|--------|
| SCBs Net NPAs Ratio | -0.595 | -0.347 | -0.043 | -0.239 | -0.878 |

** Correlation is significant at the 0.01 level (2-tailed).

Table-15: Results of Multiple Regression Analysis

Model Summary

| Model | R | R Square | Adjusted R Square | F Change | Sig. F Change | Durbin-Watson |
|-------|-------|----------|-------------------|----------|---------------|---------------|
| 1 | 0.942 | 0.887 | 0.774 | 7.846 | 0.021 | 2.071 |

Source: Author Own Calculation through SPSS.

Table -16: Regression Coefficients

| Variable | Un-standardized | Standardized Coefficients | t-value | Sig. | H ₀ : Rejected / | VIF |
|----------|-----------------|---------------------------|---------|------|-----------------------------|-----|
|----------|-----------------|---------------------------|---------|------|-----------------------------|-----|

| | Coefficients B | Beta | | | Accepted | |
|--|-----------------------|-------------|--------|-------|-----------------|-------|
| (Constant) | 5.140 | | 0.573 | 0.591 | | |
| Cash Reserve Ratio | -1.662 | -0.741 | -1.358 | 0.233 | Accepted | 2.523 |
| Repo Rate | -4.550 | -3.056 | -1.689 | 0.152 | Accepted | 4.670 |
| Reverse Repo Rate | 4.596 | 3.031 | 1.843 | 0.125 | Accepted | 3.863 |
| Bank Rate | -0.548 | -0.395 | -0.756 | 0.484 | Accepted | 3.895 |
| SLR | 0.561 | 0.658 | 0.901 | 0.409 | Accepted | 1.197 |
| Dependent Variable: SCBs' Net NPAs Ratio | | | | | | |

Table - 15 indicates the model summary of multiple regression analysis which is carried out through SPSS. The result of the model shows that the value of *R* is 0.942, which indicates a high correlation between SCBs' Net NPAs Ratio and Institutional Variables. The value of *R* square is 0.887. The *p* value of the model is .021 which is less than .05 indicating that the regression model is statistically significant and a fit model. The value of Durbin-Watson statistic is 2.07 which is free from autocorrelation problem.

Table - 16 illustrates the results of regression analysis for SCBs' Net NPAs Ratio and Institution variables, it is to be noted that Institution variable includes Cash Reserve Ratio, Repo Rate, Reverse Repo Rate, Bank Rate and Statutory Liquidity Ratio. Results of multiple regression reveals that the *p* value of all institution variables are more than 0.05 at 5 % level of significance. This indicates that there is a statistically insignificant relationship between dependent variable and independent variables.

The following regression equation was obtained:

$$Y = 5.14 - 1.66X_1 - 4.55X_2 + 4.59X_3 - 0.54X_4 + 0.56X_5 + e$$

VII. CONCLUSION

The need of the study is to restore confidence, preserve financial stability, revive growth and recover stronger. At the RBI, should strive to maintain the balance between preserving financial stability, maintaining banking system soundness and sustaining economic activity. From the data analysis it can be observed that there is a statistically

insignificant relationship between Gross and Net NPAs Ratio of SCBs; and Cash Reserve Ratio and also Gross and Net NPAs Ratio of SCBs and Repo Rate during pre crisis period. But there is a statistically significant relationship between Gross and Net NPAs Ratio of SCBs and Reverse Repo Rate; Gross and Net NPAs Ratio of SCBs and Bank Rate; and Gross and Net NPAs Ratio of SCBs and Statutory Liquidity Ratio during pre crisis period. It is interesting to say that there is a statistically insignificant relationship between Gross and Net NPAs Ratio of SCBs and Institutional Variables during post crisis period. Cash Reserve Ratio is the share of a bank's total deposit it should be mandated by the RBI to be maintained with the latter in the form of liquid cash and Repo Rate is the rate at which the RBI lends money to commercial banks in the event of any shortfall of funds and it is used by monetary authorities to control inflation. So the Cash Reserve Ratio and Repo Rate should be maintained at an optimal level from time to time based on the liquidity position of the economy and inflation to control the NPAs of commercial banks. At present there is a covid-19 pandemic situation. It is very difficult to collect dues from the borrowers promptly. The RBI has been relaxed Cash Reserve Ratio, Repo Rate and Reverse Repo Rate to increase liquidity in the economy. But RBI should review the liquidity position of economy from time to time for control inflation. It leads to reduce the NPAs of SCBs.

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