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Effect of Inflation on Non-Performing Loans in the Banking Industry of India

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Abstract

This paper studies the relation of Inflation on Non-Performing loans in the Banking Industry of India. This study examined if there is any link between inflation and non-performing loans. The research used the non-performing loan amount and inflation percentage in India from 2006 to 2019. Descriptive Statistics, Regression Analysis, and Correlation Matrix are used for data analysis.

Keywords: *Inflation, Non-Performing Loans, Correlation Matrix, Regression Analysis.*

I. INTRODUCTION

Inflation is the continuous increase in price level. Inflation might happen by, a ceaseless diminishing in the interest for cash or a persistent increment in the stockpile of cash, or a mix of the two Central bank is the major authority to influence inflation. The decision made by the central bank regarding money demand and supply directly impacts inflation. Inflation also decreasing the purchasing power of the people who earn fixed income. [1]

According to Reserve Bank of India, inflation in India for year 2018 is 4.86%. Inflation rate cannot be directly determined. It is increase in price between two time periods.

Economy in impacted by inflation by restructuring of income. Purchasing power of savers will depreciate and price will increase which will impact savers. All the money invested in different financial instruments like saving account, insurance policy will depreciate due to inflation. Low level of inflation is generally existed in the developing nations. [2]

When borrower is not able to pay principal and interest for the specified time then such borrowing is termed as non-performing loans. Generally specified time is about 90 to 180 days.Non-performing Loans (NPL’s) is one of the key elements to find out the health of any banks. It has direct impact on overall performance of bank like liquidity position and profitability of banks. [3]

When inflation rises non-performing loans of banks is also supposed to rise. There is a strong positive correlation between inflation and loan default rate. [4]

II. LITERATURE REVIEW

1. In December 2012, Kamini Rai conducted the examination on execution of NPAs of Indian Commercial Banks. The study focuses on the assessment on execution of NPAs of Indian Commercial Banks by collecting the previous year’s data. The gathered information was examined and deciphered utilizing diverse factual instruments proportions, midpoints, rates, proportion investigation, Measure of focal propensity, recurrence appropriation, Standard Deviations, coefficient of variety, 't' test and ANOVA test. The investigation shows that ascent in NPA is terrible marker for banks and recessionary weight is the measure explanation behind ascent in NPA's. [5]
2. In December 2013, Murumba Inekwe directed an examination on the connection between Real GDP and Non-performing credits (NPL's) in Nigeria. Pearson correlation was used as research methodology to find linkage between

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Real GDP and NPL's. The research concludes that in Nigeria there is positive relationship between GDP and NPL's. [6]

3. In february 2017, Rozina Akter and Jewel Kumar Roy coordinated an investigation on the impacts of non-performing credits on benefit: An Empirical Study on Banking Sector of Dhaka Stock Exchange. Connection, relapse and ANOVA was utilized as an exploration procedure. The investigation reasons that non-performing advance influences productivity so loaning ought to be done in a prudent way. [7]
4. In December 2018, Laxmi Koju, Ghulam Abbas, Shouyang Wang Studied on whether macroeconomic determinants of non-performing advances shift with the salary level of nations. The study concludes that GDP per capita, remittance and inflation rate and factors influencing NPL's. [8]
5. In 2013, Siraj and Pillai studied on the effect of GDP on relationship between gross advance and NPA of Indian SCBS. Regression was used for data analysis. The study shows that there is strong relationship between advance and NPA of banks. The relationship between NPA and advances got better with the interaction effect of GDP on advances. [9]
6. In 2013, Prerna and Rajendra conducted the study on NPA and key financial indicators in Indian banks. Multiple regression modelling was used for data analysis. The study concludes that banks should properly manage total assets and total deposits to effectively manage NPA's. Bank should give priority to total deposits management over total loans for managing NPAs's. [10]
7. In 2015, Seema Bhattarai contemplated the determinants of non-performing advance in Nepalese business banks. Various relapse was utilized to test the impact of chosen informative factors on non-performing credit of examined banks. The investigation presumes that one year slacked swelling rate has emphatically sway on non-performing credit and bank which charges moderately higher financing cost have higher non-performing advances. [11]
8. In 2011, Thiagarajan, Ayyappan, Ramachandran studied credit hazard determinants of open and private segment banks in India. Descriptive statistics was used as measure for data analysis. The study concludes that Indian economy is performing well even in global recession. So, growth in GDP is helping banks to manage its NPA's. There should be prudent rules and regulations to manage NPA's in coming years. [12]
9. In September, Dhiraj Jain and Nasreen Sheik did a near investigation of credit execution, NPA and net benefit in chosen Indian private banks. Connection and Trend investigation has been utilized for deciphering the information. It presumed that because of inappropriate financing loaning approach of the bank were not all that judicious and bank ought to likewise give subtleties to client about their credit arrangement. [13]
10. In December 2016, Rathore, Malpani and Sharma directed an examination on non-performing assets of Indian financial framework and its effect on economy. Factors about advances were introduced in table and charts and pattern study investigation has been utilized for information examination. There is certain connection between all out development, net benefit and NPA which isn't viewed as acceptable. Bank can't loan to its new clients since its store is stuck as non-performing resources.
11. In March 2015, Wafa Rizvi and Sheheryar Khan studied the impact of inflation on loan default in Pakistan bank. Regression is used as a methodology of the study. The study concludes that if there is rise in inflation it leads to decrease in loan default rate.

III. PURPOSE OF THE STUDY

The purpose of the study is to understand the relation between inflation and non-performing loans(NPL's) in Indian banking sector. Sample data of 14 years from 2004-2019 has been taken to find out the relationships. This study also helps us to find the how NPL's influence loan repayment.

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IV. RESEARCH OBJECTIVES

The main reason for this analysis is to explore the connections and relation between inflation and non-performing loans in the banking industry of India.

V. HYPOTHESIS OF THE STUDY

Null Hypothesis (H_0) = There is no critical connection among inflation and non-performing advances (NPL's) in the financial business of India

Alternate Hypothesis(H_1) = There is a noteworthy connection among inflation and non-performing credits (NPL's) in the financial business of India

VI. METHODOLOGY OF THE STUDY

A. Period of study

To identify and analyze the linkages and relationship among inflation and non-performing loans (NPL's), the study consists of yearly inflation rate data and yearly non-performing amount data from 2006 to 2019.

B. Data Sources

The research uses yearly data of the inflation rate and non-performing loans (NPL's) amount from Reserve Bank of India (RBI) website.

VII. TOOLS FOR EVALUATING

In the research following methods have been used:

1. **Correlation Matrix**: Estimate the correlation between inflation and non-performing loans (NPL's)
2. **Regression Analysis**: Investigate the relationship between inflation and non-performing loans (NPL's)

VIII. LIMITATIONS OF THE STUDY

1. Other macroeconomic variables that influences non-performing loans (NPL's) were not considered
2. Secondary data was used which may have been generated for different purpose
3. Inflation rate heavily depends upon base year statistic. This may influence the result.

IX. ANALYSIS

The data analyzed in this study is presented in the table below: Gross non-performing loans (NPL's) amount inflation rate (2006-2019)

Date	Gross NPL's (In billion rupees)	Inflation
2006	1072.65	5.80%
2007	1039.98	6.37%
2008	1157.69	8.35%
2009	1429.8	12.30%
2010	1500.52	10.50%
2011	1915.89	9.50%
2012	2781.63	10.00%
2013	3907.47	9.40%
2014	5260.28	5.80%
2015	6458.35	4.90%
2016	12232.14	4.50%
2017	15805.37	3.60%
2018	10387.86	3.40%
2019	9353.869	3.44%

Source: Reserve Bank of India

A. Analysis of Pearson Correlation

The correlation is between NPL's and inflation is -0.75. It states that there is negative or inverse relationship between NPL's and inflation. It means when NPL's will increase inflation decreases and vice versa.

Therefore, Null Hypothesis (H0) "There is no significant relationship between inflation and non-performing loans (NPL's) in the banking industry of India" is not rejected.

According to Pearson Correlation result, during the period, inflation did not have major influence on non-performing loans (NPL's) in banking sector of India.

B. Linear Regression Analysis

Regression Statistics	
Multiple R	0.746167316
R Square	0.556765663
Adjusted R Square	0.519829469
Standard Error	3353.142927
Observations	14

Table: Regression Coefficients

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The above outcome shows that the autonomous variable (inflation) can foresee 74.62% in the needy variable (NPL's). Similarly, the coefficient of determination indicated R Square clarifies how well the information fits the relapse line or line of best fit. The outcomes show that the information fits on the regression line 55.67% of the time.

The outcomes in this manner show that expansion is a significant indicator of the pace of advance default as it might clarify 74.62% of the variation. The staying 25.38% can be anticipated by different factors other than expansion

	Coefficients	Standard Error	t Stat	P-value
Intercept	13819.03251	2368.408732	5.834732966	0.00
Inflation	-121768.8086	31363.60031	-3.882488216	0.002178

The investigation built up a regression condition to decide the relationship between the independent variable (x) (inflation) and the dependent variable (y) (non-performing loan). This was made to build up whether there exists any huge connection between the two factors. As showed by the coefficient from the regression analysis, the regression might be presented to as follows:

Y = 13819.03251 + (-121768.8086) x + €(Error Term)

ANOVA

	df	SS	MS	F	Significance F
Regression	1	169482329.1	169482329.08	15.073715	0.002178041
Residual	12	134922809.9	11243567.49		
Total	13	304405138.9			

Table: Analysis of variance

The above table shows that the connection between the two factors is noteworthy at $p<0.005$. With a P estimation of 0.0021 subsequently the independent variable is a good indicator of the dependent variable. The regression condition shows that holding every other factor consistent a unit change in the independent variable(inflation) would result to 0.746 change in the dependent variable (NPL's).

X. CONCLUSION

Inflation and non-performing loans (NPL’s) are negatively correlated. If inflation increases NPL’s decreases and vice versa. There are also other macroeconomic elements which influences NPL’s and they should also be considered while forcasting NPL’s.

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