E-ISSN No : 2581-6195 | Volume : 9 | Issue : 5 | May 2026

IMPACT OF MACROECONOMIC INDICATORS ON MSME CREDIT GROWTH: PATHWAYS FOR THE FUTURE OUTLOOK AND ITS IMPACT DURING ECONOMIC SLOWDOWN IN INDIA

Vishal Tripathy[1], *Dr. Sanchita Som[2], Qristin Violinda[3]

HIGHLIGHTS

- It aims to study the impact of macroeconomic indicators- GDP growth rate and IIP growth rate on Credit growth rate of MSME sector in India.
- It focuses on predicting the credit growth rate values from March'2019 to March'23 on a quarterly basis using Multiple Linear Regression technique.
- Then after the macroeconomic variables from June'23 to March'26 by taking a weighted factor from the growth rate pattern of 2021-22 and 2022-23.
- Based on the forecasted macroeconomic indicators, the Credit growth rate is forecasted from June'23 to March'26 using Time Series Forecasting technique.
- Finally, scenario analysis is conducted where we have tried to analyse the decrease in credit growth rate in MSME sector during an economic slowdown in India.

ABSTRACT

The paper aims to study the impact of macroeconomic variables- GDP growth rate and IIP growth rate on Credit growth rate of MSME sector in India. It focuses on predicting the credit growth rate values based on historical data from March'2019 to March'23 on a quarterly basis using Multiple Linear Regression technique. Then we have forecasted the macroeconomic variables from June'23 to March'26 by taking a weighted factor from the growth rate pattern of 2021-22 and 2022-23 using Macroeconomic variable forecasting technique. Then-after we have forecasted the Credit growth rate values from June'23 to March'26 based on forecasted values of macroeconomic variables using Time Series Forecasting technique (White-Noise Model). Finally, we have conducted scenario analysis where we have tried to analyse the decrease in credit growth rate in MSME sector during an economic slowdown in India, i.e when GDP growth rate & IIP growth rate together falls by 7% & 1% (Low severity level); 10% & 5% (Medium severity level); 15% & 7% (High severity level).

KEYWORDS: Credit Growth, Economic Slowdown, Macroeconomic Variable, MSME

[1] Advisory Solution Advisor, Model Risk Management, Deloitte India (Offices of the US), Kolkata
[2] Associate Professor, Eastern Institute for Integrated Learning in Management, Kolkata
[3] Assistant Professor, Universitas Persatuan Guru Pepublik Indonesia Semarang, Indonesia

How to Cite:
Vishal Tripathy, Dr. Sanchita Som & Qristin Violinda (2026), Impact of Macroeconomic Indicators on Msme Credit Growth: Pathways For The Future Outlook and its Impact During Economic Slowdown in India, International Educational Journal of Science & Engineering (IEJSE),Vol: 9, Issue: 5, 08-15

Original Research

1. INTRODUCTION

The growth of Micro, Small, and Medium Enterprises (MSMEs) in India has been a crucial component of the country's economic development. These enterprises play a significant role in generating income and employment, fostering innovation, and contributing to exports. This MSME sector is the largest employment generator in India after agriculture, providing jobs to around 120 million people. It is noteworthy to mention that MSMEs contribute approximately 30% of India's GDP and it accounts for about 45% of the total exports from India.

Increasing digitization, adoption of technology in business processes and Growth in e-commerce platforms have enhanced productivity and market reach of this sector.

Nowadays, the Non-Banking Financial Companies (NBFCs) and Fintech companies have improved access to credit for MSMEs, especially for those who

Copyright© 2026, IEJSE. This open-access article is published under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License which permits Share (copy and redistribute the material in any medium or format) and Adapt (remix, transform, and build upon the material) under the Attribution-NonCommercial terms.

find it challenging to secure loans from traditional banks. Not only that the Government Schemes like the Pradhan Mantri Mudra Yojana (PMMY) and Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGS) have facilitated better access to finance.

Despite the above-mentioned credit facilities, many MSMEs still face difficulties in accessing timely and adequate credit, often due to lack of collateral or credit history.

There are many Government initiatives taken for more expansion of this sector e.g. 'Atmanirbhar Bharat Abhiyan' (Self-Reliant India Campaign) which is a comprehensive package aimed at making India self-reliant, with significant focus on MSMEs, including collateral-free loans, equity infusion, and subordinate debt. Another initiative is Make in India which aimed at promoting manufacturing in India, this initiative has provided a boost to MSMEs by enhancing infrastructure, easing regulations, and fostering innovation. Not only that Start-up India initiative focuses on creating a robust ecosystem for nurturing innovation and start-ups, benefitting MSMEs engaged in innovative fields. Digital India encourages MSMEs to adopt digital technologies to improve operational efficiency and market access. In this regard, the MSME Development Act aims to improve the ease of doing business, enhance access to finance, and support MSMEs through various schemes and incentives.

The MSME sector in India has shown resilient growth, driven by government support, technological adoption, and entrepreneurial spirit. However, to sustain and enhance this growth, continuous efforts are needed to address challenges such as access to finance, infrastructure, regulatory compliance, and skill development. The evolving economic landscape, coupled with supportive policies, positions the MSME sector as a pivotal driver of India's future economic growth and development.

The credit growth of Micro, Small and Medium Enterprises (MSMEs) in India is influenced by a variety of macroeconomic variables.

2. LITERATURE REVIEW

There are many research works related to MSME Credit growth and its impact on economic development.

Wong, Choi & Fong (2006) in their study highlighted the framework for stress testing the credit exposures of Hong Kong's retail banks to macroeconomic shocks. The analysis suggested a significant relationship between the default rates of bank loans and key macroeconomic factors, including Hong Kong's GDP, interest rates and property prices and the Mainland's GDP.

Jakubik & Sutton (2011) in the paper Thoughts on the proper design of macro stress tests introduced macro stress tests and argues that these exercises could be an important part of enhanced macro prudential policies.

Vazquez, Tabak, and Souto (2012) proposed a model to conduct a macro stress test of credit risk for the banking sector based on scenario analysis in the paper A Macro Stress Model of Credit Risk for the Brazilian Banking Sector. This paper showed a robust negative relationship between the logistic transformation of NPLs and GDP growth.

Gupta, Saini & Chaddha (2018) in their study discussed the growth and challenges of MSME financing. The study determined that the three key reasons obstructing the growth of MSMEs are inadequate financing by the banks, high collateral requirements and cumbersome processes.

Meo (2019) in the paper Scenario Design for Macro-Financial Stress Testing provided a possible approach to Scenario Design for selecting a stress scenario on economic growth, inflation and long-term interest rates in Italy. In this paper multiple scenarios on the risk factors have been generated simulating a Large Bayesian VAR for the Italian economy.

European Systemic Risk Board (2020) in the paper Macro-financial scenario for the 2020 EU-wide banking sector stress test outlines the baseline and macro-financial scenarios to capture the materialisation of relevant risks to which EU banking system is exposed to. The EU-wide stress tests in

cooperation with ESRB as a mandate by EBA assess the resilience of financial institutions to adverse financial and economic conditions.

Patra (2020) in his paper Resilience for Indian Banks: Macro stress test modelling for credit risk develops the macroeconomic stress testing model and checks the resilience of banks across different groups of banks in India like the public sector, private, and foreign banks in maintaining the minimum required regulatory capital at the time of stress situations. The stress testing exercise is undertaken using panel data models to evaluate the impact of likely changes in macro parameters on the non-performing loans under three stress scenarios like baseline, medium, and severe. The impact of these stress testing is substantial for the public sector banks as compared to private and foreign banks.

On reviewing various research works it was found that there was no study which used Time Series Regression Model (ARIMAX)to build adverse scenarios and future pathways to assess the resilience of MSME sector for the credit growth in future and from this lacuna, the objectives of the present study have been developed in the next section.

3. OBJECTIVES AND RESEARCH METHODOLOGY

The objective of this study is:

- to understand the impact of macroeconomic variables such as Gross Domestic Product (GDP) growth rate and Index of Industrial Production (IIP) growth rate on Credit Growth rate of MSME segment in India
- to see the forecasted values of MSME Credit Growth rate from Qtr'1-2023-24 to Qtr'4-2025-26 based on the future trajectory of macroeconomic variables- GDP_growth rate and IIP_growth rate.
- to analyse the impact on forecasted values of MSME Credit_Growth rate from Qtr'1-2023-24 to Qtr'4-2025-26 if our economy is hit by an economic slowdown in future that is caused by a reduction in GDP and IIP growth rates.

The study has been done on secondary data collected from Government websites. Based on the above-mentioned objectives data has been collected on the GDP growth rate from Ministry of Statistics and Programme Implementation (MOSPI). GDP growth rate is taken in the form of quarterly series. Data on MSME credit growth rate and IIP growth rate have been collected from the official website of Reserve Bank of India.

4. MODEL ASSUMPTIONS:

The time period chosen for historical data analysis ranges from March 2019 to March 2023 (quarterly data) that is post demonetization and GST implementation. The covid effect(recession) is being considered along with the expansion(pre-covid) and recovery stage(post-covid) of the economic cycle. Forecasting is based on June 2023 to March 2026.

Reason behind the choice of 2023 and 2024 for forecasting is for checking the back testing of forecasted model results. For credit growth rate and IIP growth rate, we calculated the Q-o-Q growth rate to get the quarterly data series. GDP growth rate is already in already in quarterly series. For structural equation the dependent variable is MSME credit growth rate. The control variables are GDP growth rate and IIP growth rate.

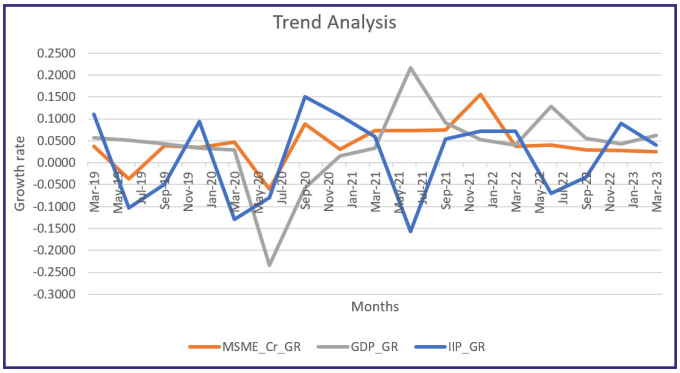
We have attempted to see the impact of 2 macroeconomic variables- GDP_growth rate & IIP_ growth rate on Credit_Growth rate of MSME segment in India using **Linear Regression Technique**. Then we calculate the future trajectory of macroeconomic variables- GDP_growth rate and IIP_growth rate (weighted factor of growth pattern in FY 2021-22(30%) and FY 2022-23(70%)) from Qtr'1-2023-24 to Qtr'4-2025-26 following **Macroeconomic Variable Forecasting**.

Finally, we see the forecasted values of MSME Credit_ Growth rate from Qtr'1-2023-24 to Qtr'4-2025-26 future trajectory of macroeconomic variables- GDP_ growth rate and IIP_growth rate using **Time Series Forecasting technique (White-Noise Model)**. Statistical tools used for this analysis is MS Excel and Python. Macro variable forecasting and Linear Regression analysis have been done with the help of MS- Excel whereas the credit growth rate forecasting and Scenario analysis have been done with the help of Python.

5. RESULTS AND DISCUSSIONS:

The following section discusses about the results in detail.

Fig. 1: Relationship between Credit Growth rate and Macroeconomic variables.



Source: *RBI Database, MOSPI Database*

The above Figure 1 depicts graphical relationship between Credit Growth rate in MSME segment and Macroeconomic variables. It is seen that there is no clear trend in the growth rate in any of the variable. However, it is seen that during the Pandemic era (Covid-19) the Credit Growth, IIP growth rate and GDP growth rates have decreased drastically (1st wave) and Credit growth rate remained flat in the 2nd wave with decrease in IIP growth rate and increase in GDP growth rate.

5.1. Exploratory Data Analysis

5.1.1. Time Series Decomposition

This section discusses the Time Series Decomposition of MSME Credit Growth Rate, GDP growth rate and IIP growth rate respectively.

MSME Credit Growth rate) shows that long-run trend is non-linear; Qtr2 and Qtr3 shows increase in growth rate and Qtr1 and Qtr4 shows decline in growth rate; residual in the inherent series follow white noise. **GDP Growth rate** shows that long-run trend is non-linear; Qtr1 and Qtr3 shows increase in growth rate and Qtr2 and Qtr4 shows decline in growth rate; residual in the inherent series follow white noise. Lastly, **IIP Growth rate** shows that long-run trend is non-linear; Qtr2 and Qtr3 shows increase in growth rate and Qtr1 and Qtr4 shows decline in growth rate; residual in the inherent series follow white noise.

5.1.2. Distribution Plots

The Distribution Plots of MSME Credit Growth Rate and IIP growth rate follow approximately normal distribution whereas GDP growth rate follows a negatively skewed distribution because of the covid effect which has led to a recessionary situation in India causing GDP to reach negative figures in consecutive 2 quarters, i.e Qtr'1 and Qtr'2 in 2020-21.

5.1.3. Correlation Analysis

The below Table 1 shows the correlation matrix between MSME Credit Growth Rate, GDP growth rate and IIP growth rate respectively.

Table 1: Correlation Matrix

Variables	MSME_Cr_GR	GDP_GR	IIP_GR
MSME_Cr_GR	1	0.451748432	0.3525
GDP_GR	0.451748432	1	-0.17323502
IIP_GR	0.352544936	-0.17323502	1

Source: *RBI Database, MOSPI Database*

The correlation value between MSME credit growth and GDP growth rate is 0.45; MSME credit growth and GDP growth rate is **0.35** respectively. Interesting point to be noted is that correlation between IIP growth rate and GDP growth rate is **-0.17** because: **Covid 2nd wave and reduction in production in Electricity Sector in FY2022-23 drastically by 23.81%.**

5.1.4. KPSS Test Analysis

The KPSS tests for MSME Credit growth rate, GDP growth rate & IIP growth rate respectively. It indicates that all the variables are stationary. The assumptions on the hypothesis for KPSS test are as follows:

H0: Data is stationary.

H1: Data is non-stationary.

Since p-values >0.05, so we accept H0.

5.2. Model Result Summary

5.2.1 Linear Regression Results

Regression Statistics	
Multiple R	0.628816644
R Square	0.395410371
Adjusted R Square	0.309040424
Standard Error	0.03929836
Observations	17

Table 2: Linear Regression Model Result Summary

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.028204325	0.01066309	2.645042244	0.019214197
GDP_GR_Fin	0.279620308	0.111596945	2.505626902	0.02519126
IIP_GR_Fin	0.220566153	0.104787489	2.104890146	0.053843645

MAPE	40.32%	N/A
MSE	0.0013	N/A
RMSE	0.0265	N/A
Heteroscedasticity test (B-P test)	3.63	0.054
DW-test	2.01	N/A

Source: *RBI Database, MOSPI Database*

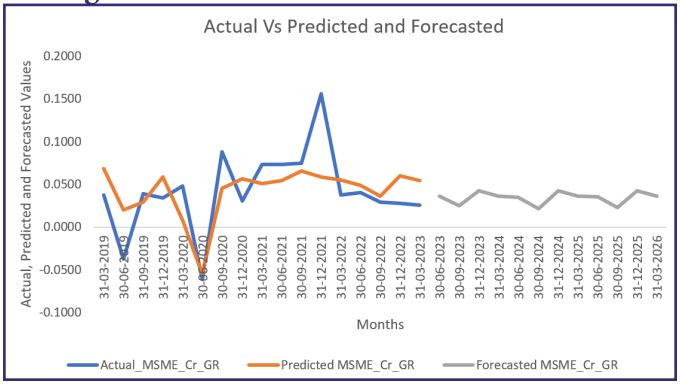
5.2.1 Time Series Regression Results

Table 3: Time Series Regression (ARIMAX) Model Performance Summary

Model Evaluation Metrics	Value	p-value
Log-Likelihood	20.65	N/A
AIC	-35.30	N/A
BIC	-33.61	N/A
L-Jung Box	0.19	0.66
Jarque-Bera	0.60	0.74

Source: *RBI Database, MOSPI Database*

Fig. 5: Actual Vs Predicted and Forecasted



Source: *RBI Database, MOSPI Database*

The above tables and figure depicts the following:

- Historical growth rate series for all the variables are taken from March'19 to March'23.
- Firstly, we applied a **Multiple Linear Regression** technique to see the impact of macroeconomic variables- GDP_growth rate & IIP_growth rate on Credit_Growth rate of MSME segment.
- Then we applied **Time Series Forecasting** technique to forecast the values of MSME Credit Growth rate from April'23 to March'26 based on the forecasted values GDP_growth rate & IIP_growth rate from June'23 to March'26.

5.3 Analysis and Outcome

5.3.1 Equational Structure:

5.3.1.1 Linear Regression Model

$$Credit\_Growtht = a + b1GDP\_Growtht + b2IIP\_Growtht + et \quad \ldots\ldots\ldots\ldots\ldots (1)$$

where,

a = **0.03**

b1 = **0.28**

b2 = **0.22**

With reference to Table 3, results from **Linear Regression** show that R-Square and Adj R-Square are 0.40 and 0.31 respectively indicating GDP_growth & IIP_growth are being able to explain 40% of the variation of MSME Credit_growth rate and 31% of the variation of MSME Credit_growth rate effectively. Intercept's sign is positive which is significant (p-value is 0.02); GDP_growth rate & IIP_Growth rates are positive and significant (p-values are: 0.03 & 0.05 respectively) indicating that Credit Growth rate cannot be negative even if we do not use any independent variables. Independent variables- GDP_growth rate & IIP_Growth rate have significant and positive effect on Credit_Growth which means as GDP and IIP growth rate increases Credit Growth rate in MSME segment also rises. The heteroscedasticity test (BP-test's p-value is 0.054) shows no presence of heteroscedasticity in the model and DW-test of 2.01(p-value is 0.01) shows presence of positive autocorrelation.

5.3.1.2 ARIMAX Model

$$Yt = c + \Sigma ip=1 \alpha i\ Yt\text{-}i + \Sigma ip=1\ \mu j\ €t\text{-}j + + \Sigma kr=1\ \beta k\ Xt,k + €t \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where: Yt : Credit Growth rate in MSME segment in the current period.

c: constant parameter.

Yt-i: Credit Growth rate in MSME segment in the lagged period.

€t: error term of the current period.

€t-j: error term of the lagged period.

Xt,k: explanatory variables which include GDP growth rate and IIP growth rate in the current period.

β1: Coefficient of GDP growth rate is 0.4062, p-value=0.000

β2: Coefficient of IIP growth rate is 0.2770, p-value = 0.05

The coefficients of GDP growth rate and IIP growth rate: β1 and β2 respectively have shown positive values of 0.4062 and 0.2770 respectively with p-values less than 0.05 which indicates that as GDP growth rate and IIP growth rate increases MSME credit growth also increases. The log-likelihood values is 20.65; AIC value is -35.30 which is less than BIC value of -33.61 indicating robustness of the ARIMAX model; L-Jung Box test's value is 0.19 with a p-value of 0.66 indicating no autocorrelation present in the model and Jarque-Bera test's value is 0.60 with a p-value of 0.74 indicating error terms are normally distributed.

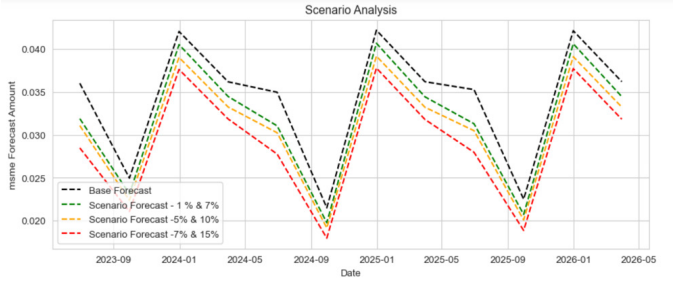
5.3.2. Model Results Interpretation:

- The results from Linear Regression Model shows that as GDP growth rate increases, per capita income increases which lead to rise in both income and savings. As a result, production and investment activities also boosts which demand for additional credit and finance. This increased demand for credit lead to a financial growth that leads to an increase in credit growth rate. On the other hand, an increase in IIP growth rate has a direct positive impact on the production activities. The companies require more funds for working capital and expansion, driving higher demand for bank credit.
- Then we calculate the future trajectory of macroeconomic variables- GDP_growth rate and IIP_growth rate (weighted factor of growth pattern in FY 2021-22(30%) and FY 2022-23(70%)) from Qtr'1-2023-24 to Qtr'4-2025-26 following **Macroeconomic Variable Forecasting** and 30% weightage has been given to lagged past (2 years before) and 70% weightage is given to recent past (1 year before). 30% weightage is applied to the growth pattern of 2021-22 and 70% weightage is applied to growth pattern of 2022-23 because **2022-23 is recent past and 2021-22 is lagged past** and 2021-22 also had the effect of Covid 2nd wave in initial 1-2 quarters. So, to avoid any artificial biasness of economic stress in the forecasted values of macroeconomic variables, we have assumed so.
- Then we see the forecasted values of MSME Credit_Growth rate from Qtr'1-2023-24 to Qtr'4-2025-26 future trajectory of macroeconomic variables- GDP_growth rate and IIP_growth rate using **Time Series Forecasting technique (White-Noise Model)**.
- The results from Model Evaluation Metrics table shows the output from Time Series Forecasting. Log-Likelihood value is 20.65; AIC value (-35.3) is less than BIC value (-33.6); L-Jung Box and J-B statistics p-value are 0.74 and 0.66 respectively indicating stability in the Forecasted values of MSME Credit Growth rates; MAPE = 40.32%, MSE=0.0013 & RMSE=0.0265 indicating stability in the Predicted values of MSME Credit Growth rates.
- The Actual Vs Predicted and Forecasted Graph shows that Actual Vs Predicted Values of MSME Credit Growth rates (from the output of Linear Regression Model) and Forecasted values of MSME Credit Growth rates in the future from June'23 to March'26 (from the output of Time Series Forecasting Model- White Noise Model).
- The forecasted Credit growth rate values shows a stable positive quarterly growth rate over next 12 quarters years due to a stable positive growth in GDP growth rate and IIP growth rate, It is seen that the credit growth rate takes a dip in quarter 1 and quarter 2 due to decrease in GDP growth rate and IIP growth rate respectively. The GDP growth rate takes a minor setback in quarter 1 of every year due to seasonal factors like reduced government spending during elections (Model Code of Conduct), weaker consumer demand post-festivals, and agricultural impacts from monsoons, affecting rural income, alongside global slowdowns impacting exports and investment, though recent slowdowns have also pointed to manufacturing struggles and consumption dips. On the other hand, IIP growth rate reduces in quarter 2 of every year due to seasonal, structural, and base-effect factors. Key reasons include the monsoon's impact on mining and power, the normalization of production after pre-festive stockpiling, and a high base effect from the previous quarter.

5.3.3. Macro Scenario Result Summary

This section shows the forecasted values of MSME Credit_Growth rate from Qtr'1-2023-24 to Qtr'4-2025-26 future trajectory of macroeconomic variables- GDP_growth rate and IIP_growth rate.

Fig. 6: Macro Scenario Analysis



Source: *RBI Database, MOSPI Database*

The above Figure 6 shows the Forecasted values in MSME Credit Growth rates in the Economic downturn scenarios- Low severity (GDP & IIP growth rate falls by 7% and 1% respectively) causes MSME Credit Growth rates to fall from **3.42% Q-o-Q to 3.19%** on average Q-o-Q; Medium severity (GDP & IIP growth rate falls by 10% and 5% respectively) causes MSME Credit Growth rates to fall from **3.42% Q-o-Q to 3.09%** on average Q-o-Q ; High severity (GDP & IIP growth rate falls by 15% and 7% respectively) causes MSME Credit Growth rates to fall from **3.42% Q-o-Q to 2.92%** on average Q-o-Q.

6. MODEL RISK & DRAWBACKS

The above Model is a Macro-Modelling where we have tested the impact of macroeconomic indicators- GDP growth rate and IIP growth rate on MSME Credit growth rate and we have also built scenarios on how MSME Credit growth rate will behave if there is an economic slowdown in future. So, as a model drawback we cannot use any policy dummy that is associated with the MSME sector that might impact its credit growth rate because we do not know about time of implementation in future so we cannot include it in in our modelling and forecasting exercise.

The model risk associated here is the short time window (4 years- 2019-2023) that we have considered for our modelling exercise, so the entire economic cycle has not been captured. It includes the Covid time window as well GDP, IIP and Credit growth rate experienced negative growth rate. We have considered only 2 macroeconomic variables in our model and included all the other possible variables that might affect the MSME Credit Growth rate in the error term. The predicted and forecasted values have got impacted. Due to the covid effect the distribution and trend of the variables are not robust. Some of the Model Evaluation metrics like – R-square, Adj R-square are low and MAPE is high. So, as a recommendation we have to wait for the data to get enhanced to get the economic cycle being captured properly.

7. CONCLUDING REMARKS

The above analysis predicting positive credit growth rate due to GDP growth rate and IIP growth rate based on historical data from March'2019 to March'23 on a quarterly basis using Multiple Linear Regression technique. Then-after we have forecasted the Credit growth rate values from June'23 to March'26 quarterly basis based on forecasted values of macroeconomic variables using Time Series Forecasting technique (White-Noise Model). Finally, we have conducted scenario analysis during an economic slowdown where we have tried to analyse the decrease in credit growth rate in MSME sector when GDP growth rate & IIP growth rate together falls by 7% & 1% (Low severity level); 10% & 5% (Medium severity level); 15% & 7% (High severity level). MSME Credit Growth rates fall from **3.42% Q-o-Q to 3.19%** on average Q-o-Q; Medium severity (GDP & IIP growth rate falls by 10% and 5% respectively) causes MSME Credit Growth rates to fall from **3.42% Q-o-Q to 3.09%** on average Q-o-Q ; High severity (GDP & IIP growth rate falls by 15% and 7% respectively) causes MSME Credit Growth rates to fall from **3.42% Q-o-Q to 2.92%** on average Q-o-Q.

REFERENCES

1. Borio C, M Drehmann, K Tsatsaronis (2012): "Stress-Testing Macro Stress Testing: Does it Live up to Expectations?" in Bank for International Settlements Working Papers (2012), No 369
2. European Systemic Risk Board (2020): "Macro-financial scenario for the 2020 EU-wide banking sector stress test"
3. Grundke P, Pliszka K (2015): "A Macro Reverse Stress Tests", Deutsche Bundesbank Euro system
4. Henry J, C Kok (2013): "A Macro Stress Testing Framework for Assessing Systemic Risks in the Banking Sector" in Occasional Paper Series No 152
5. Jakubik P, G.D. Sutton (2011): "Thoughts on the Paper Design of Macro Stress Tests" in Banking for International Settlements, Working Papers No 60
6. Kalirai H, M Scheicher (2014): "Macroeconomic Stress Testing: Preliminary Evidence for Austria" in Financial Stability Report, No 3
7. Lelyveld V I (2009): "The Link Between Macro and Micro" in Special Issue of the International Journal of Central Banking (2009), Vol 5, No 3
8. Meo D E (2019): "Scenario Design for Macro-Financial

Stress Testing, Coutnry-Level Macro Stress-Testing Practices" in Finance Stability Review (2006)
9. Patra (2020): "Resilience for Indian Banks - Macro stress test modelling for credit risk"
10. Vazquez F, B.M. Tabak and M Souto (2012): "A Macro Stress Model of Credit Risk for the Brazilian Banking Sectors" in Journal of Financial Stability, Vol 8, No 2, Pp 69-83
11. Wong J, K.F.Choi and T Fong (2006): "A Framework for Macro Stress Testing the Credit Risk of Banks in Hong Kong" in Hong Kong Monetary Authority Quarterly Bulletin
12. Gupta V, Saini J S, Chaddha S (2018): "MSME Financing: Growth and Challenges" in International Journal for Research in Engineering Application & Management (IJREAM) ISSN: 2454-9150 Vol-04, Issue-07, Oct 2018