A Study On The Impact Of Selected Macro-Economic Variables On Indian Stock Market

*Saravanan R, Assistant Professor, SoM, Sri Krishna College of Technology, Coimbatore

**Narthika R, II MBA Sri Krishna College of Technology, Coimbatore

***Dr.E.Muthukumar, Professor, Nehru College of Management, Coimbatore

ABSTRACT

The stock market is a crucial component of a country's financial system, servicing as indicator of that country's economic health. While stock market is influenced by various external and internal factor, this study examines the performance of six NSE sectoral indices on selected macroeconomic variables including GDP, gold prices, exchange rates, repo and reverse repo rates. The study uses secondary data from 2020–2024 and a descriptive methodology. The associations between macroeconomic factors and stock market performance are investigated using statistical techniques, such as descriptive statistics, the Granger Causality Test, the Augmented Dickey-Fuller (ADF) test, correlation analysis, Johansen's Cointegration Test, and regression analysis. The results show strong interdependencies, with GDP and gold prices having a positive impact on stock indices and interest rates and exchange rates having varying effects on different sectoral indices. The study helps investors, policy makers, and financial analysts make better investment choices, manage risk, and formulate economic policies by offering insightful information.

Keywords: Macro-economic variables, NSE, Nifty Sectoral indices, GDP, Gold prices, Exchange rates, Repo Rate, Reverse repo rates.

INTRODUCTION

The stock market plays a crucial role in a country's economic growth by enabling capital formation and efficient resource allocation. In India, the Bombay Stock Exchange and National Stock Exchange facilitate trading in financial instruments like stocks, derivatives, and bonds. Stock prices are influenced by company performance, investor sentiment, and broader macroeconomic. Sectoral indices like Nifty 50, Nifty Bank, Nifty FMCG, Nifty Midcap 100, Nifty MNC, and Nifty Service Sector help assess market reactions to economic changes. This study aims to analyze the relationships between these macroeconomic factors and NSE sectoral

indices to provide insights into investment strategies and economic policymaking in India's evolving financial landscape.

REVIEW OF LITERATURE

Dr Amit Hedau (2024) study analyzes the macroeconomic factors influencing the performance of India's NIFTY 50 index, using both primary and secondary data. Nine years of monthly data on macroeconomic variables were regressed against the NIFTY 50 performance through logistic regression. The results were further validated through expert interviews. Secondary data analysis identified the Dow Jones Index and exchange rate movements as key determinants, while experts also emphasized the significance of political stability, global economic conditions, and India's bilateral relations. This research is the first to combine both domestic and international factors to predict NIFTY 50 index movements in the Indian context.

Vandana Bhama (2022) examined how certain macroeconomic factors and the COVID 19 pandemic have influenced the stock market by looking at NIFTY 100 companies. Via a vector error correction model (VECM) her research revealed a lasting connection, between these factors. Notably the Indian stock market displayed a correlation, with price fluctuations witnessing a value of 57. Furthermore, this indicates that increased price volatility adversely affects stock trading operations. The exchange rates took a hit amid the crisis, with the rupee dropping to 76 95 against the US dollar The research also looked into how the rising COVID 19 cases impacted the stock market revealing a negative impact of 022 indicating that while COVID 19 dented market sentiment it had minimal influence on currency fluctuations The study suggested that businesses fared better during the second wave of Covid 19 lessening its adverse effects on the stock market.

PROBLEM STATEMENT

One of the most important measures of economic performance is the stock market, which shows a country's financial soundness and room for expansion. However, a variety of internal and external factors, especially macroeconomic ones like GDP, gold prices, currency rates, and interest rates, influence stock market swings. The relationship between macroeconomic variables and stock market performance in industrialised economies has been the subject of much research, but emerging markets such as India have received less attention. Changes in the macroeconomic environment have a significant impact on the Indian stock market, which is reflected by the National Stock Exchange's (NSE) major indices. But little is known about the scope and character of these influences, especially when it comes to sectoral indices. By examining the dynamic relationship between a few selected macroeconomic indicators and the NSE's sectoral indexes, this study seeks to close this gap. In order to better understand market behavior, develop investment strategies, and aid in the creation of economic policies that promote financial stability and progress in India, the research looks at these interdependencies.

OBJECTIVES OF THE STUDY

- To understand the central tendency of time series data of select macroeconomic variables and sectoral indices of NSE.

- To determine the inter-dependent nature of relationship between select macroeconomic variables and NSE sectoral indices.

- To assess the causal relationship between chosen macroeconomic variables and sectoral indices on the NSE.

RESEARCH GAP

Despite extensive studies on the relationship between macroeconomic variables and stock market performance, there remains a gap in understanding the sector-specific impact of these variables on the Indian stock market. Existing research primarily focuses on broad indices like Nifty 50 and Sensex, often overlooking sectoral indices. Additionally, the evolving nature of economic policies, global market interdependencies, and post-pandemic market dynamics demand a more updated analysis. This study aims to bridge this gap by examining the influence of selected macroeconomic variables on both the overall and sectoral indices of NSE, offering deeper insights for investors and policymakers.

RESEARCH METHODOLOGY

This study uses a descriptive research design to examine the connection between a few macroeconomic factors and the Indian stock market, with a focus on the National Stock Exchange's (NSE) sectoral measures. The study uses secondary data gathered over a five-year period (2020–2024) from reputable sources like the Reserve Bank of India (RBI), NSE, and investing.com. GDP, gold prices, exchange rates, repo rates, and reverse repo rates are the main independent factors. The NSE sectoral indexes, which comprise the Nifty 50, Nifty Bank, Nifty FMCG, Nifty Midcap 100, Nifty MNC, and Nifty Service Sector, are the dependent variables.

The analysis employs a range of statistical and econometric techniques, including Descriptive Statistics to examine data distribution, the ADF Test to assess stationarity, and Correlation Analysis to evaluate the strength of relationships between variables. Additionally, Johansen's Cointegration Test is used to explore long-term connections, while the Granger Causality Test determines directional influences between macroeconomic factors and stock indices. Regression Analysis further quantifies the extent of these impacts.

By focusing solely on the Indian stock market, this study offers valuable insights into the intricate relationships between economic variables and stock performance.

RESULT AND ANALYSIS

Objective 1: To understand the central tendency of time series data of select macroeconomic variables and sectoral indices of NSE.

1.1 Descriptive Statistics of Sectoral indices

	Nifty 50	Nifty Bank	Nifty FMCG	Nifty Midcap 100	Nifty MNC	Nifty Service Sector
Mean	17051.84	37570.21	4211.66	31500.25	19512.91	22767.96
Median	17339.85	37491.4	39529.7	30117.3	19069.95	23733.75
Maximum	25,810.8	52,978.1	65,540.3	60,153.8	32,582.00	33,007.5
Minimum	8,597.75	19,144.0	27,319.2	11,703.7	11,069.30	11,876.8
Std Deviation	4090.7	8851.13	10090.29	12311.62	4968.04	4876.7
Skewness	-0.02	-0.39	0.43	0.64	0.8	-0.39
Kurtosis	2.64	2.51	2.13	2.8	3.37	2.9
Jarque-Bera	0.294	1.992	3.547	4.011	6.52	1.535
Probability	0.86	0.37	0.17	0.13	0.04	0.46

1.2 Tabulation of Macroeconomic variables

	Exchange Rate	GDP	Gold Rate	Repo Rate	Reverse Repo Rate
Mean	78.3	6340895.29	149794	5.16	3.45
Median	77.56	6499562.01	142618	5.51	3.35
Maximum	83.867	7828147.6	220641	6.5	4.9
Minimum	71.54	3893942.58	113735	4	3.35
Standard Deviation	4.28	1094854.15	23751.37	1.13	0.35
Skewness	0.01	-0.48	1.21	0.13	3.61
Kurtosis	1.27	2.36	3.81	0.19	14.61
Jarque-Bera	7.07	3.19	13.57	7.87	444.52
Probability	0.029	0.202	0.001	0.019	2.962

Objective 2: To determine the inter-dependent nature of the relationship between select macroeconomic variables and sectoral indices of NSE.

2.1 CORRELATION OF MACROECONOMIC VARIABLES AND SECTORAL INDICES

	Exchange Rate	Gold Rate	Nifty 50	Nifty Bank	Nifty FMCG	Nifty Midcap 100	Nifty MNC	Nifty Service Sector	Repo Rate	Reverse Repo Rate
Exchange Rate	1	0.79	0.8	0.82	0.91	0.81	0.81	0.74	0.93	-0.32
Gold Rate	0.79	1	0.85	0.79	0.87	0.99	0.91	0.79	0.72	-0.34
Nifty 50	0.8	0.85	1	0.98	0.95	0.98	0.98	0.99	0.72	-0.45
Nifty Bank	0.82	0.79	0.98	1	0.94	0.94	0.94	0.97	0.78	-0.39
Nifty FMCG	0.91	0.87	0.95	0.94	1	0.96	0.96	0.91	0.87	-0.37
Nifty Midcap 100	0.81	0.9	0.98	0.94	0.96	1	0.99	0.95	0.75	-0.37
Nifty MNC	0.81	0.91	0.98	0.94	0.96	0.99	1	0.95	0.74	0.38
Nifty Service Sector	0.74	0.79	0.99	0.97	0.91	0.95	0.95	1	0.65	-0.45
Repo Rate	0.93	0.72	0.72	0.78	0.87	0.75	0.74	0.65	1	-0.05
Reverse Repo	-0.32	-0.34	-0.45	-0.39	-0.37	-0.37	-0.38	-0.45	-0.05	1

The above tables for correlation analysis highlights strong positive relationships between the Exchange Rate and Gold Rate and among Nifty indices, especially Nifty 50 and Nifty Bank indicating similar market trends. The Exchange Rate also shows high correlations with Nifty FMCG) and Nifty Bank while the Repo Rate is moderately correlated with the Exchange Rate and Nifty Bank Conversely, the Reverse Repo Rate has a negative correlation with most Nifty indices, suggesting its increase may negatively impact these sectors. Overall, exchange rates and gold prices align with market trends, while interest rate changes, particularly the Reverse Repo Rate, influence sectors differently. Additionally, GDP shows strong correlations with Nifty Bank and Nifty 50, highlighting the close link between economic growth and stock market performance

2.2 JOHANSEN'S CO-INTEGRATION TEST

Null Hypothesis (H0) - There is no cointegration between the variables**.**

Alternative Hypothesis (H1) - There is a cointegration exist between the variables.

		t-statistic	Critical Value	Prob.
Nifty 50 & Macro-economic Variable	None*	106.8432	69.81889	0
	Atmost 1*	57.3714	47.85613	0.005
Nifty Bank & Macro-economic Variable	None*	115.0511	69.81889	0
	Atmost 1*	56.04767	47.85613	0.0071
Nifty FMCG & Macro-economic Variable	None*	103.554	69.81889	0
	Atmost 1*	57.3382	47.85613	0.005
Nifty Midcap 100 & Macroeconomic variable	None*	110.7408	69.81889	0
	Atmost 1*	61.04241	47.85613	0.001
Nifty MNC & Macro-economic Variable	None*	107.3089	69.81889	0
	Atmost 1*	60.2547	47.85613	0.002
Nifty service sector & Macroeconomic variable	None*	110.7151	69.81889	0
	Atmost 1*	56.2708	47.85613	0.006
Nifty 50 & GDP	None*	6.85616	15.49471	0.59
	Atmost 1*	0.03367	3.841465	0.85
Nifty Bank & GDP	None*	10.467	15.49471	0.24
	Atmost 1*	0.3261	3.841465	0.56
Nifty FMCG & GDP	None*	8.0337	15.49471	0.46
	Atmost 1*	0.6177	3.841465	0.43
Nifty Midcap 100 &GDP	None*	4.8605	15.49471	0.82
	Atmost 1*	1.0338	3.841465	0.3
Nifty MNC & GDP	None*	6.962092	15.49471	0.58
	Atmost 1*	3.375869	3.841465	0.06
Nifty Service Sector &GDP	None*	5.506599	15.49471	0.75
	Atmost 1*	0.107115	3.841465	0.74

As per the Johansen's Co-integration test, there exists two co-integration equation between the Nifty 50, Nifty Bank, Nifty FMCG, Nifty Midcap 100, Nifty MNC, Nifty Service Sector and macroeconomic variables. There is no cointegrating equations between Nifty 50, Nifty Bank, Nifty FMCG, Nifty Midcap 100, Nifty MNC, Nifty Service Sector and GDP.

Objective 3: To determine the causal relationship between selected macroeconomic variables and sectoral indices of NSE.

3.1 GRANGER CAUSALITY TEST

Null Hypothesis (H0) - There is no causal relationship between the variables.

Alternative Hypothesis (H1) - There is a causal relationship between the variables.

	F-Statistic	Prob.
Nifty Service Sector vs Exchange Rate	3.02996	0.0568
Exchange Rate vs Nifty FMCG	3.74294	0.0302
Nifty 50 vs GDP	6.44697	0.0032
Nifty Bank vs GDP	6.6559	0.0027
Nifty FMCG vs GDP	3.28557	0.0456
Nifty Midcap 100 vs GDP	5.07188	0.0099
Nifty MNC vs GDP	4.12143	0.022
Nifty Service Sector vs GDP	5.86722	0.0051
Nifty Bank vs Repo Rate	5.84203	0.0051
Nifty Service Sector vs Repo Rate	3.51279	0.0369
Reverse Repo Rate vs Nifty Bank	10.1147	0.0002
Nifty Bank vs Reverse Repo Rate	6.0794	0.0042
Reverse Repo Rate vs Nifty Service Sector	5.12318	0.0092
Nifty Service Sector vs Reverse Repo Rate	4.39592	0.0171

The Granger causality test results indicate significant causal relationships between several macroeconomic variables and NSE sectoral indices. GDP is strongly influenced by Nifty 50, Nifty Bank, Nifty FMCG, Nifty Midcap 100, Nifty MNC, and Nifty Service Sector, as reflected in their low probability values. Additionally, reverse repo rate exhibit a bidirectional causal relationship with Nifty Bank and Nifty Service Sector, While others exhibit unidirectional relationship. The exchange rate impacts Nifty FMCG, while the relationship between the Nifty Service Sector and the exchange rate is weaker. Gold rate has shown no causality with any of the sectoral indices.

3. 2 REGRESSION ANALYSIS

Null Hypothesis (H0) - The macroeconomic variables have no significant impact on the dependent variable.

Alternative Hypothesis (H1) - The macroeconomic variables have a significant impact on the dependent variable.

	R-squared:
Nifty 50 and Macroeconomic Variables	0.903249
Nifty Bank and Macroeconomic Variables	0.882349

Nifty FMCG and Macroeconomic Variables	0.933989
Of Nifty Midcap 100 and Macroeconomic Variables	0.902389
Nifty MNC and Macroeconomic Variables	0.902307
Nifty Service Sector and Macroeconomic Variables	0.851646

The regression analysis highlights strong relationships between macroeconomic variables and sectoral indices, with R-squared values ranging from 85.16% to 93.40%, indicating high explanatory power. GDP and Gold Rate consistently show significant positive impacts across all indices, emphasizing their crucial role in market performance. The Exchange Rate generally has a negative influence, particularly on Nifty 50, Nifty Midcap 100, and Nifty MNC, with statistically significant effects. The Repo Rate positively impacts Nifty FMCG but negatively affects the Nifty Service Sector. The Reverse Repo Rate exhibits mixed effects but is generally not statistically significant.

FINDINGS

1. Exchange rates and gold prices exhibit a strong positive correlation with most NSE indices, particularly Nifty 50 and Nifty Bank, indicating their influence on stock market movements.

2. The reverse repo rate, on the other hand, shows a negative correlation with sectoral indices, suggesting that an increase in the reverse repo rate could dampen stock market growth.

3. Nifty FMCG and Nifty Midcap 100 exhibit higher volatility, implying that these sectors are more sensitive to economic fluctuations.

4. Nifty Bank shows a strong correlation with GDP, highlighting the banking sector's close link to overall economic growth and financial stability.

5. The Nifty MNC index displays a higher skewness, suggesting that multinational companies react differently to macroeconomic changes compared to other sectors.

6. Johansen's cointegration test confirms a long-term association between macroeconomic factors and NSE indices, indicating that fluctuations in these variables can have lasting effects on stock performance.

7. The Granger Causality test reveals that repo rates and exchange rates have a predictive impact on certain NSE indices, meaning changes in these factors can help anticipate stock market trends.

8. The reverse repo rate show exhibits a bidirectional causal relationship with Nifty Bank and Nifty Service Sector.

LIMITATION OF THE STUDY

- The period of only 5 years (2020 – 2024) has been considered for the study.
- This study mainly focuses on selected five macroeconomic variables which may not completely represent the macroeconomic status of the country.
- The study is limited to six sectoral indices of National Stock Exchange Due to the non-availability of monthly data for GDP quarterly data have been taken for the study.

CONCLUSION

The study highlights the significant influence of macroeconomic variables on the Indian stock market, particularly the NSE sectoral indices. Key factors such as GDP, gold prices, crude oil prices, interest rates, and fiscal deficits play a crucial role in shaping market trends. The findings indicate that different sectors respond uniquely to these economic indicators, with indices like Nifty Bank and Nifty Midcap 100 showing higher sensitivity to fluctuations.

Understanding these relationships can help investors, policymakers, and financial analysts make informed decisions. While some sectors offer stability, others exhibit volatility, necessitating strategic investment approaches. As economic conditions evolve, continuous monitoring of these macroeconomic factors remains essential for navigating market uncertainties and optimizing financial outcomes.

BIBLIOGRAPHY:

Journals

1. Hedau, A. (2024). Impact of Macroeconomic Variables on the Performance of the Indian stock market. *Journal of Informatics Education and Reasearch, 4*(1).
2. Bhama, V. (2022). Macroeconomic variables, COVID-19 and the Indian stock market performance. *Investment Management & Financial Innovations*, *19*(3), 28.

Websites

https://www.niftyindices.com/

https://www.rbi.org.in/

https://in.investing.com/