

INFLUENCE OF MACROECONOMIC FACTORS ON INDIAN STOCK MARKET PERFORMANCE: AN EMPIRICAL ANALYSIS

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ABSTRACT

This paper investigates the influence of macroeconomic factors on the performance of the NIFTY 50, India's benchmark stock market index, utilizing a novel approach that integrates both primary and secondary data. The study analyzes nine years of monthly macroeconomic data using logistic regression to examine their impact on the NIFTY 50's monthly performance. Secondary data analysis reveals that fluctuations in the Dow Jones Index and exchange rates are significant determinants of NIFTY 50 movements. To validate these findings, qualitative insights were gathered through face-to-face interviews with stock market experts, who highlighted additional factors such as political stability, economic conditions in developed nations, and India's bilateral relations as crucial elements in predicting market trends. This research is pioneering in the Indian context, offering a comprehensive analysis by combining domestic and international macroeconomic variables to forecast NIFTY 50 performance, providing valuable insights for policymakers, investors, and financial analysts.

Keywords: Macroeconomic variables, India, Logistic regression, NIFTY 50

1. Introduction

Several economic indicators, commonly referred to as macroeconomic variables, play a crucial role in analyzing stock market performance and behavior. These indicators reflect the overall state of the economy and are closely linked to key factors such as business environment, interest rates, inflation, exchange rates, monetary policy, and foreign direct investment (FDI). Research on the impact of macroeconomic variables on stock returns remains a widely explored area in financial studies. According to the fundamental stock valuation model, stock prices are determined by "expected cash flows" and the "required risk-adjusted rate of return" based on the stock's risk level. Both the risk-adjusted discount rate and a firm's cash flows are influenced by macroeconomic conditions. Prior studies support the relationship between macroeconomic drivers and stock market performance, as evidenced by research in developed economies [Morelli (2002); Flannery & Protopapadakis (2002); Gjerde & Sættem (1999); Adam & Tweneboah (2008)] and emerging markets [Yartey (2010); Tangjitprom (2011)]. Dutta et al. (2012) also emphasize that macroeconomic factors significantly impact overall stock market returns alongside company-specific performance.

In India, macroeconomic variables such as interest rates, inflation, monetary policy, exchange rates, and FDI have undergone significant changes over the past decade. The Indian economy, in terms of GDP, expanded from \$1.83 trillion in 2012 to approximately \$3.73 trillion in 2024. Reflecting this economic growth, the NIFTY 50 index surged from 5,339 in March 2012 to an all-time high of over 22,000 in early 2024, achieving a compound annual growth rate (CAGR) of around 13%. The evolving dynamics of business and economic environments have contributed to greater efficiency in financial markets. Stock markets react swiftly to new developments, whether political challenges, geopolitical tensions, regulatory shifts, or global market movements, due to the widespread accessibility of information. As India emerges as a leading global investment destination, a deeper understanding of stock market drivers becomes increasingly essential for investors and policymakers alike.

1.1 Markets Performance

Let's dive into the stock markets—it's been a turbulent journey. From soaring all-time highs and unwavering optimism to concerns over an economic slowdown, heavy FII sell-offs, and a market correction, this year has been anything but predictable.

Market performance in 2024

Index to 100, January 1, 2024, till December 20, 2024

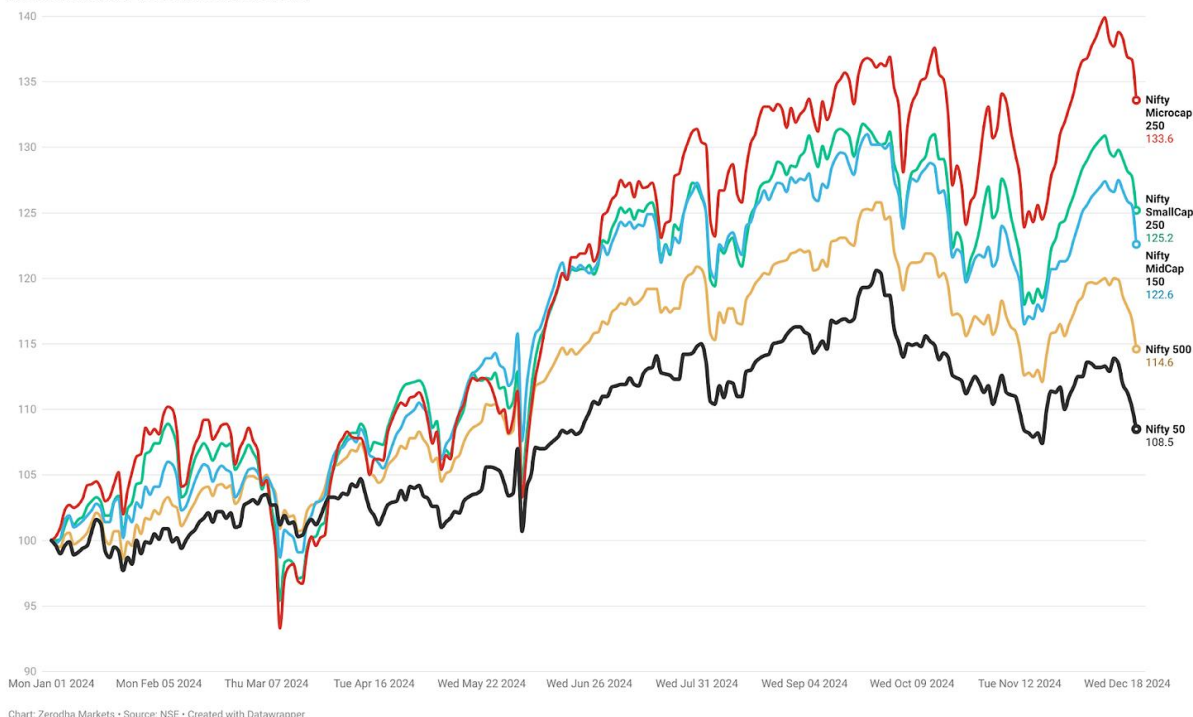


Figure :1 Market Performance in 2024

Table 1 highlights the cyclical nature of India's stock market, showing strong bull runs in years like 2007, 2009, 2014, 2017, and 2021, contrasted by major downturns in 2008, 2011, 2013, 2015, and 2018, where mid and small-cap stocks suffered the most. The 2008 financial crisis led to steep declines, followed by a sharp recovery in 2009. Recent years reflect resilience, with 2023 witnessing a strong rebound, especially in mid and small-cap stocks, while 2024 shows moderate but positive returns. Nifty 5-year G-Sec yields surged during downturns but remained subdued in bullish equity markets. Overall, smaller stocks exhibit higher volatility, and government bonds provide stability in uncertain times. The data underscores the stock market's sensitivity to macroeconomic factors, FIIs, and global events, emphasizing the importance of diversification and risk management for investors.

Table: 1 Market Returns from 2005 to 2024

Yearly market returns

Total Return Indices

Year	Nifty 50	Nifty 500	Nifty Midcap 150	Nifty Smallcap 250	Nifty Microcap 250	Nifty LargeMid 250	Nifty 5 year Gsec
2005	36.4%	36.5%	43.4%	55.8%	53.4%	40.4%	5.6%
2006	41.9%	35.9%	26.9%	30.8%	11.8%	32.4%	3.8%
2007	55.2%	63.2%	75.9%	94.6%	107.7%	69.6%	7.3%
2008	-51.3%	-56.8%	-65.6%	-69.2%	-75.7%	-60.3%	17.8%
2009	73.2%	85.7%	108.6%	111.4%	110.7%	94.9%	0.1%
2010	18.5%	14.3%	18.1%	15.9%	9.8%	15.8%	5.5%
2011	-24.1%	-26.8%	-31.6%	-35.8%	-42.7%	-28.5%	5.5%
2012	29.1%	33.3%	47.2%	40.1%	41.5%	39.2%	10.0%
2013	7.2%	3.9%	-2.4%	-7.6%	-8.0%	2.4%	5.1%
2014	33.0%	39.1%	61.8%	69.4%	100.1%	48.0%	13.5%
2015	-3.0%	0.0%	9.3%	10.0%	22.9%	3.9%	9.5%
2016	4.2%	4.7%	5.5%	0.5%	1.6%	5.3%	11.9%
2017	30.4%	37.3%	54.4%	56.1%	71.9%	43.4%	4.8%
2018	5.6%	-1.6%	-12.5%	-26.5%	-27.9%	-4.7%	7.4%
2019	13.0%	8.6%	0.6%	-7.6%	-24.8%	5.8%	10.8%
2020	16.0%	17.7%	25.1%	25.5%	35.8%	20.6%	12.2%
2021	25.3%	31.0%	46.5%	61.5%	75.2%	36.0%	3.3%
2022	4.1%	2.8%	2.8%	-3.9%	7.0%	3.2%	2.3%
2023	20.7%	26.3%	43.6%	48.0%	64.3%	31.9%	7.9%
2024	10.5%	16.3%	23.5%	25.8%	32.3%	18.5%	8.3%

Table: Zerodha Markets • Source: NSE • Created with Datawrapper

2. Review of Literature

In this section, the author reviews relevant literature, focusing primarily on macroeconomic variables and their relationship with stock market performance, given the extensive research available on the subject. Additionally, the author examines findings from studies specific to the Indian context in a subsequent section. In India, this subject has been extensively studied. Ahmed (2008) analyzed the causal linkages between stock prices and key macroeconomic variables representing the real and financial sectors of the Indian economy from March 1995 to March 2007, using quarterly data. The study considered the BSE Sensex and NIFTY 50 indices as dependent variables, with industrial production, exports, foreign direct investment, money supply, exchange rate, and interest rate as independent variables. To evaluate short-run relationships, BVAR modeling for variance decomposition and impulse response functions was employed, while Johansen's cointegration approach and the Toda and Yamamoto Granger causality test were used to examine long-run interactions. The findings revealed multiple causal relationships between stock indices and aggregate macroeconomic variables over time. The study concluded that the Indian stock market is influenced by both current performance and anticipated future potential. Ghosh et al. (2010) found that the call money market and inflation had an insignificant impact on stock market returns. In contrast, Srivastava (2010) presented findings that contradicted Ghosh et al., demonstrating that interest rates and inflation significantly influenced India's stock market performance. Srivastava also emphasized that domestic factors hold greater sway over international influences. Agrawal and Srivastava (2011) further established a relationship between exchange rates and the Indian stock market.

Ahuja et al. (2012) investigated the relationship between macroeconomic factors—such as industrial production, inflation, call rates, exchange rates, gold and oil prices, and foreign institutional investors (FIIs)—and the Indian stock market. Using regression and correlation analysis, they found that exchange rates, call rates, and FIIs had a more significant impact on the Indian stock market compared to the other macroeconomic factors considered in the study.

Tripathi and Seth (2014) examined the causal linkages between stock market performance and specific macroeconomic indicators in India. Using monthly data from July 1997 to June 2011, they employed various analytical techniques, including factor analysis, ADF and PP unit root tests, regression, the ARCH model, Granger causality, and the Johansen Co-integration test. Additionally, Impulse Response analysis was used to study the stock market's reaction to shocks from the real economy. Their findings revealed a strong relationship between macroeconomic variables and stock market performance. Through factor analysis, they identified inflation, interest rates, and exchange rates as the three key determinants influencing stock market trends.

Ramanujam and Leela (2014) analyzed the effects of various macroeconomic factors, including GDP, currency exchange rates, and industrial production, on the stock market. Their findings revealed that GDP had a significantly positive impact on the capital market, while industrial production (IIP) and exchange rates had a significantly negative impact. Similarly, Aanchal (2017) investigated the relationship between GDP, inflation, exports, imports, and investments with the Indian stock market. The study found that inflation was negatively correlated with GDP, exports, and imports, while all other variables demonstrated a positive correlation with the stock market. Giri and Joshi (2017) explored the short- and long-term relationships between macroeconomic variables and the Indian stock market. Their findings indicated that inflation, currency exchange rates, and India's economic growth positively influenced the stock market, while oil prices had a negative impact. The Vector Error Correction Model further revealed a directional relationship between stock market growth and foreign direct investment in both the short and long term.

Misra (2018) examined the effects of macroeconomic factors such as industrial production (IIP), inflation, interest rates, gold prices, exchange rates, foreign institutional investments (FIIs), and money supply on the Indian stock market. The study identified strong long-term correlations between interest rates, IIP, inflation, gold, exchange rates, money supply, FIIs, and stock market performance.

Megaravalli and Sampagnaro (2018) investigated the relationship between macroeconomic factors and the stock markets of China, India, and Japan. Using the Johansen test, they established a long-term relationship between the stock markets in China and India and their respective inflation rates. The Granger causality test revealed a bidirectional causal relationship between the exchange rate and the Indian stock market. However, no correlation was found between Japanese stock market inflation and Indian stock prices. The study also observed a positive long-term relationship between the Indian stock market and exchange rates, as well as between the Chinese stock market and inflation. The most recent study, conducted by Chellaswamy et al. (2020), found that inflation significantly and positively affected India's stock market index, while the exchange rate was deemed insignificant.

3. Significance of the Study

The present study addresses this research gap by combining secondary data analysis with expert insights to provide a comprehensive understanding of the factors influencing the NIFTY 50 index. By incorporating both measurable economic

indicators and qualitative factors such as political stability and bilateral relations, this study offers a unique contribution to the existing body of literature. This review underscores the complexity of stock market movements and the necessity of an integrated approach to analyzing the interplay of macroeconomic variables, global trends, and subjective factors in influencing indices like the NIFTY 50.

4. Research Gap

In India, extensive research has been conducted on this topic over the past two decades, yet a clear consensus has not been reached. Each study differs in its choice of independent variables, data frequency, and methods of analysis. Monthly data is often preferred over quarterly data as it allows for a greater number of observations in the analysis. However, the use of GDP as an independent variable is limited by the availability of quarterly GDP figures in India, as monthly GDP data is not published.

Additionally, the calculation of the Wholesale Price Index (WPI) in India includes prices of gold, crude oil, and 695 other commodities. According to the author, including WPI, gold prices, and crude oil prices as separate independent variables may introduce multicollinearity among them. Therefore, the author recommends using only WPI as an independent variable and excluding gold and crude oil prices from the analysis to avoid multicollinearity issues. Finally, given the interconnectedness of global stock markets due to international investors, it is important to assess the impact of major global stock indices on India's stock market. The author suggests including the monthly price changes of the US market index, the Dow Jones Industrial Average, as an independent variable—an aspect that has not been explored in previous studies within the Indian context. Incorporating this new variable would address the research gap identified by Chellaswamy et al. (2020). Furthermore, by incorporating qualitative data obtained through questionnaires and interviews with domain experts, the study also addresses the gap highlighted by McConnell et al. (1986).

5. Research Methodology

This section outlines the methodology used to estimate the relationship between macroeconomic variables and stock market performance. It includes a discussion of the data sources, the selection of research variables, and the formulation of an empirical model to analyze the data.

After a comprehensive review of the literature, the author has selected key macroeconomic variables, including inflation, interest rates, money supply, and exchange rates, to explain the performance of the Indian stock market. Inflation is measured using the WPI index numbers, while interest rates and money supply are represented by the 365-day Government of India Treasury bills (GoI T-bills) and broad money (M3), respectively. The exchange rate is represented by the monthly percentage change in the US dollar (US\$) to Indian Rupee (INR). The NIFTY 50 index serves as a proximate measure of market performance. Pathania and Swami (2000) found a strong positive correlation (.984) between the NIFTY 50 index and the BSE Sensex, suggesting that using either index movement as a dependent variable is appropriate. In this study, the monthly percentage change in the NIFTY 50 index is used as the dependent variable.

Previous studies have predominantly focused on domestic macroeconomic factors. However, recognizing that global economic conditions influence the Indian market, the author introduces the monthly percentage change in the closing values of the US Market Index—the Dow Jones Industrial Average—as an additional independent variable, a factor not yet explored in the Indian context. This makes the study the first in India to integrate both domestic and global macroeconomic variables. The analysis covers nine years of financial data, spanning from **January 2015 to December 2023**. Monthly historical data on interest rates, inflation, broad money, and exchange rates are sourced from the Reserve Bank of India (RBI) website (DBIE, n.d.). The monthly percentage change data for the NIFTY 50 and the Dow Jones Industrial Average are obtained from Yahoo Finance (NIFTY 50 (^NSEI) Historical Data - Yahoo Finance, n.d.). Based on the identified research variables, the following regression equation is proposed:

$$\text{NIFTYPERFORMANCE } (0, 1) = \beta_0 + \beta_1 \text{ Inflation} + \beta_2 \text{ Dowjones} + \beta_3 \text{ Money Supply} \\ + \beta_4 \text{ Exchange Rate} + \beta_5 \text{ Interest Rate} + e \quad \text{Eq... 1}$$

The data analysis is conducted in two stages. In the first stage, secondary data is utilized. Regression analysis is employed to model the relationships between variables, assess the strength of their correlations, and make predictions based on the models. When the relationship between the variables is assumed to be linear, either simple linear regression or multiple linear regression is used (Davis, 2005). If the relationship is non-linear in the parameters, several non-linear techniques may be applied to improve the accuracy of the regression. In cases where the response variable can only take binary values (e.g., yes or no), logistic regression is employed. Logistic regression results in a function that illustrates how the relationship between the predictors and the likelihood of the event (yes or no) changes (Tabachnick & Fidell, 2001).

The objective of the present study is to develop a model that categorizes NIFTY 50 index performance into two groups—good or poor—using logistic regression. The distinction between good and poor performance is based on monthly returns, with a positive return considered good and a negative return considered poor. A set of macroeconomic indicators is used as independent variables to predict their impact on NIFTY performance. McConnell et al. (1986) demonstrated that qualitative data can provide additional insights to more accurately predict stock price movements. Therefore, in the second phase of the data analysis, primary data collected through questionnaires, surveys, and interviews is classified and transcribed. Matrix coding is then performed using qualitative analysis tools such as NVivo to identify patterns and understand the code structure.

6. Empirical Results

In this section, the author presents the findings from the estimation of the impact of macroeconomic variables on the performance of the NIFTY 50 index. The first step involves presenting descriptive statistics, tests for model appropriateness using the Omnibus Tests of Model Coefficients and the Hosmer & Lemeshow Test, regression coefficients, and subsequent model validation. The second step discusses the results from the analysis of the primary data.

5.1 Statistical Findings

Table 1 presents the descriptive statistics of the observed data, including the mean, median, minimum, and maximum values. The definitions of these terms are straightforward. The standard deviation values indicate that the monthly change in the NIFTY index is more volatile compared to the other variables.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Interest Rate	108	-.77	1.20	.1328	.48856	.239
Dow Jones	108	-3.40	1.14	-1.6451	.78746	.620
Inflation	108	-1.06	.39	-.2509	.37068	.137
Exchange Rate	108	-3.10	-1.41	-1.9923	.38722	.150
Money Supply	108	6.99	7.32	7.1547	.09946	.010

Source: SPSS Data Analysis

A logistic regression model was performed to determine whether interest rates, the Dow Jones Industrial Average index performance, inflation, exchange rates, and money supply predict the odds of NIFTY's performance. The results of the logistic regression analysis are presented in Table 2.

Table 2: Output of Logistic Regression

	B	S.E.	Wald	df	Sig.	Exp(B)
Interest Rate	-.074	.069	.367	1	.024	.9286
Dow Jones	.104	.092	1.278	1	.011	1.109
Inflation	.027	.277	.010	1	.922	1.028
Exchange Rate	4.392	6.786	3.378	1	.012	80.801
Money Supply	-.014	.000	.045	1	.832	.9860
Constant	.285	1.048	.074	1	.786	1.330
Nagelkerke R ²	.440					
<i>n</i>	108					
Classification Rate (%)	67.000					
Good Performance (%)	80.700					
Poor Performance (%)	48.800					
Hosmer and Lemeshow Test	0.731					

The result of the chi-square value from the Omnibus Test of Model Coefficients indicates that the overall goodness-of-fit test is highly significant, with a chi-square value of $\chi^2(5, n = 108) = 13.079, p < 0.05$. This suggests that the model is able to effectively distinguish between good and poor performance of the NIFTY 50 index. The set of independent variables explains 44% of the variance in NIFTY 50 performance (Nagelkerke R²), and the model correctly classifies 67% of the cases into two groups: good (80.7%) and poor (48.8%). Furthermore, the results from the Hosmer and Lemeshow test support the model's validity, with a chi-square value of 5.248 and a significance level of 0.731. Since

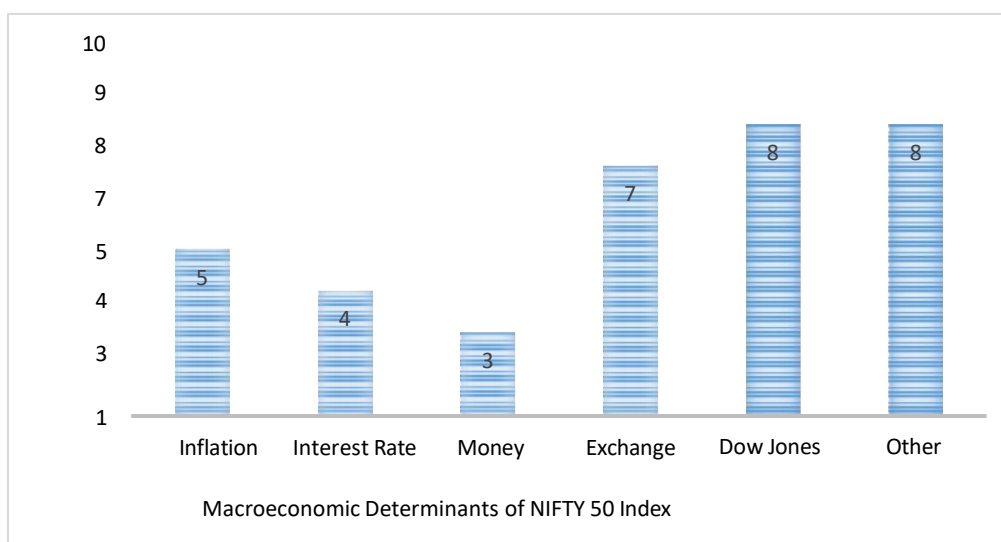
this value is greater than 0.05, it provides further support for the model's appropriateness.

6.1 Validation of Model

Split-group validation is employed to confirm the predictive ability of the model. The model is validated by randomly sampling instances in a 70/30 ratio. Given that the results are not statistically different between the two groups, it is reasonable to conclude that the original statistical findings are reliable and applicable.

6.2 Results of Multi-method research findings from experts

The responses from market investors and domain experts were collected following the analysis of the secondary data. A total of 10 respondents participated in the survey. Among them, 6 are from India, and 4 are from other countries (2 from the USA, 1 from Germany, and 1 from Australia). The respondents from outside India have Indian origins and are investors in the Indian capital market. Of the 10 respondents, 6 (4 outside India and 2 from India) provided their responses via email, while the remaining 4 Indian respondents (2 equity analysts and 2 academicians) were interviewed face-to-face. The average stock market investment experience of all respondents is 11 years. The responses from the experts are presented in the form of a line graph, as shown in Figure 1.



Most respondents agreed that exchange rates and the performance of the Dow Jones Industrial Average are key determinants of NIFTY returns, highlighting the strong synchronization of India's stock market with the global economy. According to the respondents, domestic factors such as inflation, money supply, and interest rates are managed by the government through appropriate policy measures, including adjustments in key interest rates like the CRR, SLR, Repo, and Reverse Repo rates. However, since international factors remain beyond India's control, NIFTY is more susceptible to global influences. Inflation remains a primary concern for the economy, though India has not consistently experienced high inflation. While the stock market reacts negatively to rising inflation, it tends to recover when inflation declines. An expert pointed out that although inflation can influence NIFTY, it does not have absolute control over it. Beyond quantitative factors, eight respondents emphasized the significance of diplomatic relations between major global powers—such as the U.S. and China, the U.S. and Russia, Russia and China, and the UK and China—along with domestic political stability, government transparency, and effective governance in shaping stock market performance. Although there is no established statistical method to measure the direct impact of political stability on stock market success, the author tested this relationship through observations. Notably, aside from periods of global crises like the pandemic, the NIFTY 50 index has consistently delivered positive returns over the past decade, during which India was governed by a single party with a parliamentary majority. In conclusion, the study suggests that considering both quantitative and qualitative factors—rather than focusing on a single determinant—can lead to more accurate market index predictions.

Interest rates have an inverse relationship with stock returns. A decline in interest rates reduces borrowing costs, encouraging businesses to take on more debt, which enhances profitability and boosts stock prices. This appreciation in stock prices is reflected in NIFTY's performance. Gjerde and Sættem (1999) also found a negative correlation between interest rates and stock prices. This implies that the stock market favors low interest rates while reacting negatively to high rates, reinforcing the long-term inverse relationship between interest rates and NIFTY 50. Inflation, on the other hand, has exhibited a positive correlation with NIFTY performance. These findings align with the studies of Maysami et al. (2004) and Ratanapakorn and Sharma (2007). As the Indian economy and capital markets evolve at a rapid pace, the

present study suggests that equities in India serve as a hedge against inflation. The Indian stock market perceives the country's rising inflation trends as a driver of economic growth, thereby benefiting NIFTY's performance. Similarly, an increase in money supply positively influences stock market performance. A higher money supply stimulates economic activity and boosts corporate profits, leading to higher stock prices. This finding is consistent with previous research by Mukherjee and Naka (1995) and Sohail and Hussain (2009).

The study also finds a positive association between exchange rates and NIFTY performance. Foreign institutional investors (FIIs) have significantly invested in Indian markets, benefiting from the long-term depreciation of the Indian rupee (INR). A depreciating domestic currency allows FIIs to capitalize on market growth and profit repatriation. Additionally, if export demand is elastic, currency depreciation boosts demand for Indian exports—particularly in commodities and IT services—thereby increasing cash flows within the country. The impact of exchange rates depends on whether a nation is export- or import-driven, and in India's case, the findings indicate a positive relationship between currency depreciation and stock market performance. This aligns with Mukherjee and Naka's (1995) conclusion that currency rates and stock returns are positively correlated. The United States, as the world's largest economy, exerts a significant influence on global stock markets. Any negative developments in U.S. markets tend to have a ripple effect on other economies, particularly India's. Globalization has led to integrating financial markets worldwide, creating an interconnected economic system. The 2008 financial crisis demonstrated how economic turmoil in one country can impact markets across the globe. Based on these observations, the study concludes that the NIFTY 50 and the Dow Jones Industrial Average exhibit a clear correlation, reflecting the interdependence of global financial markets.

7. Future Scope

Future research can build upon this study by incorporating a broader set of macroeconomic and geopolitical factors. Key areas for expansion include examining the role of political stability, economic conditions in major developed nations such as the USA, UK, and Japan, and the impact of India's bilateral relations with global economies. Additionally, researchers should explore the concept of reverse causality to assess how stock market movements influence macroeconomic policies. Addressing these aspects will contribute to more comprehensive insights and facilitate better policy development and investment decision-making.

8. Conclusion

This study highlights the relationship between macroeconomic factors and the performance of India's stock market indicator, NIFTY 50. The findings suggest a moderate predictive power of macroeconomic variables in determining NIFTY performance. Notably, the index exhibits a stronger correlation with global factors such as the Dow Jones Industrial Average and exchange rates. Additionally, qualitative analysis of primary data indicates that other variables may also influence NIFTY, though expert opinions slightly differ from the quantitative results. The study's conclusions hold significant implications, especially for emerging economies like India. The findings support the idea that investors can enhance portfolio performance and mitigate market volatility by incorporating the study's recommendations into their investment strategies. Despite its contributions, this study has certain limitations. First, the reliability of the findings depends on the accuracy of the secondary data used for analysis. Second, not all factors influencing NIFTY 50 performance have been considered due to data constraints. The exclusion of certain variables may impact the comprehensiveness of the results.

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