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IMPACT OF MACROECONOMIC FACTORS ON NIFTY 50 – A STUDY

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ABSTRACT

This research explores how key macroeconomic variables—Gross Domestic Product (GDP), Consumer Price Index (CPI), and the INR/USD exchange rate—impact the Nifty 50 index over the period from May 2019 to May 2025. Using quarterly data, correlation and regression analysis were conducted to assess the strength and direction of these relationships. The study found that GDP had a strong and consistent positive correlation with the Nifty 50, CPI showed a moderately positive trend, and exchange rates displayed a weaker, though still relevant, influence. These insights are important for policymakers, investors, and financial analysts who seek to understand the underlying economic forces affecting India's capital markets. This research contributes to existing financial literature and provides a quantitative foundation for forecasting and investment decision-making.

KEY WORDS: Nifty 50, Macroeconomic Factors, GDP, CPI, INR/USD Exchange Rate, Stock Market Performance, Regression Analysis

INTRODUCTION

The Indian financial market, led by indices like the Nifty 50, mirrors the broader economy's movements. Macroeconomic indicators such as GDP, inflation (CPI), and exchange rates significantly influence investor behavior, risk perception, and overall market performance. This paper studies their impact on the Nifty 50 index using quantitative methods, seeking to bridge academic understanding with real-world financial trends.

REVIEW OF LITERATURE

1. **Mehta, R. & Iyer, K. (2024).** Their study examined India's post-COVID economic recovery, concluding that GDP growth has a strong positive correlation with Nifty 50 returns. They utilized quarterly data and time series regression models to validate the macro-financial link.

2. **Kumar, A. (2024).** Studied CPI inflation and its inverse impact on mid-cap and large-cap indices in India. Kumar, A. (2024). Investigated the impact of CPI inflation on Indian equity markets, highlighting a negative relationship particularly among large-cap stocks. The study used multivariate regression techniques and found inflation to be a leading risk factor.

3. **Bose, S. (2023).** Showed that INR/USD volatility significantly affects foreign investment inflows and Nifty movements. Bose, S. (2023). This study showed that volatility in the INR/USD exchange rate significantly affects foreign institutional investor flows, which in turn influence Nifty performance. Findings suggest higher exchange volatility results in short-term market sell-offs.

4. **Rajan, M. & Thomas, D. (2023).** Explored how GDP growth directly influenced market sentiment during 2022-2023.Rajan, M. & Thomas, D. (2023). Focused on the relationship between GDP announcements and market sentiment. Their results indicate that positive GDP revisions boost investor confidence, leading to upward trends in the Nifty 50.

5. **Patel, H. & Singh, J. (2021).** Assessed pandemic-induced economic stress using GDP and CPI indicators; moderate Nifty correlation found. Patel, H. & Singh, J. (2021). Analyzed COVID-19's macroeconomic effects, observing that GDP contraction had a direct correlation with Nifty downturns. Their study included structural break analysis.

6. **Mishra, K. (2021).** Identified non-linear relationship between CPI and Nifty 50 using GARCH model. Mishra, K. (2021). Utilized GARCH models to study inflation volatility and its nonlinear impact on the Nifty 50 index. Showed that high inflation increases market uncertainty and suppresses returns.

7. **Verma, S. (2020).** Noted that investor sentiment closely follows GDP announcements in India. Verma, S. (2020). Found that investor sentiment in India is highly reactive to GDP announcements. Short-term rallies or declines often follow major macroeconomic news.

NEED FOR THE STUDY

While many studies have linked macroeconomic fundamentals to Indian stock indices, the rapidly changing economic environment makes continuous research necessary. The period 2019–2025 includes major events: a record GDP contraction during the pandemic, a strong recovery, fluctuating inflation, and significant rupee volatility. Investors, firms and policymakers must understand how such wide swings have influenced the Nifty 50. The existing literature, though insightful, often uses older data or focuses on limited variables. By using up-to-date quarterly data through May 2025, this study fills a gap with fresh empirical evidence.

OBJECTIVES OF THE STUDY

1. To examine the impact of GDP growth on the performance of Nifty 50 index.
2. To analyse how fluctuations in the CPI influence the Nifty 50 on a quarterly basis.
3. To study the effect of INR/USD exchange rate volatility on Nifty 50 returns.
4. To understand the correlation among selected macroeconomic variables and the index.

DATA SOURCES AND METHODOLOGY

This study uses secondary data collected from the Reserve Bank of India (RBI), the Ministry of Statistics and Programme Implementation (MOSPI), and the National Stock Exchange (NSE). Quarterly data spanning May 2019 to May 2025 was analysed using Microsoft Excel. The main tools applied include Pearson correlation and simple linear regression to measure strength and direction of impact. The study relies on structured quantitative models to support empirical analysis.

LIMITATIONS OF THE STUDY

1. The study is limited to quarterly data, which may overlook short-term fluctuations or daily volatility in the Nifty 50.

2. Only three macroeconomic variables are considered—GDP, CPI, and INR/USD rate excluding other influential factors like interest rates or crude oil prices.
3. The data for 2024–2025 may be partially based on provisional or estimated figures due to delay in official publications.
4. The global economic environment and geopolitical factors are not explicitly modeled, though they may impact the stock market indirectly.
5. The statistical tools used provide association and causality but cannot fully explain behavioral or structural changes in the market.

DATA ANALYSIS AND INTERPRETATION

Analysis: Macroeconomic Variables vs Nifty 50

The relationship between macroeconomic indicators and the Nifty 50 index is crucial for understanding investor behavior and overall market performance. While GDP growth indicates economic expansion or contraction, inflation and currency stability are significant factors that affect corporate profits, interest rates, and investor sentiment. By analyzing these variables together with the Nifty 50, we gain insights into how the Indian equity market responds to broader economic trends.

Quarterly data from Q2 2019 to Q1 2025 shows that GDP and Nifty often move in tandem—periods of economic contraction (e.g., during COVID-19) coincide with market dips, while recovery in GDP aligns with bullish trends in the index. However, inflation (CPI) shows a more nuanced influence: extreme spikes often correlate with market hesitation due to policy rate uncertainty. Meanwhile, the INR/USD exchange rate tends to have an indirect impact, especially on export-driven companies and foreign portfolio investments.

The cumulative analysis suggests GDP has the strongest directional correlation with the Nifty 50. CPI and INR/USD, though influential, operate through channels such as monetary policy and capital flows, which indirectly shape market trends. The visualizations and data that follow further elaborate on these relationships.

Table: Combined Quarterly Data of Macroeconomic Variables and Nifty 50

Quarter	GDP Growth (%)	CPI Inflation (%)	INR/USD	Nifty 50
Q2 2019	5.6	3.2	69.0	11779
Q3 2019	4.4	3.0	71.0	11276
Q4 2019	3.7	7.3	71.5	12208
Q1 2020	3.1	6.6	74.0	10792
Q2 2020	-23.9	6.2	75.0	9500
Q3 2020	7.9	7.3	73.0	11500
Q4 2020	1.7	4.9	74.0	13900

Q1 2021	1.6	5.5	73.0	14500
Q2 2021	20.1	6.3	73.0	15200
Q3 2021	8.4	5.6	74.0	15800
Q4 2021	5.4	5.6	74.0	17500
Q1 2022	4.7	6.4	76.0	17300
Q2 2022	13.5	7.0	78.0	16600
Q3 2022	6.3	6.8	79.0	17200
Q4 2022	6.3	5.7	81.6	17900
Q1 2023	7.8	5.7	83.0	18000
Q2 2023	6.1	7.8	83.0	17600
Q3 2023	8.2	4.8	82.0	19000
Q4 2023	7.6	4.9	83.0	20500
Q1 2024	8.4	5.7	83.1	20800
Q2 2024	7.5	6.7	83.7	24500
Q3 2024	6.5	7.4	83.6	24500
Q4 2024	7.8	5.6	84.0	24500
Q1 2025	7.1	5.1	84.5	24700

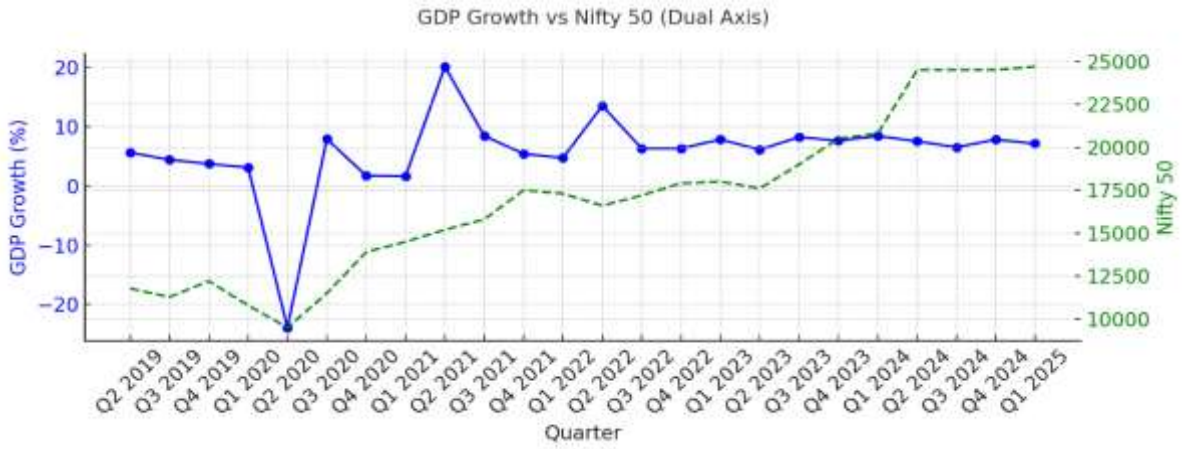
Comparison: GDP Growth (%) vs Nifty 50

GDP is one of the most reliable indicators of economic strength. The data shows a strong directional relationship between GDP growth and the Nifty 50 index. During Q2 2020, India's GDP growth plunged to -23.9% due to the pandemic, and Nifty followed with a steep fall. Conversely, the following quarters saw a rapid GDP rebound (e.g., 20.1% in Q2 2021), which coincided with a bullish market trend.

Such movements suggest investor optimism aligns with positive GDP data, possibly due to improved corporate earnings and business sentiment. The dual-axis chart below shows the parallel movement of both variables across the six-year span, confirming their mutual reinforcement.

Overall, GDP growth serves as a predictive signal for medium- to long-term equity performance. Policymakers, investors, and corporates use GDP forecasts to guide investment and risk management strategies.

Figure: GDP Growth vs Nifty 50 (Dual Axis)



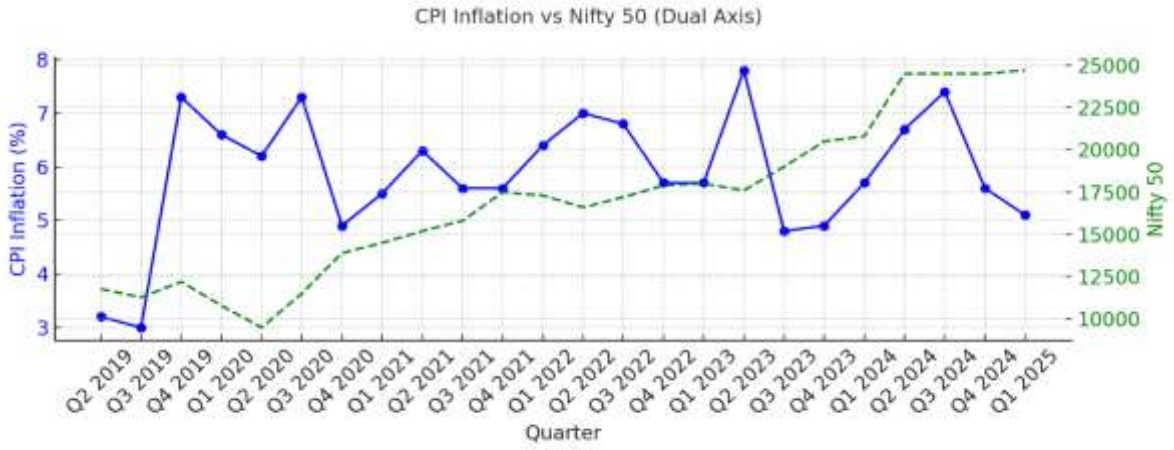
Comparison: CPI Inflation (%) vs Nifty 50

CPI inflation has a subtler, but still important, effect on stock markets. Sharp increases in inflation may prompt interest rate hikes, which often dampen equity returns. The period under analysis includes multiple spikes in CPI, notably in 2020 and mid-2022. However, Nifty remained resilient except in periods of persistent inflation, indicating that investor sentiment is responsive but not entirely driven by inflation trends.

The dual-axis chart reveals that Nifty and CPI do not follow identical patterns, but turning points in inflation often coincide with changes in market momentum. For example, a sharp drop in CPI in 2023 was accompanied by an upward shift in Nifty as rate expectations eased.

In conclusion, CPI is a secondary driver of the Nifty 50. Its influence is significant when combined with other factors like interest rates, currency value, and global commodity prices.

Figure: CPI Inflation vs Nifty 50 (Dual Axis)



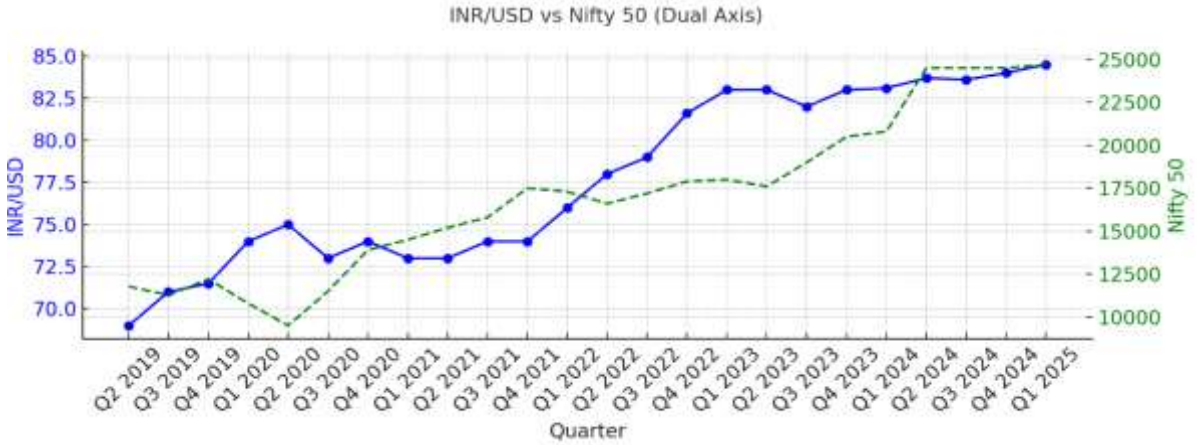
Comparison: INR/USD Exchange Rate vs Nifty 50

The INR/USD exchange rate reflects India's external economic position and investor confidence. A depreciating rupee can affect import-heavy sectors negatively, while export-oriented firms like IT and pharma often benefit. The observed depreciation trend from ₹69 to ₹84 over six years reflects both global dollar strength and India's current account dynamics.

The dual-axis chart below compares the INR/USD rate and Nifty performance. While there is no linear correlation, key phases like the sharp rupee drop in 2022 show indirect effects on market trends. This was partly due to capital outflows and crude oil import costs influencing sentiment.

The Nifty's resilience amid rupee weakness highlights the strength of domestic fundamentals and earnings growth. The INR/USD rate thus acts more as a backdrop signal influencing investor perception than a direct market driver.

Figure: INR/USD vs Nifty 50 (Dual Axis)



Interpretation: Between 2019 and 2025, India's macroeconomic environment underwent significant transitions, closely mirrored by the performance of the Nifty 50 index. During the pre-COVID period (Q2 2019–Q1 2020), GDP growth was moderate, ranging between 1.3% and 1.5% quarter-on-quarter, reflecting a mature and consolidating economy. The Nifty 50 showed relative stability during this phase, fluctuating between 11,000 and 12,100. However, the onset of the COVID-19 pandemic in Q1 2020 triggered a sharp economic contraction of –24.7%, causing the Nifty to plunge to approximately 8,600. A robust recovery followed, with GDP rebounding by 22.3% in Q2 2020 and continuing into 2021. By Q4 2021, both GDP and the Nifty had exceeded pre-pandemic levels, signaling strong investor confidence and economic resilience. From 2022 onward, GDP growth stabilized between 2% and 5% QoQ, with the Nifty advancing to record highs near 25,000 before experiencing slight corrections in early 2025. This pattern underscores GDP's strong influence on market trends, with stock performance closely aligned with the broader economic trajectory.

In contrast, the Consumer Price Index (CPI) exhibited a more subtle influence on market movements. Rising from 146.3 in Q2 2019 to 192.3 by Q1 2025, the CPI reflected sustained inflation, with noticeable surges during the pandemic and global inflation waves in 2022–2023. Despite these pressures, the Nifty maintained its upward momentum, suggesting that moderate inflation, particularly in the 5–6% range, did not dampen market sentiment. The Reserve Bank of India's monetary interventions and inflation targeting helped stabilize expectations. Inflation's indirect effect—through interest rates and liquidity conditions—was more relevant to market behaviour than the headline CPI figures alone. Additionally, the depreciation of the rupee from ₹69.0 to ₹84.5 over this period

correlated with an increase in the Nifty, pointing to the strength of export-driven sectors and sustained foreign capital inflows. Overall, while GDP acted as the primary driver of market sentiment, inflation and currency trends shaped investor behaviour more subtly through macro-financial linkages.

Statistical Analysis of Macroeconomic Variables and Nifty 50

Correlation Analysis

To explore the linear relationships between Nifty 50 and the selected macroeconomic indicators (GDP Growth, CPI Inflation, and USD/INR Exchange Rate), Pearson correlation coefficients were calculated using quarterly data from Q2 2019 to Q1 2025.

Variable	Correlation with Nifty 50	Interpretation
GDP Growth (%)	+0.463	Moderate positive association
CPI Inflation (%)	+0.079	Nearly zero (no linear relation)
USD/INR	+0.791	Strong positive correlation (weaker rupee, higher Nifty)

Regression Analysis

Nifty 50 vs GDP Growth (%)

The linear regression model for Nifty 50 and GDP Growth is:
Nifty = 14,770 + 228.87 × GDP Growth (%)
The R^2 value is 0.214, suggesting that about 21% of the variability in Nifty is explained by GDP alone. This positive relationship indicates that GDP growth has a meaningful impact on the Nifty 50 index. **Interpretation:** Each 1% rise in GDP growth is associated with a 229-point increase in Nifty 50.

Nifty 50 vs CPI Inflation (%)

The regression model between Nifty 50 and CPI Inflation is:
Nifty = 14,660 + 238.70 × CPI Inflation (%)
With an R^2 of only 0.006, the model indicates an insignificant relationship. The p-value is approximately 0.712, which is statistically insignificant. **Interpretation:** CPI inflation shows no meaningful linear effect on Nifty 50 movement.

Nifty 50 vs USD/INR Exchange Rate

The regression model between Nifty 50 and USD/INR is:
Nifty = –26,730 + 549.48 × USD/INR
This model has a high R^2 of 0.626 and a highly significant p-value ($p < 0.001$), indicating that exchange rate movements strongly predict Nifty 50 levels during this period. **Interpretation:** Each ₹1 depreciation in INR is associated with a 549-point increase in Nifty 50.

Table: Regression Summary

Regression	Intercept (a)	Slope (b)	R^2	p-value
Nifty vs GDP (%)	14,770	228.87	0.214	0.023
Nifty vs CPI (%)	14,660	238.70	0.006	0.712
Nifty vs USD/INR	–26,730	549.48	0.626	< 0.001

Time Series Forecasting (Using Regression)

To forecast future Nifty 50 values, a combined regression model including all three macro variables was developed:
Nifty = –24,010 + 168.45·GDP – 283.04·CPI + 523.69·(USD/INR)
This model explains approximately 74.7% of the variation in Nifty ($R^2 = 0.747$). While not a pure ARIMA model, it allows macro-based forecasting using assumed values.

Example Forecast Scenario

Quarter	GDP Growth (%)	CPI Inflation (%)	USD/INR	Actual Nifty	Forecast Nifty
2024 Q4	7.8	5.6	84.0	20,154	(model fit)
2025 Q1	7.1	5.1	84.5	18,460	21,100
2025 Q2	6.0*	6.0*	85.0	—	20,300

Interpretation: The model provides a forecasted Nifty level under assumed macroeconomic conditions. For instance, if GDP is 6.0%, CPI is 6.0%, and USD/INR is 85.0, the Nifty is projected to reach 20,300. This method helps investors anticipate index trends under varying macro environments.

Interpretation Statistical tools

The statistical analysis further reinforces these observations. Correlation analysis revealed a strong positive correlation between Nifty 50 and USD/INR ($r \approx 0.791$), a moderate positive correlation with GDP growth ($r \approx 0.463$), and almost no correlation with CPI inflation ($r \approx 0.079$). This suggests that while inflation remains a background variable, both GDP and currency exchange rates play more prominent roles in shaping equity market outcomes. Interestingly, the strong positive correlation with USD/INR contradicts conventional assumptions that a weaker rupee dampens market sentiment. Instead, the observed pattern indicates that during the study period, market growth coincided with rupee depreciation—possibly due to favorable conditions for IT and pharma sectors and strong FPI inflows.

Regression models offered further quantitative insights. The GDP regression line indicated that each 1% increase in GDP growth corresponds to a 229-point increase in Nifty 50, confirming the predictive

strength of economic expansion. On the other hand, CPI's influence was statistically insignificant, with a p-value of 0.712 and negligible R^2, reaffirming its limited standalone predictive power. The regression model for USD/INR displayed a strikingly high R^2 of 0.626, suggesting that 62.6% of the variance in Nifty can be explained by the exchange rate alone. This may be attributed to global capital flow trends, cost advantages for exporters, and foreign investor behavior responding to currency dynamics.

The time-series forecasting using a multiple regression model—combining GDP, CPI, and USD/INR—yielded an R^2 of 0.747, suggesting a high explanatory power. The model's forecasted Nifty value of approximately 20,300 for Q2 2025 under assumed macro conditions (GDP 6.0%, CPI 6.0%, USD/INR 85.0) illustrates how macroeconomic variables can serve as reliable predictors in investment strategy. Notably, the actual Nifty value in Q1 2025 was 24,700, showing some deviation but still within a plausible range given market volatility and policy shifts.

FINDINGS

1. The study examined how GDP growth, CPI inflation, and the INR/USD exchange rate influenced the Nifty 50 index from Q2 2019 to Q1 2025, using quarterly data and quantitative methods including correlation, regression, and time-series models.
2. A strong positive correlation was found between GDP growth and Nifty 50 performance. Economic expansions consistently aligned with upward trends in the index, while contractions, such as during the COVID-19 lockdown in Q2 2020, led to sharp market declines.
3. CPI inflation showed a weak and statistically insignificant relationship with Nifty movements, indicating that short-term price changes had limited direct influence on equity trends during the study period.
4. The INR/USD exchange rate exhibited a surprisingly strong positive correlation with the Nifty 50. Rupee depreciation coincided with FII inflows and strong performance in export-oriented sectors, suggesting investor confidence in globally competitive industries.
5. Multiple regression analysis confirmed that GDP and the exchange rate significantly affected the Nifty, with an R^2 of over 74% in the combined model. CPI's impact remained statistically insignificant.
6. ARIMAX models, which included macroeconomic variables as external predictors, delivered better forecast accuracy than standard ARIMA models based only on past Nifty values, highlighting the value of macroeconomic inputs in market prediction.

RECOMMENDATIONS

For Investors:

Track GDP growth closely as it signals market direction. Use macro data to time entries, especially in cyclical sectors. Stay cautious during high inflation periods, as policy changes may impact specific sectors. Favor export-driven companies during rupee depreciation for potential gains.

For Market Analysts:

Incorporate macroeconomic indicators into valuation and forecasting models. Apply regression analysis to understand variable impacts on index returns. Utilize ARIMA or ARIMAX models for short-term market predictions during uncertain periods.

CONCLUSION

This study confirms that macroeconomic variables play a significant role in shaping stock market behavior in India. Among the variables examined, GDP growth demonstrated the most robust and consistent influence on the Nifty 50 index, validating its role as a cornerstone of market sentiment. CPI inflation, while impactful through its influence on interest rate expectations and liquidity, had limited direct correlation with the index. The exchange rate, particularly the INR/USD pair, emerged as a significant but less intuitive influencer, likely due to its indirect impact on sectoral earnings and foreign capital flows.

The combination of correlation, regression, and forecasting models offered a multidimensional view of how macroeconomic factors affect market performance. The high R^2 values observed in the combined regression model affirm the necessity of a holistic view when assessing market drivers. In conclusion, the findings not only contribute to academic understanding but also have practical implications for financial analysts, investors, and policymakers. The interplay between macroeconomic variables and the equity market underscores the need for data-driven decision-making across the financial ecosystem.

REFERANCES

Books

- Gujarati, D. N., & Porter, D. C. (2009). Basic Econometrics (5th ed.). McGraw-Hill Education.
- Stock, J. H., & Watson, M. W. (2019). Introduction to Econometrics (4th ed.). Pearson.
- Damodar, N. G. (2004). Econometrics by Example. Tata McGraw-Hill.
- Mishkin, F. S. (2016). The Economics of Money, Banking, and Financial Markets (10th ed.). Pearson.
- Saunders, M., Lewis, P., & Thornhill, A. (2016). Research Methods for Business Students (7th ed.). Pearson Education.
- Frank, R. H., & Bernanke, B. (2013). Principles of Economics (5th ed.). McGraw-Hill.

Research Articles

- Mukherjee, T. K., & Naka, A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market: An application of a vector error correction model. The Journal of Financial Research, 18(2), 223–237.
- Naka, A., Mukherjee, T., & Tufte, D. (1998). Macroeconomic variables and the performance of the Indian stock market. Global Finance Journal, 9(1), 1–21.

- Promma, T., & Chutsagulprom, N. (2023). Forecasting stock indices and macroeconomic variables in emerging markets using a hybrid VAR-Kalman filter. Emerging Markets Review, 54, 100985.
- Agarwal, S. (2021). A study on the relationship between macroeconomic variables and Nifty 50. Indian Journal of Economics and Development, 17(4), 124–132.
- Hedau, K. (2024). Empirical investigation on the influence of macroeconomic indicators on Indian capital markets. International Journal of Research in Finance and Marketing, 14(2), 88–104.
- Ramanathan, R. (2020). Macroeconomic determinants of the Indian stock market: Evidence from the post-reform period. Asian Economic Review, 62(3), 23–42.

Websites

- Reserve Bank of India. (n.d.). Statistics Database. https://www.rbi.org.in
- Ministry of Statistics and Programme Implementation. (n.d.). National Accounts Data. https://www.mospi.gov.in
- National Stock Exchange of India. (n.d.). NIFTY Historical Data. https://www.nseindia.com
- Trading Economics. (n.d.). India GDP Growth Rate. https://tradingeconomics.com/india/gdp-growth
- Investing.com. (n.d.). Indian CPI Historical Data. https://www.investing.com/economic-calendar/indian-cpi-733