



MACROECONOMIC INDICATORS AND NIFTY PERFORMANCE: AN ANALYSIS OF CYCLICAL MARKET EFFECTS

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Abstract

In this study, the authors have studied relationship between selected macroeconomic indicators and performance of NIFTY 50 stock index, focusing on the cyclical market aspects during the period from 2016-17 to 2020-21. The study examines how the NIFTY has been affected by inflation, interest rate, exchange rate, industrial production index and crude oil prices, by using the secondary data gathered from trustworthy sources of the economic and financial information. The use of descriptive and analytical methods enables the user to use the trend-relation-variation theory to identify trends, associations and variations throughout the market cycle. The results suggest that macroeconomic conditions positively affect stock-market performance on first sight, but there are different degrees to this affectation. The economies shrink, and NIFTY recovery for a decade, intertwined from the business of 2020-21, clearly demonstrates the pro-activity of equity markets. The study finds that NIFTY movements are a result of the synergistic effect of macro-economic conditions, monetary policy, investor's expectations, and market sentiment.

Keywords: Macroeconomic Indicators, NIFTY 50, Stock Market Performance, Inflation, Interest Rate, Exchange Rate, Industrial Production, Crude Oil Prices, Cyclical Effects.

1. Introduction

The stock market plays a vital role in a modern financial system to help with the process of capital formation, investment and wealth creation. Firm-specific conditions are not the only ones that affect stock market performance, other macroeconomic conditions also play a role. A number of variables like inflation, interest rates, exchange rates, industrial production, money supply, crude oil prices and foreign institutional investment (FII) affect the profitability of the businesses, investor expectations, liquidity and cost of capital. Hence, stock market prices and returns could be influenced by changes in macroeconomic factors. Thus, economic activity and stock prices have continued to be central empirical topics in financial economics.

The theoretical tie between macro and stock prices also receives assistance from the belief that stock prices include expectations for expected economic activity and/or earnings of the firm. Stock prices may signal changes in fundamental economic conditions, as suggested by an important relationship between stock returns and real economic activity from Fama (1981) and between the rate of return in stock prices and the inflation rate and money supply. Likewise, Chen et al. (1986) showed how systematic economic forces account for stock return variations and consequently helped lay the groundwork for studying the macroeconomic determinants of equity markets.

The relationship has significance as in the Indian context, the National Stock Exchange's NIFTY 50 is a broad indicator of large-cap stocks from the Indian markets. NIFTY can be influenced by the several mechanisms of economic fluctuations. Increased interest rates could make borrowing more expensive which could lower the attractiveness of investments, while an increase in inflation could affect the cost of producing investments, consumption and real returns. The impact could be felt by companies having a significant exposure in the imports or exports segment and also by the crude oil prices key component in the Indian affairs which greatly relies on imported energy sources. Additional market



fluctuations may occur due to fluctuations in foreign institutional investment, in response to movements in international capital flows.

The present study attempts to study the cyclical impact of macro-economic indicators on the performance of NIFTY. The cyclical approach allows relating the macroeconomic variables to the relationship as more of a rolling association rather than just a static one; the dynamic nature of the relationship admits that the effects of the macroeconomic variables can differ depending on the period or phase of the economic and financial cycle. It is also important to note that the analysis includes only a few years in the timeframe around 2016–17 to 2020–21 to capture a relatively different economic and market environment towards the end of this period, which includes significant economic and financial shocks like pandemic, or refer to the index without the pandemic. Taking this timeframe as a basis, a useful theme for examining the NIFTY is to see how it changes with the fluctuation in macroeconomic figures and whether the selected indicators showed a synchronicity or synchronization when compared to market performance.

2. Literature Review

In the international literature the link between any macroeconomic variables and stock markets has been much explored. Fama (1981) made several important observations of linkage between stock returns and inflation, as well as money supply and real economic activity that make macroeconomics important in understanding the stock market. Not long afterward, Chen, et al., (1986) showed that economic factors are significant contributors of systematic risk in equity returns. In applying the vector error-correction model, Mukherjee and Naka (1995) discovered that the price of the Japanese stock market was cointegrated with several macroeconomic variables and that long-term behavioral relationships among the stock price and economic fundamentals had been found.

The relevance of macroeconomic variables reported by the Indian studies suggests that the relation is positive but the direction and magnitude of relations differ based on the choice of variables, time period and methodology. To study the Indian stock market performance, Tripathi and Seth (2014) utilized monthly data sets and applied various methods such as correlation, regression, ARCH, Granger causality and Johansen cointegration methods. Their results showed that there were significant relationships between the stock-market indicators and some of the macro-economic factors emphasizing the dynamics of these relationships.

In specific, the study of the Indian stock market was conducted by Sultana and Reddy (2017) where the subjects related to the exchange rates and crude oil prices, industrial production, foreign institutional investment, reserve requirement, interest rate, and inflation were analyzed. They found the significant relation among some MACRO-ECONOMIC variables with NIFTY whereas from Granger-causality result they found that some monetary and investment variables can cause NIFTY.

Gautam et al. (2019) studied the returns of NIFTY 50 as an index vis-à-vis CPI, IIP, exchange rates and foreign exchange reserves for a period of eighteen years. The results found by them confirmed the substantial macroeconomic impacts and lifted causal relationship between NIFTY and economic variables. Based on monthly time-series data of India from 1994 to 2018, Gopinathan and Raja Sethu Durai (2019) analyzed the LT characteristics of relationships among the stock market and the macroeconomic variables, which also confirms the value of examining LT relationships as well as short-term movements.



Yadav et al. (2022) studied the relationship of Indian stock market and foreign reserves, exchange rates and consumer prices for period 2001-2021 was attempted with the help of cointegration and VECM method. It is their study which uniquely shows that the stock market– macroeconomic relationship can be analyzed via a dynamic econometric model and not necessarily through the lens of conventional correlation analysis. Likewise, Kuntamalla and Maguluri (2022) examined short and long-run causal relationship with the ARDL framework in the context of NIFTY 200 with a set of variables like inflation, money supply, interest rate, exchange rate and foreign institutional investments.

While extensive studies have documented macroeconomic relationships with Indian stock markets, less research has focused on the cyclical behaviour of stock markets in a period of time that is both specific and economically diversified, such as a recession. To bridge this gap, the present study tries to understand the relationship among selected macroeconomic variables and NIFTY's performance from 2016-17 to 2020-21, focussing the changes in market or economic conditions.

3.1 Objectives:

The study will explore the association between the selected macroeconomic parameters and performance of NIFTY, analyse the cyclical behaviour of NIFTY in the study period, examine the impact of the selected macro-economic parameters on NIFTY and whether macroeconomic fluctuations have any significant role in explaining the variations in performance of the stock market.

3.2 Methodology

The type of study used is descriptive and analytical with secondary data. The data for the NSE NIFTY 50 and other macroeconomic indicators like inflation, interest rate, exchange rate, industrial production, crude oil price and money supply will be obtained from the reliable source like NSE, RBI, MOSPI and other official sources from 2016-17 till 2020-21 annually and monthly. NIFTY's performance is going to be evaluated with the help of index movements and returns, descriptive statistic of NIFTY indices, correlation and regression analysis will be used to analyse relationship and impact of macroeconomic indicators on NIFTY. A periodic analysis of the market will be performed to detect market performance variations during the different economic phases using trend and cyclical analysis. The relationships will be assessed by relevant statistical tests and tested the formulated hypotheses.

4. Result and Analysis

The study examines relationship between performance of NIFTY and the selected macroeconomic indicators for the period 2016-17 to 2020-21. The indicators taken into consideration are Consumer Price Index (CPI) inflation, policy repo rate, price of crude oil, exchange rate and Index of Industrial Production (IIP) growth. The NIFTY Annual return is the basic gauge of the performance of the stock market. This is an important time frame as it spans through the relatively calm markets of the recent period, the economic downturn and the unprecedented market uncertainty of COVID-19. Data from the RBI shows real GDP growth falling from 4.0% in 2019-20 to – 8.0% in 2020-21, and similar trends are seen in the case of IIP, which dropped from – 0.8% to – 8.6% in the same period.

Table 1: NIFTY Performance and Selected Macroeconomic Indicators, 2016□17 to 2020□21

Financial Year	NIFTY Annual Return (%)	CPI Inflation (%)	Repo Rate (%)	Exchange Rate (₹/US\$)	IIP Growth (%)	Crude Oil Price (US\$/barrel)
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2016–17	16.88	4.5	6.25	67.1	5.2	52.5
2017–18	10.25	3.6	6.00	64.5	4.6	61.5
2018–19	15.01	3.4	6.25	69.9	3.8	69.9
2019–20	–26.03	4.8	4.40	74.9	–0.8	60.5
2020–21	70.87	6.2	4.00	73.5	–8.6	44.8

Source: RBI reports annual CPI inflation and IIP growth and document the macroeconomic deterioration during 2019–20 and 2020–21.

Table 1 shows indeed a high degree of cyclical along this period. NIFTY recorded a positive return of 16.88% in 2016–17, followed by 10.25% in 2017–18 and 15.01% in 2018–19. The market then dropped sharply by 26.03% during 2019–20, due to poor economic conditions and increased uncertainty. On the upside, however, the NIFTY index had gained the exceptional return of 70.87% in 2020–21 even as the real economic activity was highly negatively correlated.

The movement shows that the market does not always behave in a linear fashion in relation to the current growth in the economy. This robust recovery of NIFTY in the year 2020–21 was concurrent with a significant pullback of GDP and IIP. This is indicative of not only economic conditions but also of their anticipation of economic recovery and rump's policy of monetary accommodation, liquidity, and corporate earnings recovery.

Table 2: CPI Inflation and NIFTY Performance

Financial Year	CPI Inflation (%)	NIFTY Return (%)
2016–17	4.5	16.88
2017–18	3.6	10.25
2018–19	3.4	15.01
2019–20	4.8	–26.03
2020–21	6.2	70.87

RBI data report average CPI inflation of 4.5% in 2016–17, 3.6% in 2017–18, 3.4% in 2018–19, 4.8% in 2019–20 and 6.2% in 2020–21.

Inflation varied from one to one relationship and that of NIFTY was not uniform. The same year following 2016–17, NIFTY was logging positive figures along with the falling inflation rate till 2018–19. NIFTY was down and inflation on the rise to 4.8% in 2019–20. But in 2020–21 inflation was seen to be 6.2% and NIFTY had gone significantly up. In fact, the pattern shows that the effect of inflation is not sufficient to account for the changes in NIFTY during the study period. It seems to depend on some other economic or financial factors.

Table 3: Repo Rate and NIFTY Performance

Financial Year	Repo Rate (%)	NIFTY Return (%)
2016–17	6.25	16.88
2017–18	6.00	10.25
2018–19	6.25	15.01
2019–20	4.40	–26.03
2020–21	4.00	70.87

The repo rate declined considerably from 6.25% in 2018– 19 to 4.40% in 2019– 20 and 4.00% in 2020– 21. The ease of the monetary policy is reflected from the RBI numbers as well; during this period of the pandemic, monetary policy stance was □ac accommodative.□

This reflects the rallies of NIFTY in 2020-21 when the interest rates were down. Decreasing policy rates can lessen the cost of capital, make borrowing relatively cheap to equities and attract more liquidity. The performance in 2019– 20, however, shows a drop in NIFTY even though interest rates dropped during the year, it suggests that interest rates were not the only factors influencing the market. The year was one of "extraordinary uncertainty" and weakening economic conditions, it seems, seemed to have been pouring into market sentiment during the period.

Table 4: Exchange Rate and NIFTY Performance

Financial Year	Exchange Rate (₹/US\$)	NIFTY Return (%)
2016–17	67.1	16.88
2017–18	64.5	10.25
2018–19	69.9	15.01
2019–20	74.9	–26.03
2020–21	73.5	70.87

The rupee appreciated from around ₹64.5/US dollar in 2017–18 to ₹74.9/US dollar in 2019–20 and shows a significant negative performance for NIFTY in 2019–20. NIFTY bounced back well during the period but the exchange rate declined from around ₹72.40 per \$1 of the previous year to about ₹73.50 per \$1 of the current year in 2020-21. The exchange-rate data is an important part of India's external-sector indicators and is available in the RBI publications.

The pattern in this exchange-rate chart indicates that during times of economic uncertainty, currency depreciation might follow bad stock-market conditions. The rate of cross-border trade, however, does not bear out a direct proportionality as export-intensive firms could gain from a weak rupee while import intensive ones may experience higher operational costs.

Table 5: IIP Growth and NIFTY Performance

Financial Year	IIP Growth (%)	NIFTY Return (%)
2016– 17	5.2	16.88
2017– 18	4.6	10.25
2018– 19	3.8	15.01
2019– 20	– 0.8	– 26.03
2020– 21	– 8.6	70.87

In fact, the trend for IIP is decreasing and it is less than 5.2% growth in 2016 and 17, and now it is less 0.8% in 2019-20 and more sharp contraction as -8.6% in 2020-21. The RBI's Annual Report validates the contraction of the IIP as well as the significant decrease in economic activity in real terms in 2020– 21.

Contrary, NIFTY had negative performance in 2020-21. The NIFTY rose by nearly 70.87% as opposed to the IIP which fell by 8.6%. This divergence is an important conclusion of the study and a measure of the decline of the difference between real-sector cycles and the expectations in the



financial markets. Price of equity shares may be forward-looking, and may react to anticipated recovery, not just to current production figures.

Table 6: Correlation between NIFTY Returns and Selected Macroeconomic Indicators

Variable	Correlation with NIFTY Return (r)	Direction
CPI Inflation	+0.561	Moderate Positive
Repo Rate	– 0.253	Weak Negative
Exchange Rate	+0.026	Negligible
IIP Growth	– 0.586	Moderate Negative
Crude Oil Price	– 0.654	Moderate Negative

The correlation analysis reveals that CPI inflation rates moderate positively associated with NIFTY returns with $r = 0.561$ while the repo rate has moderate negatively association with the NIFTY return with $r = -0.253$. Communication coefficients are very close to zero between exchange rate and NIFTY return ($r = 0.026$) which has virtually no linear relevance. It is observed that the growth of IIP has a moderate negative correlational relationship ($r = -0.586$) and crude oil price has the highest negative correlation with other variables ($r = -0.654$).

The interpretation of the coefficients should be descriptive, however, due to the limited number of annual observations in the analysis there is no evidence of a statistically significant relationship. A correlation/ regression based on five observations is not able to make sound statistical inferences. The best way for an empirical paper to be published would be to use 60 monthly observations from April 2016 to March 2021 and apply correlation, multiple regression analysis and stationarity tests as well as ARDL/VECM and/or Granger-causality tests if it is available.

Overall Interpretation

Based on the analysis, the periods can be identified as three different stages. Period 1 (2016-17 to 2018-19) witnessed a favourable trend in NIFTY with mild macro-economic factors. During the second phase (2019-20), industrial activity weakened, the rupee has shed ground and the NIFTY has lost considerably. GDP fell by 8.0 per cent, the IIP by 8.6 per cent and the NIFTY by around 70.87 in the third phase (2020-21), the performance was reminiscent of a triathlon. The third phase (2020-21) saw a tremendous variation in performance between the real economy and the stock market as GDP plummeted by 8.0 per cent and the IIP by 8.6 per cent, while the NIFTY gained around 70.87 per cent. Similarly, RBI data confirmed now that 2020– 21 was an extraordinary macro-economic contraction.

The pattern suggests that macroeconomic conditions and the performance of the stock market are not only nonlinear but cyclical as well. The stock market seems to embody expectations, liquidity conditions and economic prospects into futures more than just correlated with current macro-economic trends. Hence, it is necessary to take into account the effect of individual macroeconomic indicators as part of a whole and not individually.

5.1 Conclusion

The researchers find that the behavior of NIFTY is affected by macroeconomic conditions, but this effect varies depending on the position in the business cycle. NIFTY showed positive performance in 2016-17 through 2018-19 in relatively benign economic environments while 2019-20 was characterized by a significant market falloff and a lagging industrial performance and the lack of economic confidence. Indeed, the recovery seen in NIFTY in 2020-21 even as GDP and IIP



contracted $\square$ reveals that stock markets are foresighted and not just reacting to the current macro-economic conditions, but to expectations of recovery, monetary accommodation, liquidity and sentiment of investors. Thus, the results suggest that NIFTY movements cannot be solely explained with any single indicator and the joint interactions between the variables of inflation, interest rate, exchange rate, industrial activity and other economic variables and financial factors determine the cyclical behaviour of stocks keeping. Therefore the conclusion is that the interactions among inflation, interest rate, exchange rate, industrial activity and other economic and financial variables explain cyclical stock-market behaviour, not any single variable.

5.2 Recommendations

Using approaches to different macro-economic signs is best so that one can evaluate NIFTY differentials correctly and investors need a comprehensive approach. Fundamental shifts in the inflation, monetary policy, currency and prices of crude oil and industrial goods should be fed into the investment and risk-management process. Policymakers must be aware of the spillover impacts that macroeconomic shifts have on the financial markets, and keep the right policies in place to provide stability to markets in times of turmoil. When interpreting macroeconomic signals, it is important to take into account market expectations, market liquidity and macroeconomic developments worldwide by financial analysts and institutional investors. For future studies, higher frequency monthly/quarterly data as well as more powerful econometric tools are suggested to investigate the short-term, long-term, and cyclical relationship between them.

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