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EVALUATING THE EFFECT OF MACROECONOMIC INDICATORS ON INDIAN STOCK MARKET IN POST LIBERALISATION ERA

Dr. Chetana R. Marvadi

Assistant Professor
School of Commerce,
Gujarat University,
Ahmedabad.
Mo.:9979455599
E-Mail: chetanamarvadi1977@gmail.com

Abstract

Due to liberalisation and globalisation policies of Indian government in 1991, Indian capital market has undergone tremendous changes. Indian capital market has proved to be a key driver of modern market-based economy and has acted as the major source of raising resources for Indian corporates, leading to financial development and economic growth of India. Macroeconomic variables play a vital role in framing government policy decisions. The present study attempts to evaluate the impact of macroeconomic variables on the performance of the Indian stock market during the study period 1993-94 to 2018-2019. Gross Domestic Product, Broad Money, Crude oil Price, Current deficit and Foreign Exchange Reserve have been used as Macroeconomic Indicators whereas; Sensex and Nifty have been used as Stock Market performance to study the research objectives. Step-wise Backward Elimination Method of Multiple Regression Analysis has been used. It is found that GDP and FER are the significant variables in explaining the variations of Sensex whereas FER, CD and COP are the significant variables contributing to the variations of NSE Nifty.

Keywords: *Macroeconomic Indicators, Nifty, BSE-Sensex, GDP, FER*

INTRODUCTION

The Indian stock market plays a predominant role in the growth of Indian economy. Its every movement affects the performance of the economy. Analysing the effect of the macroeconomic indicators on the performance of stock market dates back to the various schools of thoughts of economic theory like Classical theory by Adam Smith, David Ricardo, Thomas Robert Malthus and John Stuart Mill, Keynes theory by John Maynard Keynes. Various economic theories such as New Classical theory, New Keynesian theory and New Growth theory have also described their own views about the role of macroeconomic variables in explaining the performance of the stock market.

The stock performance can be influenced by both domestic and global macro-economic factors. The available literature depicts the causal relationship between the stock market returns and macroeconomic indicators. These macroeconomic variables have received a lot of attention from the academic researchers and economists around the world. Many research studies have been conducted using different approaches to evaluate the relationship between stock prices and macroeconomic indicators. There are several other studies conducted to understand the interaction of share market returns and the macroeconomic variables and all these studies have provided different findings. But commonly they all have accepted that macroeconomic variables are the most remarkable variables in Governments policy decisions. Further, the stock market is a place where investors, whether Indians or foreigners can invest or take the funds for capital appreciation. So, Macroeconomic variables are the key indicators to show the prevailing trends in the economy.

Due to liberalisation and globalisation policies of Indian government in 1991, Indian capital market has undergone tremendous changes. Indian capital market has proved to be a key driver of modern market-based economy and has acted as the major source of raising resources for Indian corporates, leading to financial development and economic growth of India. In fact, Indian stock market is one the emerging market in the world.

LITERATURE REVIEW

The relationship between stock performance and macro-economic variables has always been the key area of interest for researchers from the beginning of stock markets. Some of the previous research studies in this area are as follows:

Makan & Ahuja (2012), studied the relationship between the Indian stock market and selected seven macroeconomic variables. They have used ADF test, Correlation and Regression analysis and Granger Casually test to see the effect of macroeconomic variables on Bombay Stock Exchange Indices for the period of April 2005 to March 2012. It was found that exchange rate, foreign institutional investment and call rate have significant effect on the Indian stock market. It was observed that there is a positive relation between FII and Sensex, call rate and Sensex whereas exchange rate and Sensex is having a negative relation.

Sangmi (2013) evaluated the impact of macroeconomic variables on the Indian stock prices using inflation, exchange rate, industrial production, money supply, gold price, interest rate as variables. The aim was to identify effect of these selected macroeconomic variables on the performance of three indices Sensex, Nifty and BSE 100. Multiple regression has been applied on monthly data. The result showed that there is a significant relationship between the stock market prices and macroeconomic variables.

Tripathi et al. (2014) conducted this study to investigate the long-term relationship between selected external macroeconomic variables and sectoral indices at the National Stock Exchange using Exchange Rate (USD), Crude Oil prices, Foreign Institutional Investments, Current Account Balance, and Foreign Exchange Reserves for eight years covering the period from April 2005 to March 2013.They have concluded that there is high correlation among the variables under study. They observed that amongst all macroeconomic variables only Foreign Institutional Investment (FII) affects all sector-wise indices.

Gurloveleen & Bhatia (2015) have investigated the impact of macroeconomic variables on the functioning of Indian Stock Market specifically after the Global Financial Crisis. They used the ADF Test, Multiple Regression and Granger Causality Tests were used. It was found that the two macroeconomic variables Foreign Institutional Investors and Exchange Rate have significant impact on Indian Stock market. The study no relationship amongst the variables during the study period.

Kotha & Sahu (2016) investigated the relationship between Indian stock market and selected macro-economic indicators using monthly data from July 2001 to July 2015. They used Johansen's co-integration analysis and granger causality tests. The study found that there is a presence of one cointegrating vector between Sensex and macro-economic indicators viz., exchange rate, money supply, WPI and treasury bill rate.

RESEARCH METHODOLOGY

Objective and Data Description:

This study aims at evaluating the effect of major macroeconomic indicators on the performance of the Indian stock market during the post liberalization era encompassing the duration of 27 years from 1993-94 to 2018-19. It is based on secondary data collected from RBI Handbook of Statistics and Economics and websites of BSE and NSE. In order to establish the relationship between macroeconomic indicators and stock markets indices, Step-wise Backward Elimination Method of Multiple Regression Analysis has been applied. The following Table-1 shows the description of macroeconomic indicators and stock market indices which are used in the study.

Table-1 Variables Under Study

No.	Variable	Description	Symbol
1.	Broad Money-M3 (in Rs. Billion)	M3 = M1 + Time deposits with the banking system where, M1 = Currency with public + Demand deposits with the Banking system (savings account, current account).	BM
2.	Gross Domestic Product (in % annual growth rate)	The sum of the final prices of the goods and services produced in an economy in a given period.	GDP
3.	Crude Oil Price (Indian Rs. Per Barrel)	The price of oil, or the oil price, generally refers to the spot price of a barrel of benchmark crude oil	COP
4.	Foreign Exchange Reserve (in Rs. Billion)	Foreign exchange reserves are assets that are held by a nation's central bank or monetary authority.	FER
5.	Current Deficit (in Rs. Billion)	**Current Account** Deficit = Trade gap + Net current transfers + Net income abroad (**Trade gap** = Exports – Imports)	CD
6.	Nifty Fifty	It is **National stock exchange FIFTY**. It is also known as Nifty 50, Nifty simple, or Nifty CNX. It is a benchmark index on the NSE in India for large firms. (Annual closing price is calculated as average of monthly closing prices.)	NIFTY
7.	BSE Sensex	SENSEX is **Stock Exchange Sensitive Index.** (Annual closing price is calculated as average of monthly closing prices.)	SENSEX

DATA ANALYSIS AND INTERPRETATION

The following Models have been estimated for this purpose:

Model-1:

$SENSEX = \beta_0 + \beta_1 BM + \beta_2 GDP + \beta_3 CD + \beta_4 COP + \beta_5 FER + \varepsilon_t$

Model- 2:

$NIFTY = \beta_0 + \beta_1 BM + \beta_2 \times GDP + \beta_3 CD + \beta_4 COP + \beta_5 FER + \varepsilon_t$

The above two models were estimated fully using Multiple Regression Analysis, the results of which indicated presence of multicollinearity in the estimated models. In order to overcome this problem, Stepwise Backward Elimination Method was applied for arriving at the parsimonious model.

The results of the Multiple Regression Analysis are summarised below:

Table: 2 Descriptive Statistics

Variable	BM	CD	COP	FER	GDP	NIFTY	SENSEX
Mean	50214.05	1181.835	2591.033	10308.71	6.571654	3719.023	13298.31
Median	30147.66	539.4150	2661.270	7723.045	7.227000	2813.002	9522.620
Maximum	154320.7	4796.100	5888.578	28558.82	8.846000	10748.93	36068.33
Minimum	4310.840	33.3400	541.7140	604.2000	3.087000	755.6039	3055.410
Standard Deviation	47087.71	1366.691	1766.961	9174.022	1.678342	2988.645	10568.56
C.V.	0.93774	1.156414	0.681952	0.889929	0.255391	0.80361	0.79473

Table-2 represents the Descriptive statistics of selected variables. The low value of Coefficient of variation shows high consistency in data. Here, in this study, Gross Domestic Product has the least Coefficient of variation indicating Gross Domestic Product as the most consistent variable while Current deficit has the highest value of Coefficient of variation indicating that Current deficit as the most inconsistence variable.

Table-3 Correlation Matrix

Variables	NIFTY	SENSEX	BM	GDP	CD	COP	FER
NIFTY	1						
SENSEX	0.973* (0.000)	1					
BM	0.979* (0.000)	0.965* (0.000)	1				
GDP	0.200 (0.326)	0.303 (0.132)	0.187 (0.360)	1			
CD	0.754* (0.000)	0.726* (0.000)	0.758* (0.000)	-0.042 (0.839)	1		
COP	0.735* (0.000)	0.747* (0.000)	0.758* (0.000)	-0.017 (0.934)	0.762* (0.000)	1	
FER	0.984* (0.000)	0.976* (0.000)	0.988* (0.000)	0.208 (0.308)	0.743* (0.000)	0.795* (0.000)	1

("*" indicates significance at 5% level)

Table-3 shows the correlation between the pairs of selected variables. The above results indicate that Sensex, Broad Money, Current Deficit, Crude Oil Price and Foreign Exchange Reserve have positive significant correlation with Nifty whereas GDP has positive insignificant correlation with Nifty.

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Table-4 Results of Multiple Regression Analysis
(Step wise Backward Elimination Method)

MODEL 1: Dependent Variable- BSE SENSEX					MODEL 2: Dependent Variable-NSE NIFTY				
		Coefficient	**t**	**Sig.**			**Coefficient**	**t**	**Sig.**
Step-1	(Constant)	-2132.848	-1.013	0.323	Step-1	(Constant)	947.123	2.098	0.049
	BM	-0.010	-0.130	0.898		BM	-0.005	-0.328	0.746
	GDP	677.186	2.292	0.033		GDP	-33.587	-0.530	0.602
	CD	0.599	1.009	0.325		CD	0.275	2.158	0.043
	COP	-0.379	-0.711	0.485		COP	-0.342	-2.988	0.007
	FER	1.138	2.862	0.010		FER	0.370	4.337	0.000
	R^2	0.965				**R^2**	0.980		
	F- value	108.744				**F- value**	192.112		
	Sig. F	0.000				**Sig. F**	0.000		
Step-2	(Constant)	-2187.866	-1.086	0.290	Step-2	(Constant)	917.375	2.120	0.046
	GDP	684.062	2.411	0.025		GDP	-29.869	-0.490	0.629
	CD	.569	1.065	0.299		CD	0.258	2.250	0.035
	COP	-.346	-.757	0.458		COP	-0.324	-3.295	0.003
	FER	1.088	11.933	0.000		FER	0.343	17.484	0.000
	R^2	0.964				**R^2**	0.979		
	F- value	142.602				**F- value**	250.771		
	Sig. F	0.000				**Sig. F**	0.000		
Step-3	(Constant)	-2809.431	-1.543	0.137	Step-3	(Constant)	722.172	4.353	0.000
	GDP	728.905	2.653	0.015		CD	0.270	2.436*	0.023
	CD	.422	0.856	0.401		COP	-0.314	-3.322*	0.003
	FER	1.050	13.992	0.000		FER	0.339	19.256*	0.000
	R^2	0.964				**R^2**	0.979		
	F- value	193.706				**F- value**	346.243		
	Sig. F	0.000				**Sig. F**	0.000		
Step-4	(Constant)	-2356.309	-1.360	0.187					
	GDP	658.390*	2.526	0.019					
	FER	1.099*	23.047	0.000					
	R^2	0.962							
	F- value	293.613							
	Sig. F	0.000							

("*" indicates significance at 5% level)

Initially the full models including all the macroeconomic indicators under study were estimated. Further, due to the problem of multicollinearity, the following reduced estimated parsimonious models were obtained using Step-wise Backward Elimination Method:

Estimated Model-1:

SENSEX = -2356.309 + 658.390GDP + 1.099FER

Estimated Model-2:

NIFTY = 722.172 + 0.270CD - 0.314COP + 0.339FER

The above result indicates that Gross Domestic Product is the highest contributing Variable followed by Foreign Exchange Reserve with positive significant effect on BSE Sensex. This indicate that an increase in GDP and FER will lead to increase in BSE Sensex, The Foreign Exchange Reserve is highest contributing variable having positive significant impact on NSE nifty. Current deficit has positive significant impact whereas Crude oil price has negative significant impact on NSE nifty. R-square value indicates that both the Models are powerful with 96 % variation in case of Sensex and 98 % in case of Nifty.

FINDINGS AND CONCLUSION

Sensex and Nifty act as proxy variables for Stock market performance in India. The major macroeconomic indicators: Broad money, Gross Domestic Product, Current deficit, Crude oil price, and Foreign Exchange Reserve are used to reflect the economic performance of the country during the post liberalisation era. GDP and FER are the significant variables in explaining the variations of Sensex whereas FER, CD and COP are the significant variables in explaining the variations of NSE Nifty. Since GDP is the highest contributing variable to Sensex, it means that the performance of BSE-Sensex highly depends on economic growth of the country. Further, FER is found to be the highest contributing variable to NSE-Nifty indicating that the performance of National Stock Exchange highly relies upon assets that are held by a nation's central bank or monetary authority for foreign trade.

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