"Impact of Macroeconomic Variables on Stocks of Sectoral Indices of BSE: An Evidence From India"

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Abstract: Stock market return is generally considered to be an indicator of financial and economic conditions of an industry. There are a number of macroeconomic and sector related factors that potentially can affect the stock market performance of companies or industries. The key objective of this paper is to examine the relationships of different macroeconomic variables such as Exchange Rate, Interest Rate, Inflation Rate, Foreign Institutional Investors, Crude Oil Prices, Rate of Money Supply, Index of Industrial Production etc. on sectoral Indices of BSE in India. In this research the four particular macroeconomic variables have been selected such as Exchange Rate, Foreign Institutional Investors, Crude oil prices and Index of Industrial Production for the purpose of study. The research has covered four sectoral indices such as S&P BSE FMCG, S&P BSE Energy, S&P BSE Auto and S&P BSE IT. All sectoral indices used as dependent variables and all the macroeconomic indicators have been taken as independent variables. Time Series monthly data from 1st January 2009 to 31st December 2016 has been collected and Multiple Regression model has been used to examine the effect of Macroeconomic environment on the stock market performance. The result of the research focused on the values of R- Square value of the dependent variables BSEFMCG, BSEENERGY, BSEAUTO and BSE IT which are .920, .398, .879 and .876 respectively. These values explain that 92% in BSEFMCG, 39.8% in BSEENERGY, 87.9% in BSEAUTO and 87.6% in BSEIT variations occur due to collectively change in the various independent variables which are used in this analysis. Thus, the first null hypothesis (H01) "There is no significant relationship between the sectoral indices and various macroeconomic variables ", is rejected, and it can be concluded that all the selected macroeconomic indicators significantly affect the stocks of different industries in India. According to the findings, Exchange Rate (EXR) have a least p-value or significance value which indicates that this is most significant macroeconomic indicator affecting all the selected industries in India. Most of the sectors are dependent on the movements of exchange rates. Alternatively, least sectors are dependent on the changes in FII rates, where remaining two macroeconomic variables showing the mixed results.

INTRODUCTION

Stock market plays a very crucial role to determine the level of economic developments and financial sustainability. It consists of income as well as the capital gains. Usually hundreds of listed company's shares trade by the stock market. The value of a stock index is an aggregate value that produces by different stocks together. Stock market provides historical performances as an information and with the help of these information, an investor can decide the best investment avenue. If a capital market is well-functioning then it can contributes to economic progress through more effective allocation of resources as well as increasing savings .Generally stock market is affected by the different financial and economic factors. These affecting factors can influence the stock market prices from day to day thus volatility of the capital market. Some of the factors may be internal and some of them may be external. If we are talking about the Indian stock market, it is affecting by different macroeconomic factors. Some fundamental macroeconomic variables such as interest rate, money supply, exchange rates, inflation, GDP, Foreign Institutional Investments, Foreign exchange reserve, Index of Industrial Production, Crude Oil Prices, Gold prices, Unemployment rate, Employment, etc. The regular fluctuations in the values of all these variables directly affects the returns of stocks. Inflation is generally the increasing prices of the goods and services. Thus the high rates of inflation decrease the purchasing power of a currency of a country. Widely the inflation is calculated by the percentage change in consumer price index (CPI). CPI is a price index which is created statistically with the prices of sample items whose prices are collected periodically. In the same way interest rate is the price of money. It is the proportion of the borrowed fund and it can be used by the many governments to control the different macroeconomic variables. The monetary value as Gross domestic product (GDP) shows the economic health of a country. GDP plays a very vital role to determine the economic condition of a country. Obviously, it will be one of cause of volatility in the stock market. Gold prices and oil prices are the asset prices. They are eventually correlated with each other and significantly affect the stock market. The financial transaction between the countries is depend upon the exchange rates. If the value of the currency is decreasing against the US Dollar immediately it will increase the import value and decreased its export value and vice versa. Export value can be increased by the stronger value of the currency of a country. An appreciating value of the currency can benefitted the stock prices. For repaying the liabilities at international level all countries like India maintains the reserve which is called the Foreign Exchange Reserve. This kind of reserve maintains by the central bank and different monetary bodies in the form of various currencies like US Dollar, Sterling Pound, Euro, and Japanese Yen. It is very helpful to keep the value of currency stable and if the position of a country is stronger in Foreign Exchange Reserve then investors would like to invest more in stock market, so there is the positive relationship between the stock market returns and Foreign Exchange Reserve. Foreign Exchange reserve also plays a very vital role to handle the unanticipated emergencies. A short term investment which is made by foreign investors is called the Foreign Institutional Investors (FII). A large impact of FII exerts, on the domestic financial market. It is also have a significant relationship with the stock market. Foreign capital plays a very important role to develop the economy, to personify the status of production in the industrial sector in a country, the Index of Industrial Production (IIP) is used. IIP exhibits a positive relationship

with the changes in the stock prices. It is used as a proxy of GDP because GDP is not having the monthly data.

BSE SECTORAL INDICES

Bombay Stock Exchange is the world's fastest stock exchange with a 6 microsecond trade speed. Bombay Stock Exchange have $ 1.43 Trillion market capitalization as of March 2016 and it is the largest stock exchange. The Indian capital market has given a length and breadth of the investments to the investors around the world that is why it is ranked among the emerging markets at international level. Bombay Stock Exchange have 12 broad sectoral indices and a large number of subsets for the investments. S&P BSE sectoral index consists of a few indices such as. Banks, Auto, Oil & Gas, Consumer durables, IT, Power, Healthcare Metal and so on. Due to increased values of FIIs in India sectoral indices are moving it to a new orbit. From 2013 to 2014, some indices have outperformed and help SENSEX to touch the new heights are as follows:

S&P BSE FMCG: In past few decades FMCG sector has shown a virtuous growth. Due to increased value of sales, FMCG sector has boosted up. The major companies are listed in this particular index such as Hindustan Unilever, Dabur India, Nestle, ITC and United Spirits.

S&P BSE ENERGY: India is a largest energy concentrated country in the world in the fast growing economy. Usually this sector recognized as one of the most substantial contribution for economic development. BSE Energy Index include companies from Gas & Power sub sectors, Petroleum etc.

S&P BSE AUTO: Demand of three wheelers and batteries segment are the main reason of growth of auto sector in India. Major companies are listed in the index such as Maruti Suzuki, Bajaj Auto etc. These companies have lifted the index growth of the sector due to increased export. 11% YTD return is given by this particular sector.

S&P BSE IT: I is not surprising that IT sector earns major revenue from European and United States countries. This sector has led to increase in flexible expenses in these two markets and improved the sentiments of the customers. So due to these reasons IT sector's index is at the top position and given a return of 63% YTD.

LITERATURE REVIEW

Many practitioners, researchers and industry analysts have tried to find out the relationship between the different macroeconomic variables and stock markets. They have done several descriptive and empirical studies to check the effect of these variables on stock prices. Mr. Joseph Tangne Talla conducted research with title "Impact of macroeconomic variables on the stock market prices of the Stockholm stock exchange" with four macroeconomic variables and found that depreciation in currencies and inflation have a significant negative affect on stock prices, interest rate is negatively related to stock price change on the other hand, money supply is positively associated to stock prices. No unidirectional Granger Causality is found between stock prices and all the indicator variables under study, only one unidirectional causal relation from stock prices to inflation. Mahmoud Ramadan Barakat, Sara H. Elgazzar & Khaled M. Hanafy (2016) analysed the impact of macroeconomic factors on two emerging markets (Egypt & Tunisia) from 1998 to 2014. And found that there is a casual relationship between Egypt stock indices and macroeconomic variables including

CPI, Exchange rate, money supply and interest rate and found the same situation between Tunisian stock indices and all these variables except CPI , which has no causal relationship with the stock indices.Ihsan Ilahi,Mehboob Ali &Raja Ahmed Jamil investigates weak relationship between Macroeconomic variables (inflation rate, exchange rate and interest rate) on stock market returns in Pakistan. Money supply and inflation are found to be significant determinants of the returns at Nairobi Stock Exchange. Exchange rates is found to have a negative impact on stock returns, while interest rates are not important to determine the long rung run returns in the Nairobi Stock Exchange. Investigated by Wycliffe Nduga Ouma, Dr. Peter Muriu (2014) in Kenya. Dr. L.K. Tripathi, Arpan Parashar & Swati Jaiswal (2014) studied the impact of external macroeconomic variables (including Exchange Rate (USD), Crude Oil prices, Foreign Institutional Investments, Current Account Balance and Foreign Exchange Reserves) on sectorial indices like CNX Auto, CNX Bank, CNX Energy, CNX FMCG and CNX IT at NSE using Multiple Regression Equation Model and found that only Foreign Institutional Investment (FII) affects all sectorial indices however rest of the macroeconomic variables selectively affect different sectoral indices in India. Prof. M. Subramanian (2015) *"These cross-impacts create ripples in stock market, and thereby investor confidence levels are being tested, every now and then."* According to Sadia Saeed & Noreen Akhtar (2012) studied a significant impact of Exchange Rate, and Short Term Interest Rate on Banking index. Macroeconomic variables affects the banking index negatively except Oil prices, which has a positive impact on banking index. Macroeconomic factors including inflation rate, public deficit, unemployment rate, gross domestic product and liquidity ratio determines the liquidity level of the banking system, by Ioan Trenca (2015) concluded in the research "Impact of macroeconomic variables upon the banking system liquidity". Baranidharan Subburayan & Dr. Vanitha Srinivasan (June 2014) examine the impact of four macroeconomic variable on CNX Bankex and found that all macroeconomic variables are significant on Banking stock return, banking stock returns are having a long run relationship with the macroeconomic variables, exchange rate and interest rate are reflected positive on banking stock returns, there is not any causal linkage between banking stocks & interest rates and banking stocks and Inflation and finally bank stocks exist unidirectional causal effects on the exchange rate. Gurloveleen K* and Bhatia BS(2015) conducted the research to examine the impact of ten macroeconomic variables including Broad Money, Call Money Rate, Crude Oil Price, Exchange Rate, Foreign Exchange Reserve, Foreign Institutional Investors Gross Fiscal Deficit, Index of Industrial Production, Inflation Rate and Trade Balance and a stock market index BSE 500. They have applied ADF, Ganger causality along with multiple regression tests and found that only two variables i.e. FII and exchange rate out of ten variables are significant. Due to result of granger causality test, it has been found that all these variables are having unidirectional and bidirectional relation with closing prices of SE 500. Satya Paul & Girijashankar Malik (March 2003) investigated the effect of three macroeconomic variables including inflation, interest rate and real GDP growth on stock prices of banking and finance sector in Australian Stock Market. The research has been conducted at University of Western Sydney. They have found that the bank and finance stock prices are co -integrated with all three macroeconomic variables. Interest rate is affected negatively whereas GDP growth is effected positively.

Gross Domestic Product growth rate, Exchange rate and Inflation were positively related with stock prices (KSE-100index). While finding the negative impact of negative impact of interest rate on the stock prices of KSE-100 index. Muhammad Salman Khan (2014).

Muazu Ibrahim & Alhassan Musah (2014) analysed in their research "An Econometric Analysis of the Impact of Macroeconomic Fundamentals on Stock Market Returns in Ghana"

The effects of different macroeconomic variables on stock market returns by applying the Johansen multivariate co-integration method and VECM and found the long run relationship between variables and the Ghana stock market. Inflation, money supply and exchange rate explain a significant proportion of the variance error of stock returns and persist over a long term. MACN. Shafana (2012) has been conducted the research on Sri Lankan Stock market and analysed that except IT and Telecom sector , the Exchange rate and inflation rate have significant effect on all the sector's stock prices. Gabriel Nkechukwu, Justus Onyeagba & Johnson Okoh (June 2015) evaluate the effect of macro-economic factors on Nigerian stock prices and found that, the prices of stocks are having long run relationship with macroeconomic variables. The research concluded that predicting stock prices on the behalf of macroeconomic factors is difficult in Nigerian Stock Market. Rakesh Kumar (October 2013), evaluate a significant role of industrial performance influencing the stock market. Though some impact of policy rates cannot be ignored but it does not seem sustainable. Market rely more on optimistic macroeconomic environment indicates for state's sensible efforts to maintain macroeconomic stability. Besides, stock market responds to performance of the firm specific factors and unforeseen events in the economy. Banking indices are positively affected by exchange rate, inflation and GDP, whereas Gold prices are having negative impact, Manisha Luthra and Shikha Mahajan (2014). According to Mike Mugambi & Timothy C. Okech (June 2016) inflation , interest rate and exchange rate are having significant impact on banking stock returns whereas GDP had an insignificant impact at 5% level of significance. With the help of this research they suggest that bank should not be engaged in foreign currency speculation. Because the price fluctuation affect the stock returns immensely. This is the evidence from Kenyan Stock Market.

OBJECTIVE

1. To explore the different macroeconomic variables affecting the stocks of different sectors in Indian Stock Market.
2. To examine the impact of changes in these macroeconomic variables on the sectoral indices at BSE.

DATA DESCRIPTION

In this research four macroeconomic variables namely Exchange Rate (abbreviated as EXR), Foreign Institutional Investors (abbreviated as FII), Crude Oil Prices (abbreviated as COP), and Index of Industrial Production (abbreviated as IIP) have been taken as Independent variables and sectoral indices of Bombay Stock Exchange (BSE) such as S&P BSE FMCG (abbreviated as BSEFMCG), S&P BSE Energy (abbreviated as BSEENERGY), S&P BSE Auto (abbreviated as BSEAUTO) and S&P BSE IT (abbreviated as BSEIT) are taken as dependent variables. Monthly time series data of both independent and dependent variables have been used for the purpose of study. The exchange rate is taken in terms of INR/USD, FII (Equity & Debt), price of crude oil on USD on the basis of per barrel and IIP in terms of INR. The period of the research is from 1st January 2009 to 31st December 2016.

HYPOTHESIS

1. H01: There is no significant relationship between the selected macroeconomic variables and stock return of different sectoral indices.
2. H02: The performance of the sectoral indices are not dependent on various macroeconomic variables.

RESEARCH METHODOLOGY

A statistical technique Multiple Regression Analysis has been used to analyse the relationship between the variables, simultaneously developed a mathematical equation between above mentioned four independent variables and single dependent variable for testing as follows:-

Y = a + ß1 X1 + ß2 X 2+ ß3 X3 + ß4 X 4 + U

Where

Y = Return on Sectoral Indices

a is an intercept

X1 = Exchange Rate (EXR)

X2 = Foreign Institutional Investors (FII)

X3 = Crude Oil Prices (COP)

X4 = Index of Industrial Production (IIP)

U = Error Term

ß1, ß2, ß3 and ß4 are the slopes or coefficients of regression of X1, X2, X3 and X4 respectively. These coefficients represent the rate of change in dependent variable Y due to change in its function. The significance of the coefficients is checked by p- values or t-values. The null hypothesis will be accepted if the p-value is greater than and rejected when the p-value is less than the significant level.

RESULT INTERPRETATION &
HYPOTHESIS TESTING

Table 1
Descriptive Analysis of all Dependent & Independent Variables

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
BSEFMCG	96	2032.69	8822.47	5510.2	2104.81
BSEENERGY	96	1584.65	3031.25	2453.5	294.45
BSEAUTO	96	2500.23	22231.7	12184	5157.32
BSEIT	96	2096.17	11969.5	7462.4	2692.31
EXR	96	44.21	68.6	55.704	8.1448
FII	96	-19982.37	25376.5	2963.3	9355.63
COP	96	33.62	113.93	77.197	22.4719
IIP	96	8.13	82.5	34.724	21.6926
Valid N (listwise)	96				

Table 1 is given above, showing the descriptive analysis of dependent and independent variables. In table1 (b) the figures show the volatility in different macroeconomic variables after taking the Deviations from mean. Stocks of BSEAUTO and Exchange rate (EXR) is showing the highest volatility.

Table 2
Correlation between each Sectoral Index and each macroeconomic variable

BSEFMCG	Pearson Correlation	EXR	FII	COP	IIP
	Sig. (2-tailed)	-.954**	0.126	.417**	.760**
	N	0	0.222	0	0
BSEENERGY	Pearson Correlation	96	96	96	96
	Sig. (2-tailed)	-.276**	-0.05	-.375**	0.176
	N	0.006	0.63	0	0.086
BSEAUTO	Pearson Correlation	96	96	96	96
	Sig. (2-tailed)	-.900**	0.077	.222*	.661**
	N	0	0.453	0.03	0
BSEIT	Pearson Correlation	96	96	96	96
	Sig. (2-tailed)	-.922**	0.038	.295**	.774**
	N	0	0.71	0.004	0
		96	96	96	96

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.0 level (2-tailed)

Table 2 is showing the results of correlation analysis which has been found by applying the Karl Pearson's Coefficient of Correlation method between each selected sectoral index of BSE and each macroeconomic variable as a benchmark. According to the result, Exchange Rate (EXR) is showing the negative correlation with all the selected sectoral indices of BSE in which the correlation with BSEIT is highly negative, Foreign Institutional Investors (FII) have a positive correlation with all the indices except BSEENERGY,where Index of Industrial Production (IIP) is showing the positive correlation with all sectoral indices in which it is highly correlated with BSEIT and Crude Oil Prices (COP) is also in a moderate positive correlation with the sectoral indices except BSEENERGY.

Table 3(a)
Model Summary

	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
BSEFMCG	1	.959[a]	0.92	0.916	608.9254
BSEENERGY	1	.630[a]	0.398	0.371	233.5203
BSEAUTO	1	.937[a]	0.879	0.873	1835.166
BSEIT	1	.936[a]	0.876	0.87	968.868

Predictors: (Constant), IIP, FII, COP, EXR

As per the Table 3(a) the values of R- Square explains the ratio of estimated variations to the total variables. It explains the changes in the dependent variables due to change in the independent variables. The R- Square value of the dependent variables BSEFMCG, BSEENERGY, BSEAUTO and BSEIT are .920, .398, .879 and .876 respectively. These values explain that 92% in BSEFMCG, 39.8% in BSEENERGY,

87.9% in BSEAUTO and 87.6% in BSEIT variation occur due to collectively change in the various independent variables which are used in this analysis. Thus, the first null hypothesis (H01) "There is no significant relationship between the selected macroeconomic variables and stock return of different sectoral indices", is rejected, and it can be concluded that all the selected macroeconomic indicators significantly affect the stocks of different industries.

Table 3(b)
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
(a): Dependent Variable:	(Constant)	22077.06	1034.12		21.349	0.000
BSEFMCG	EXR	-287.447	15.043	-1.112	-19.109	0.000
	FII	-0.013	0.007	-0.057	-1.699	0.093
	COP	1.385	3.387	0.015	0.409	0.684
	IIP	-17.971	5.857	-0.185	-3.068	0.003
(b): Dependent Variable:	(Constant)	4110.949	396.579		10.366	0.000
BSEENERGY	EXR	-18.457	5.769	-0.511	-3.199	0.002
	FII	0.002	0.003	0.063	0.687	0.494
	COP	-8.648	1.299	-0.66	-6.657	0.000
	IIP	0.932	2.246	0.069	0.415	0.679
(c): Dependent Variable:	(Constant)	62300.852	3116.6		19.99	0.000
BSEAUTO	EXR	-794.366	45.335	-1.255	-17.522	0.000
	FII	-0.041	0.023	-0.074	-1.807	0.074
	COP	-41.333	10.208	-0.18	-4.049	0.000
	IIP	-73.6	17.653	-0.31	-4.169	0.000
(d): Dependent Variable: BSEIT	(Constant)	27205.378	1645.39		16.534	0.000
	EXR	-330.038	23.934	-0.998	-13.789	0.000
	FII	-0.022	0.012	-0.077	-1.866	0.065
	COP	-16.703	5.389	-0.139	-3.099	0.003
	IIP	-0.089	9.32	-0.001	-0.01	0.992

Further, in order to analyse the second null hypothesis (H02) with reference to the coefficients tables, Table 3 (b), P- value or significance value compared with our assumed level of significance (i.e. at 5% or 0.05) with taking each macroeconomic variable as a benchmark.

For Exchange Rate (EXR) : The significance value of exchange rate for all sectoral indices are below the assumed level of significance value (i.e. 0.05 or 5%), it indicates that all the selected sectors are dependent on the changes in USD.

For Foreign Institutional Investors (FII): Alternatively, the significance values of FII for all the selected sectors are above the assumed level of significance. So it can be concluded that all the selected sectors are not dependent on the changes in the percentage change in FII.

For Crude Oil Prices (COP): The Crude Oil Prices(COP) have the significance values for BSEENERGY, BSEAUTO & BSEIT are below the assumed level of significance , however, the significance value for BSEFMCG is .684 which is above 0.05(Assumed level of sig.). So, it is concluded that among all the selected sectoral indices only BSEFMCG is not dependent on the changes in the Crude Oil Prices (COP).

For Index of Industrial Production: IIP have the significance values for BSEFMCG, BSEAUTO & BSEIT are below the assumed level of significance and the significance value for BSEENERGY is above the assumed level of significance (i.e. 0.05), which indicate except all the selected sectoral indices only BSEENERGY is not affected by the changes in the value of Index of Industrial Production (IIP).

CONCLUSION

In the present research "Impact of Macroeconomic Variables on Stocks of sectoral indices of BSE: An Evidence from India" is studied and found that all macroeconomic variables are significantly related with the stocks of the different sectors of India. According to the findings, Exchange Rate (EXR) have a least p-value or significance value which indicates that this is most significant macroeconomic indicator affecting all the selected industries in India. Most of the sectors are dependent on the movements of exchange rates. Alternatively, least sectors are dependent on the changes in FII rates, where remaining two macroeconomic variables showing the mixed results.

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