IMPACT OF MACRO ECONOMIC VARIABLES ON STOCK MARKET IN INDIA

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Abstract: *The moment of stock market get influenced with both macro and micro economic variables. These economic variables range of impact we can clearly noticed with the fluctuations of stock market. Even some of earlier studies are stating that macro variables show greater impact on stock market performance than that of micro economic variables. In this study we are going to measure the range and impact of macroeconomic variables on stock market, for this we consider some of the macroeconomic variables which shown greater impact on market, those are Foreign Direct Investment (FDI), Foreign Institutional Investors (FII), Balance Of Trade (BOT) and Foreign Exchange Reserves (FER). Data is collected from secondary sources; data is analyzed and tested with the specific hypotheses to measure reliability and validity with some of popular tools like descriptive statistics, paired comparison t-test and least square regression analysis. Finally, results are drawn FII, FDI and FER are showing greater impact on stock market and three are the sources to bring some changes in the returns on investment. Whereas BOT is having negative relationship with stock returns.*

Keywords: *Macro economic variables, Stock market, Returns and CNX NIFTY*

1. INTRODUCTION

The Economic factors play a significant role on Stock Market movement in both long run and short run. The changes in Stock prices are one of the important indicators to the market participants for taking investment decisions. Several researches were conducted on the study on effect of Macro Economic variables on stock market. The basic Macro Economic factors include Gross Domestic Product, Inflation, Interest rate, Money Supply, Exchange rate, Foreign Direct Investment, Industrial production Index, Gold Prices, Silver prices, Crude oil prices, political stability, Trade deficit, International Stock market and Real Economic activity, Balance of Trade, Foreign Exchange reserves.

The Stock Market remains an important conduit for developing economies. It facilitates liquidity through stock trading which enables financial market to get more liquid. After liberalization and globalization, India became one of the leading stock markets in the world by introducing various innovative financial assets. However the growing demand for capital has played a major role in stock market volatility. It became one of the primary sources for raising corporate finance.

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The CNX Nifty is a Stock index of 50 constituents; it is a well diversified stock index which accounts for 13 different sectors in the economy. The present market capitalization of CNX Nifty represents about 66.17% on NSE and NSE has a market capitalization of more than US$ 65 trillion. It is one of the 12th largest stock exchanges as of 2015.

2. REVIEW OF LITERATURE

Mukarjee and Naka (1995) examined the impact of variables like inflation rate, money supply, real economic activity, long term governed bond rate and call money rate on stock prices of Japanese stock market. It was found that indeed relationship exists between stock prices and with these variables during 1971-1990 by using VECM model.

Mayasami and Koh (2000) analyzed on the same study which was conducted by Mukarjee and Naka (1995) he also concluded the same results in which inflation, money supply growth, changes in the interest rate and exchange rate made a positive relationship with Singapore stock market.

Bhattacharya and Mukherjee (2002) measured the impact on three economic factors with BSE sensex for a period of 1992-2000 by using the tools like Unit root test, co-integration and long run Granger casuality test, it is proved that variables like real effective exchange rate, foreign exchange reserves and trade balance doesn't impact on stock prices.

Al-Sharkas, Adel (2004) analyzed a long run equilibrium relationship between Jordanian stock market and selected macro economic variables by using VECM for period of 1980 to 2003. In which it covers the selected variables like Real economic activity, Money supply, inflation and interest rate. The results reveals that relation exists between all the selected variables and the stock exchange of Amman.

Ahmad (2008) conducted research on 6 macro economic factors and its impact with stock markets of Nifty and Sensex , he applied BVAR model to measure long run and short run. Its impact it is found that it is not only with macro economic variables, the changes in stock market get influenced with other factors like expected potential performance and it also clearly proved that stock prices movements are not getting affected with changes in interest rate but also with other economic activity.

Dharmendra Singh (2010) applied bilateral Granger causality test, Unit root test and correlation to test the relationship between stock market index i.e sensex and other three variables (IIP, WPI & Exchange Rate). They came to conclusions that IIP and sensex having a bilateral granger causality where as WPI and sensex is having strong correlation.

Tripathy (2011) studied relationship between exchange rate, interest rate, International stock Market and its market efficiency, they used various techniques like Q- test, Breuch – Godfrey LM test, Unit root test, Granger causality test. He found that a bidirectional relation exists between stock market and interest rate, exchange rate, international stock market and it is also suggested that a unirelation exists from international stock market to Domestic stock market.

Sam Veg Patel (2012) analyzed impact on stock indices with selected macro economic variables like Interest rate, Inflation, Exchange rate, Index of Industrial Production, Money supply, Gold price, silver price & oil price. The study used various test like augmented Dickey fuller unit root test, Johnson co integration test, Granger causality test and VECM. It found that Exchange Rates, Industrial Production, Inflation, Interest rate is highly significant factors.

Murnal Joshi (2013) studied effect of macroeconomic variables like Gross GDP, Foreign Intuitional Investors, political stability, Inflation, Liquidity and interest rate on BSE & NSE. The study reveals that only FII flow, political stability and Inflation were high correlation between performance of economy and stock market.

Based on above literature collections we understood that there are so many factors reflect on the returns of the stock market. Earlier contribution is made based on some basic macro and micro variables. With these evidences this study is also considered some of key macroeconomic variables which rarely studied by the earlier researchers, those variables are foreign direct investment (FDI), foreign institutional investors (FII), balance of trade (BOT) and foreign exchange reserves (FER).

3. OBJECTIVES OF THE STUDY

- To study the stock market movement under economic variables.
- To measure the reliable relationship between stock market and economic variables

Hypotheses

Hypothesis –1: Relationship between FII and CNX Nifty

H_0: There is no significant relationship between FII and CNX Nifty

H_1: There is significant relationship between FII and CNX Nifty

Hypothesis –2: Relationship between FDI and CNX Nifty

H_0: There is no significant relationship between FDI and CNX Nifty

H_1: There is a significant relationship between FDI and CNX Nifty

Hypothesis –3: Relationship between BOT and CNX Nifty

H_0: There is no significant relationship between BOT and CNX Nifty

H_1: There is significant relationship between BOT and CNX Nifty

Hypothesis –4: Relationship between FER and CNX Nifty

H_0: There is no significant relationship between FER and CNX Nifty

H_1: There is significant relationship between FER and CNX Nifty

4. METHODOLOGY

This study conducted to measure the range and impact of selective macroeconomic variables on Indian stock market. Secondary data is collected from SEBI & RBI official website and NSE Website, 13 years of annual reports are used (i.e., 2001-02 to 2013-14). Data is analyzed and tested with SPSS-17, popular statistical tools Descriptive statistics, Paired comparison t-test and Least square regression method are used.

5. RESULTS AND ANALYSIS

The following results have shown the relationship between stock market with economic variables.

Table 1
Descriptive Statistics

	CNX Nifty	Foreign Institutional Investors	Foreign Direct Investment	Balance of Trade	Foreign Exchange Reserves
N of Cases	13	13	13	13	13
Minimum	1,093.500	-2,714.200	10,064.000	-879,504.000	2,001.000
Maximum	8,282.700	133,266.800	165,146.000	-27,302.000	15,884.000
Arithmetic Mean	4,415.854	45,895.770	68,986.385	-338,399.923	9,015.000
Standard Deviation	2,142.019	45,908.829	57,556.080	293,959.167	4,935.596
Skewness(G1)	0.057	0.951	0.357	-0.630	-0.065
Kurtosis(G2)	-0.896	-0.123	-1.594	-0.805	-1.654

From the Table 1, we clearly understand that analysis is made with 13 years macro variable data from 2001 to 2013. CNX Nifty mean value is less than the macro variables mean. Similarly, CNX Nifty Standard deviation (2, 142.019) is less than the other variables like FII, FDI, BOT and FER, it indicates that though variance are high in macro economic variables but fluctuations in the stock market is little. In skewness- CNX Nifty, FII and FDI are positively skewed, it insist that right tail distribution is more than the left and BOT and FER are negatively skewed, it means

left tail distribution is more than right tail. Similarly, Kurtosis both stock market and cited economic variables are platykurtic, less sharply peaked than the normal distribution.

Table 2
Paired Comparison T-Test

2.1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Foreign Institutional Investors	4.5896E4	13	45908.82857	12732.81811
	CNX Nifty	4.4159E3	13	2142.01933	594.08927
Pair 2	Foreign Direct Investment	6.8986E4	13	57556.07963	15963.18433
	CNX Nifty	4.4159E3	13	2142.01933	594.08927
Pair 3	Balance of Trade	-3.3840E5	13	2.93959E5	81529.60391
	CNX Nifty	4.4159E3	13	2142.01933	594.08927
Pair 4	Foreign Exchange Reserves	9.0150E3	13	4935.59613	1368.88807
	CNX Nifty	4.4159E3	13	2142.01933	594.08927

2.2. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Foreign Institutional Investors & CNX Nifty	13	.179	.558
Pair 2	Foreign Direct Investment & CNX Nifty	13	.745	.004
Pair 3	Balance of Trade & CNX Nifty	13	-.845	.000
Pair 4	Foreign Exchange Reserves & CNX Nifty	13	.876	.000

2.3. Paired Samples Test

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper	t	df	Sig. (2-tailed)
Pair 1	Foreign Institutional Investors - CNX Nifty	**4.14799E4**	45573.30151	12639.75964	13940.24591	69019.58686	3.282	12	**.007**
Pair 2	Foreign Direct Investment - CNX Nifty	**6.45705E4**	55979.55197	15525.93423	30742.42607	98398.63546	4.159	12	**.001**
Pair 3	Balance of Trade - CNX Nifty	**-3.42816E5**	2.95772E5	82032.42101	-5.21549E5	-1.64082E5	-4.179	12	**.001**
Pair 4	Foreign Exchange Reserves - CNX Nifty	**4.59915E3**	3228.25639	895.35723	2648.33034	6549.96196	5.137	12	**.000**

The relevant results for the paired t-test are in bold. From pair –1 row observe the t statistic, t = 3.282, and p = 0.007; i.e, a very small probability of this result

occurring by chance, under the null hypothesis of no difference. The null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.007$).

Similarly in Pair –2, the null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.001$). From row observe the t statistic, $t = 4.159$, and $p = 0.001$; i.e, a very small probability of this result occurring by chance, under the null hypothesis of no difference. The null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.001$).

Same way in Pair –3, the null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.001$). From row observe the t statistic, $t = 4.179$, and $p = 0.001$; i.e, a very small probability of this result occurring by chance, under the null hypothesis of no difference. The null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.001$).

Same way in Pair –4, the null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.001$). From row observe the t statistic, $t = 5.137$, and $p = 0.000$; i.e, a very small probability of this result occurring by chance, under the null hypothesis of no difference. The null hypothesis is rejected, since $p < 0.05$ (in fact $p = 0.000$).

Table 3
Relationship between FII and CNX Nifty with Regression Two-Stage
Least squares Method

3.1: Model Description

		Type of Variable
Equation 1	CNX	dependent
	FII	predictor
	FDI	instrumental
	BOT	instrumental
	FER	instrumental

3.2. Model Summary

Equation 1	Multiple R	.318
	R Square	.101
	Adjusted R Square	.019
	Std. Error of the Estimate	2369.301

In the first table, the R2, also called the coefficient of determination is very useful. It measures the proportion of the total variation in Y about its mean explained by the regression of Y on X. In this case, our regression explains 10.1 % of the CNX Nifty. Typically, values of R2 below 0.1 are considered weak, between 0.1 and 0.3, moderate, and above 0.3, strong.

3.3. ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Equation 1	Regression	6947544.278	1	6947544.278	1.238	.290
	Residual	61749463.737	11	5613587.612		
	Total	68697008.015	12			

In the second table, we will focus on the F-statistic. By computing this statistic, we test the hypothesis that none of the explanatory variables help explain variation in Y about its mean. The information to pay attention to here is the probability shown as "Sig." in the table. If this probability is above 0.05, we conclude that the F-statistic is large enough so that we can reject the hypothesis that selected explanatory variables help explain variation in Y. This test is like a test of significance of the R^2.

3.4. Coefficients

		Unstandardized Coefficients		Beta	t	Sig.
		B	Std. Error			
Equation 1	(Constant)	3192.164	1281.297		2.491	.030
	FII	.027	.024	.571	1.112	.290

Finally, the last table will help us determine whether FII and CNX Nifty are significantly related, and the direction and strength of their relationship. The first important thing to note is that the sign of the coefficient of FII who read (%) is positive. It confirms our assumption (FII increases as CNX Nifty increases). Furthermore, the probability reported in the right column is very low. This implies that the slope is statistically significant. To be less abstract, let us recall what those coefficients mean: they are the slope and the intercept of the regression line, i.e. Y = 1.112 X + 2.491. In sum, R^2 is high, probabilities are low.

Table 4: Relationship between FDI and CNX Nifty with Regression Two-Stage Least squares Method

Table 4.1
Model Description

		Type of Variable
Equation 1	CNX	dependent
	FDI	predictor
	FII	instrumental
	BOT	instrumental
	FER	instrumental

4.2. Model Summary

Equation 1		
	Multiple R	.775
	R Square	.601
	Adjusted R Square	.565
	Std. Error of the Estimate	1518.864

In the above table, the R2, also called the coefficient of determination is very useful. It measures the proportion of the total variation in Y about its mean explained by the regression of Y on X. In this case, our regression explains 60.1% of the CNX Nifty. Typically, values of R2 below 0.1 are considered weak, between 0.1 and 0.3, moderate, and above 0.3, strong.

4.3. ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Equation 1	Regression	38272353.713	1	38272353.713	16.590	.002
	Residual	25376441.441	11	2306949.222		
	Total	63648795.154	12			

In the second table, we will focus on the F-statistic. By computing this statistic, we test the hypothesis that none of the explanatory variables help explain variation in Y about its mean. The information to pay attention to here is the probability shown as "Sig." in the table. If this probability is below 0.05, we conclude that the F-statistic is large enough so that we can accept the hypothesis that selected explanatory variables help explain variation in Y. This test is like a test of significance of the R2.

4.4. Coefficients

		Unstandardized Coefficients		Beta	t	Sig.
		B	Std. Error			
Equation 1	(Constant)	2187.613	690.462		3.168	.009
	FDI	.032	.008	.868	4.073	.002

Finally, the last table will help us determine whether FDI and CNX Nifty are significantly related, and the direction and strength of their relationship. The first important thing to note is that the sign of the coefficient of FDI who read (%) is positive. It confirms our assumption (FDI increases as CNX Nifty increases). Furthermore, the probability reported in the right column is very low. This implies that the slope is statistically significant. To be less abstract, let us recall what those coefficients mean: they are the slope and the intercept of the regression line, i.e. Y = 4.073 X + 3.168. In sum, R2 is high, probabilities are low.

Table 5: Relationship between BOT and CNX Nifty with Regression Two-Stage Least squares Method

5.1. Model Description

		Type of Variable
Equation 1	CNX	dependent
	BOT	predictor
	FII	instrumental
	FDI	instrumental
	FER	instrumental

5.2. Model Summary

Equation 1	Multiple R	.841
	R Square	.708
	Adjusted R Square	.681
	Std. Error of the Estimate	1195.914

In the above table, the R2, also called the coefficient of determination is very useful. It measures the proportion of the total variation in Y about its mean explained by the regression of Y on X. In this case, our regression explains 70.8 % of the CNX Nifty. Typically, values of R2 below 0.1 are considered weak, between 0.1 and 0.3, moderate, and above 0.3, strong.

5.3. ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Equation 1	Regression	38152335.257	1	38152335.257	26.676	.000
	Residual	15732307.202	11	1430209.746		
	Total	53884642.459	12			

In the second table, we will focus on the F-statistic. By computing this statistic, we test the hypothesis that none of the explanatory variables help explain variation in Y about its mean. The information to pay attention to here is the probability shown as "Sig." in the table. If this probability is below 0.05, we conclude that the F-statistic is large enough so that we can accept the hypothesis that selected explanatory variables help explain variation in Y. This test is like a test of significance of the R2.

5.4. Coefficients

		Unstandardized Coefficients		Beta	t	Sig.
		B	Std. Error			
Equation 1	(Constant)	2287.071	529.052		4.323	.001
	BOT	-.006	.001	-.863	-5.165	.000

Finally, the last table will help us determine whether BOT and CNX Nifty are significantly related, and the direction and strength of their relationship. The first important thing to note is that the sign of the coefficient of BOT who read (%) is negative. It confirms our assumption (BOT decreases as CNX Nifty increases). Furthermore, the probability reported in the right column is very low. This implies that the slope is statistically not significant. To be less abstract, let us recall what those coefficients mean: they are the slope and the intercept of the regression line, i.e. $Y = -5.165 X + 4.323$. In sum, R^2 is high, probabilities are low.

Table 6: Relationship between FER and CNX Nifty with Regression Two-Stage Least squares Method

6.1. Model Description

		Type of Variable
Equation 1	CNX	dependent
	FER	predictor
	FII	instrumental
	FDI	instrumental
	BOT	instrumental

6.2. Model Summary

Equation 1	Multiple R	.866
	R Square	.750
	Adjusted R Square	.728
	Std. Error of the Estimate	1078.443

In the first table, the R2, also called the coefficient of determination is very useful. It measures the proportion of the total variation in Y about its mean explained by the regression of Y on X. In this case, our regression explains 75.0 % of the CNX Nifty. Typically, values of R2 below 0.1 are considered weak, between 0.1 and 0.3, moderate, and above 0.3, strong.

6.3 ANOVA

		Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Equation 1	Regression	38443172.300	1	38443172.300	33.054	.000
	Residual	12793439.843	11	1163039.986		
	Total	51236612.143	12			

In the second table, we will focus on the F-statistic. By computing this statistic, we test the hypothesis that none of the explanatory variables help explain variation in Y about its mean. The information to pay attention to here is the probability shown as "Sig." in the table. If this probability is above 0.05, we conclude that the

F-statistic is large enough so that we can accept the hypothesis that selected explanatory variables help explain variation in Y. This test is like a test of significance of the R^2.

6.4. Coefficients

		Unstandardized Coefficients				
		B	Std. Error	Beta	t	Sig.
Equation 1	(Constant)	1025.507	661.220		1.551	.149
	FER	.376	.065	.867	5.749	.000

Finally, the last table will help us determine whether FER and CNX Nifty are significantly related, and the direction and strength of their relationship. The first important thing to note is that the sign of the coefficient of FER who read (%) is positive. It confirms our assumption (FER increases as CNX Nifty increase slightly). Furthermore, the probability reported in the right column is very low. This implies that the slope is statistically significant. To be less abstract, let us recall what those coefficients mean: they are the slope and the intercept of the regression line, i.e. Y = 5.749 X + 1.551. In sum, R^2 is high, probabilities are low.

6. CONCLUSIONS

Some of the conclusions are drawn based on above results and analysis:

There is strong evidence (t = 3.282, p = 0.007) that the FII impact on CNX Nifty. In this data set, it improved marks, on average, by approximately 45573 points. Although the difference in marks is statistically significant, it is actually relatively small. We would need to consider if this difference in marks is practically important, not just statistically significant.

There is strong evidence (t = 4.159, p = 0.001) that the FDI impact on CNX Nifty. In this data set, it improved marks, on average, by approximately 55979 points. Although the difference in marks is statistically significant, it is actually relatively small. We would need to consider if this difference in marks is practically important, not just statistically significant.

There is strong evidence (t = 4.179, p = 0.001) that the BOT impact on CNX Nifty. In this data set, it improved marks, on average, by approximately 3 points. Although the difference in marks is statistically significant, it is actually relatively small. We would need to consider if this difference in marks is practically important, not just statistically significant.

There is strong evidence (t = 5.137, p = 0.000) that the FER impact on CNX Nifty. In this data set, it improved marks, on average, by approximately 3228 points. Although the difference in marks is statistically significant, it is actually relatively

small. We would need to consider if this difference in marks is practically important, not just statistically significant.

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