

Role of the FIIs in the Development of the Indian Stock Market: An Econometric analysis.

Abstract:

The stock market of a country operates in the economy of that country and the economic conditions of the country affect the stock prices of the stocks listed in the stock exchanges of the country. And it is believed that macroeconomic variables of a country and the stock prices of the stocks listed in the stock exchanges of the country are co-integrated. In this paper, in the context of India, the relationship of 8 macroeconomic variables with the stock market was examined. These variables are IIP, WPI, Gold Price, M3, Call Money Rate, FIIs Investment, Real Effective Exchange Rate and Foreign Exchange Rates. Two periods have been taken for the study, 1991 to 2002 and 2003 to 2016. 1991 to 2002 saw a flat stock market growth and 2003 to 2016 saw exponential growth. The credit of this exponential growth in the latter period is given to the Foreign Institutional Investors Investments (FIIs). By employing the Bi-variate Johansen Co-integration Test, Granger Causality Test and the Step-wise Regression, it was concluded that during 1991 to 2002 no macroeconomic variable affected the stock market in the long-run and during 2003 to 2016 only FIIs were able to influence the stock market in the long-run.

Keywords: Indian Stock Market, FIIs, Macroeconomic Variables, Post-2003, Foreign Investment.

1. Introduction:

The stock market of a country operates in the economy of that country, the economic conditions of that country will affect the sales, revenues, profits, borrowings, investments, investor sentiment and eventually the stock prices of the companies listed on the stock exchanges of that country. Thus, it is said that the macroeconomic variables of a country affect the stock market of that country and share a long-run co-integration.

In this part, we will analyse the effect of the macroeconomic variables of India on the Indian stock market by taking 8 variables into account. Periods will be taken from 1991 to 2002 and 2003 to 2016. Different periods have been taken because of the different movement of the stock market between these periods. 1991 to 2002 showed flat growth and 2003 to 2016 showed extraordinary growth. Then in the next section effect of GDP will be analysed on the stock market. Then by forming a panel regression effect of G20 economies' on their respective stock markets will be seen. And then a state level analysis will be done in which state variables of India will be taken and their effect will be seen on the Indian stock market.

Research Title	Researchers and Publication	Research Aim	Research Outcome
The Impact of Macroeconomic Fundamentals on Stock Prices Revised: A Study of Indian Stock Market	(Giri and Joshi, 2017)	To check whether there is an equilibrium relationship between several macroeconomic variables and stock market index in the long run or not	There exists long run relationship between macroeconomic variables and stock market index because they are cointegrated. Bi-directional granger causality is also present for some variables.
Dynamic interactions between stock markets and the real economy.	(Laopodis and Papastamou, 2016)	To establish the influence of macroeconomic variables on the movement of the stock market	There is a highly positive significant relationship between the movement in the stock market and the change in exchange rate and crude oil.
The Impact of Macroeconomic Variables on Indian Stock Market using Factor Analysis Approach.	(Islam and Habib, 2016)	To examine the influence of macroeconomic variables on the Indian stock market performance with the relevance of emerging markets using factor analysis approach.	Amongst 10 variables 3 factors are selected which are positively reflected and show significant result in influencing the stock market.
The cross-sectional relationship between stock returns and domestic and global factors in the Chinese A-share market	(Wang and Di Iorio, 2007)	To analyse the relationship between some characteristics specific to firms, a local beta, two local betas and the stock market returns using the Fama and Macbeth approach.	Results show that the firm characteristics like the size and book to market ratio are significant to influence the stock returns and the findings also show that the global stock markets and the hong kong stock market does not influence the chinese A share market.
Globalization and stock market returns	(Lam and Ang, 2006)	To measure the extent to which domestic or global risk factors can influence the stock market returns.	Both macroeconomic factors and global market risk factor significantly affect the stock market returns and in case of developed markets domestic factors provide four times less explanatory ability than the global factors

Cointegration and causality between macroeconomic variables and stock market returns	(Kwon and Shin, 1999)	To explain whether the stock market returns in Korea is affected by the current economic activities using cointegration, granger causality and the VECM tests.	Indices of stock prices are cointegrated with some chosen macroeconomic variables and hence there is a long run equilibrium relationship and the key finding is that the price indices of stocks is not the top indicator for variables.
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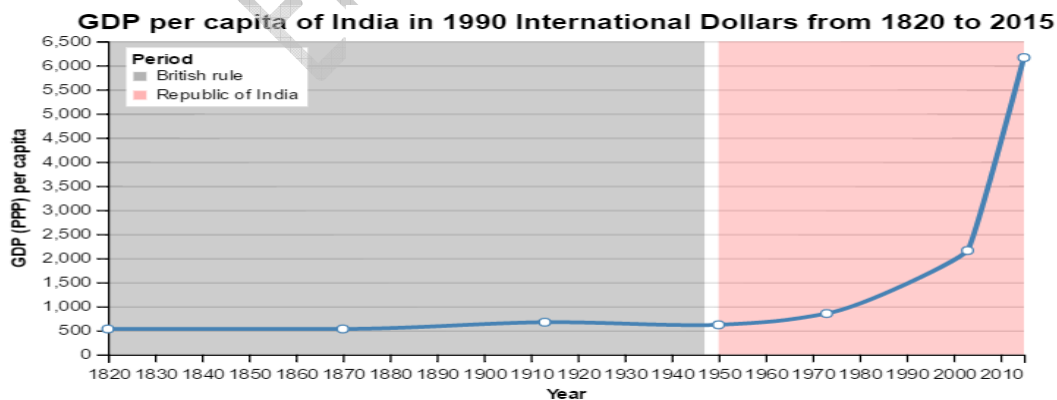
47 3. Research Gap:

48 From the literature, it was quite clear that there is still scope for analysing the impact of the FIIs
49 on the Indian stock market. We have taken two periods for our analysis for testing the effect of
50 the macroeconomic variables on the Indian stock market. First pre-2003 and second post-2003,
51 the Indian stock market growth post-2003 is largely credited to the FIIs. Pre-2002, growth of
52 the stock market was flat and there was no significant role of the FIIs. And this two-period
53 study will help us find the impact of the FIIs on the Indian stock market which has not been
54 done till now.

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56 4. Indian economy Pre and Post Liberalization and The Bombay Stock Exchange:

57 India became independent from the British rule in 1947, since independence till 1990s India
58 was only able to grow at a rate of 3 to 3.5% annually. The capital growth rate was even worse at
59 around 1.3%. The main reason behind this slow growth was centralized-economic
60 planning-model followed by the Indian government after the independence. This model was
61 inspired by the Soviet Union socialist-economic model. It was this model which gave rise to
62 extensive bureaucracy, red tape, unnecessary regulations and trade barriers in India. India's
63 protectionist policies, Nehru's five-year plans, License Raj drove economic planning and a
64 failure to open the markets to foreign investments, all contributed in the economic stagnation
65 and dismal growth rates from 1947 to 1990s.



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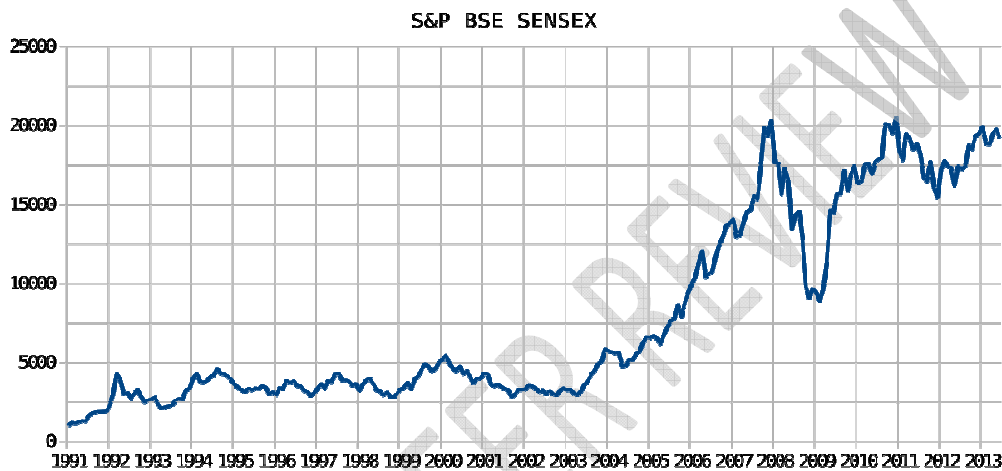
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68 In 1990 there came a period when India was in a serious economic crisis and the Indian
69 government was on the verge of bankruptcy. It had money left to import only 3 weeks of
70 imports and Indian government was forced to go to the IMF for help, it had to pledge 67 tonnes
71 of gold and as per the conditions of the IMF, it had to forcefully accept economic reforms. It
72 had to open its markets for the foreign investors, dismantle controls over the economy, had to

break state monopolies on the businesses and had to reduce tariffs. And this event in the history of Indian economy is popularly known as Liberalization of 1991.

It was the result of the liberalization that from \$132 million in 1991-92, foreign investment reached to \$5.3 billion in 1995-96. The real fruits of the reforms started to come in the 2000s when Indian economy started to grow in double digits annually. And the biggest impact which economic reforms of 1991 had was on the Bombay stock exchange of India.

Bombay stock exchange is the Asia's oldest stock exchange which began 140 years ago under a banyan tree. It has been India's primary stock exchange for a long time, it is today the 11th largest stock exchange in the world in terms of market capitalization. Its real growth started to pick from 2003 and since then it has not looked back.



The credit of its growth post-2003 is given to the 1991 economic reforms. The main driver of its growth post-2003 has been FIIs and it was the reforms of 1991 which allowed FIIs to invest into the Indian stocks through Indian stock exchanges. BSE SENSEX is the primary index of the Bombay stock exchange, it is a market index of financially sound and well-established 30 companies listed on the Bombay stock exchange. BSE SENSEX is often regarded as the barometer of the Indian economy and we will be taking this index in our research as the proxy representing the Indian stock market.

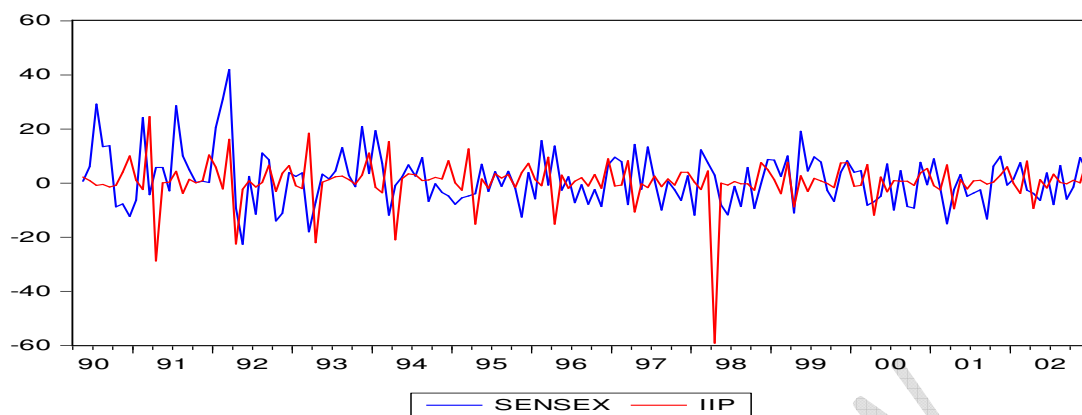
5. Information about the Macroeconomic Variables taken in the study:

1. IIP.

Information: Index of Industrial production of all commodities of India. An abstract number that represents the status of production in the industrial sector in India.

Expected Relationship: Positive Relationship. Higher IIP → Higher Production → Higher Sales → Higher Profits → Higher Stock Prices.

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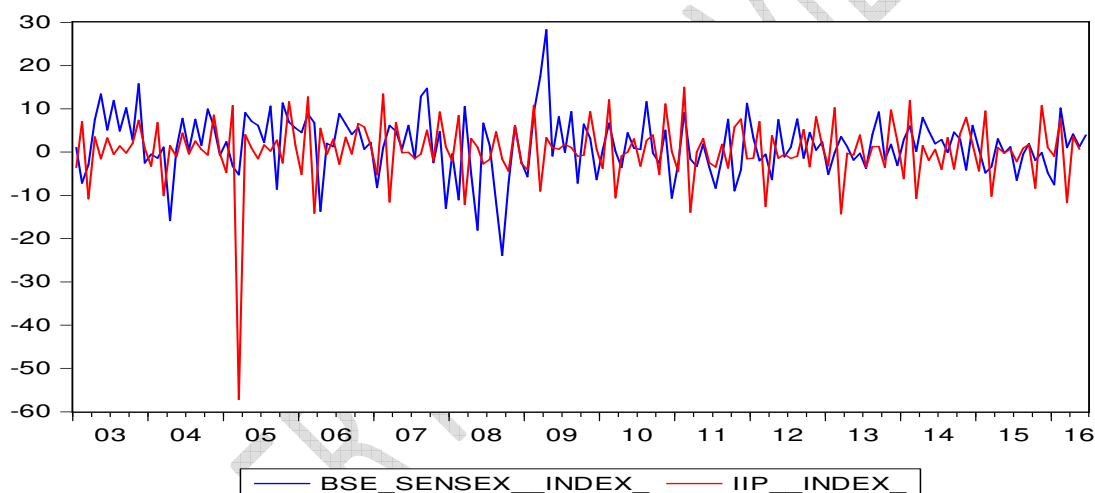
Pre-2003 (% Change in Values)

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Post-2003 (% Change in Values)

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2. WPI.

Information: Wholesale Price Index of India. An abstract number that represents the price of a representative basket of wholesale goods of India. Used to signify domestic inflation.

Expected Relationship: Negative Relationship. A. Higher WPI → Higher Prices → Lower Purchasing Power → Lower Demand → Lower Sales → Lower Profits → Lower Stock Prices.

B. Higher WPI → Higher Prices of Inputs → Higher Costs → Lower Profits → Lower Share Prices.

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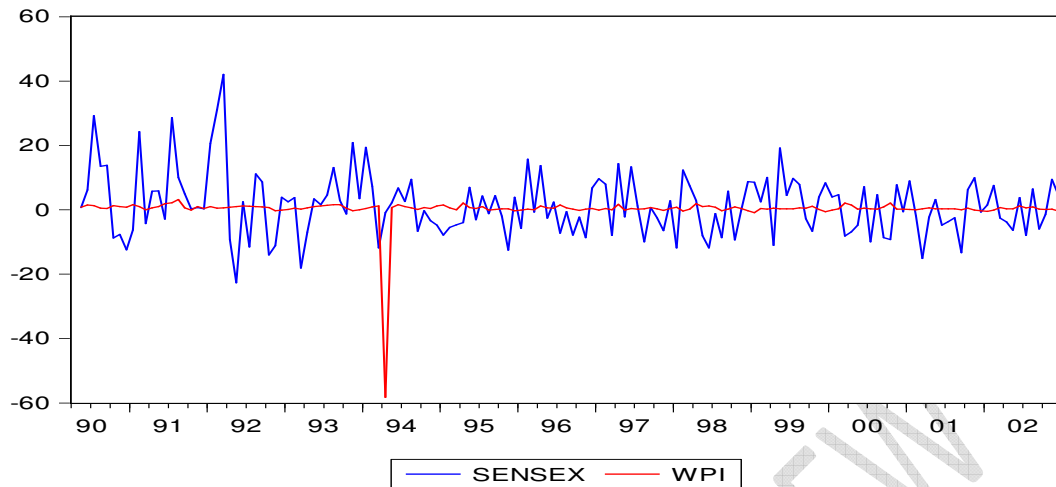
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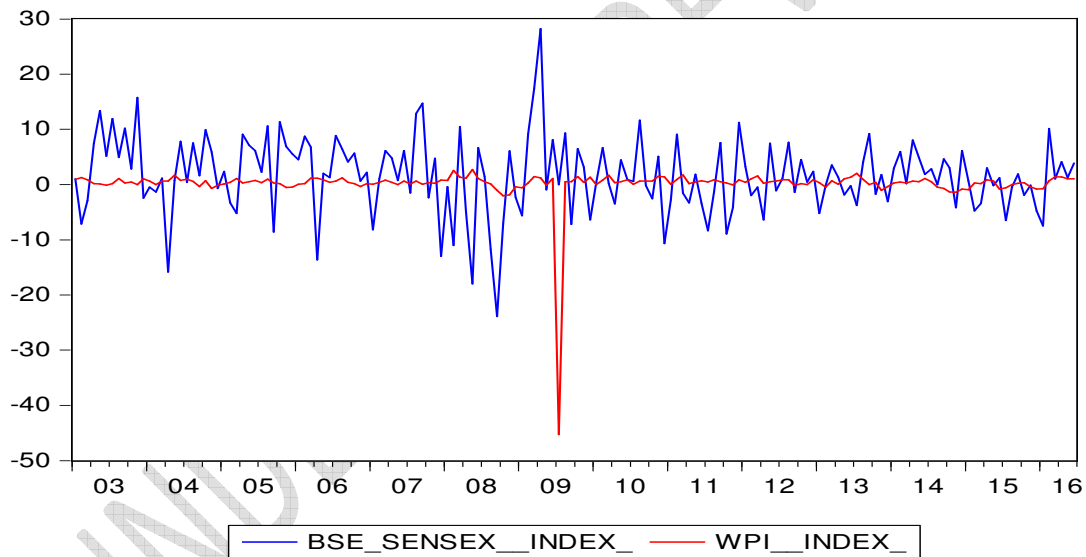
Pre-2003 (% Change in Values)

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Post-2003 (% Change in Values)

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3. Gold Price.

Information: Price of Gold per 10 grams in Mumbai. Quantities are in rupees. Used to signify domestic gold prices.

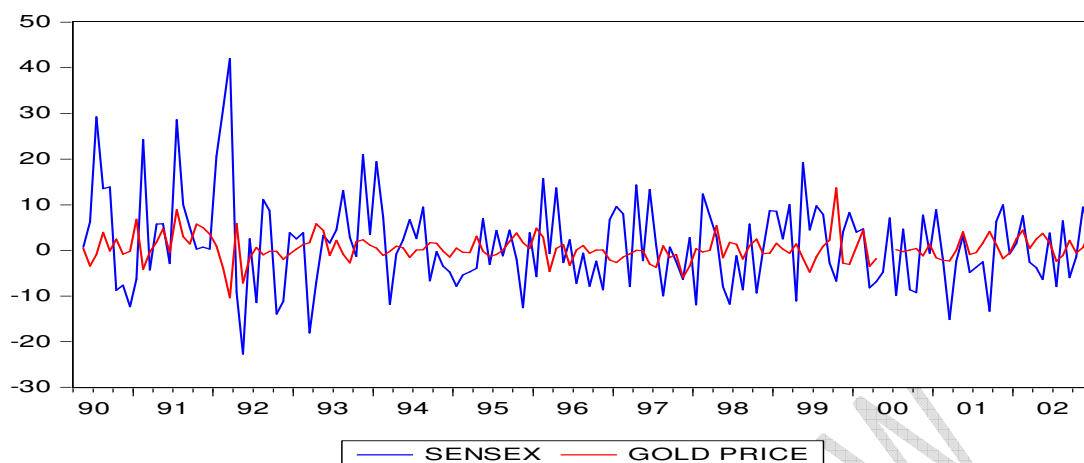
Expected Relationship: Negative Relationship. Higher Gold Prices → Lesser Investment in Gold → Higher Investment in Stocks → Higher Demand of Stocks → Higher Stock Prices.

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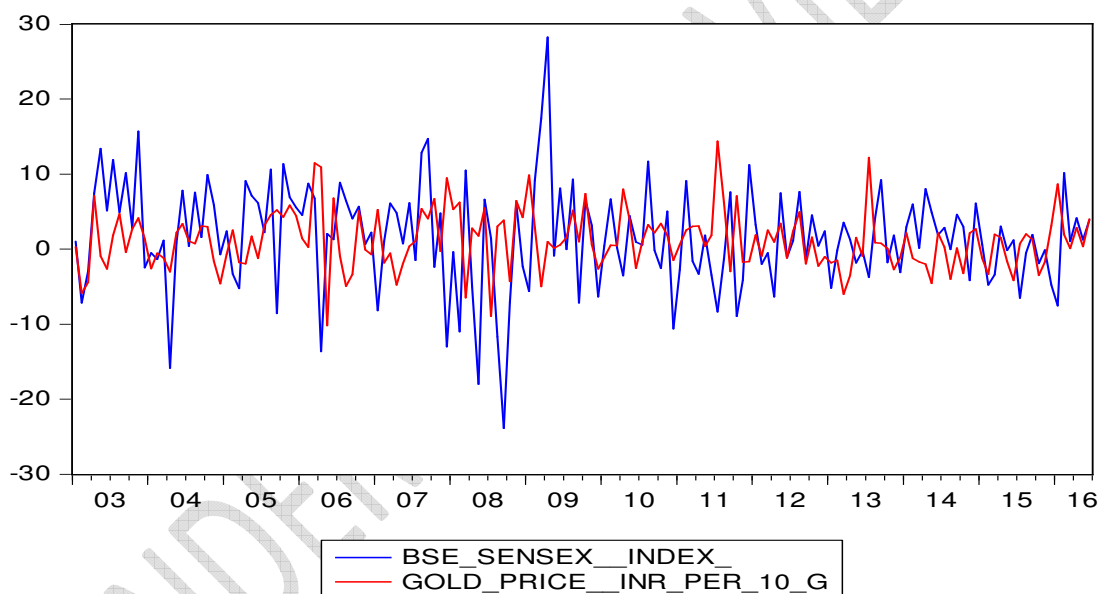
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Pre-2003 (% Change in Values)

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Post-2003 (% Change in Values)

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4. M3.

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Information: A broad monetary aggregate that includes operational deposits in central bank, money in saving accounts and current accounts, all banknotes and coins circulating in the economy, certificates of deposit, money market deposits, repurchase agreements and all other deposits. Quantities are in INR Crores. Used to signify domestic money supply.

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Expected Relationship: Positive Relationship. A. Higher M3 → Higher Money Supply → Lower Borrowing Rates, Mortgage Rates, etc → Higher Purchasing Power → Higher Demand → Higher Sales → Higher Profits → Higher Stock Prices.

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B. Higher M3 → Higher Money Supply → Lesser Interest Rates → Lesser Investments in Instruments like bonds, etc → Higher Investment in Stocks → Higher Demand of Stocks → Higher Stock Prices.

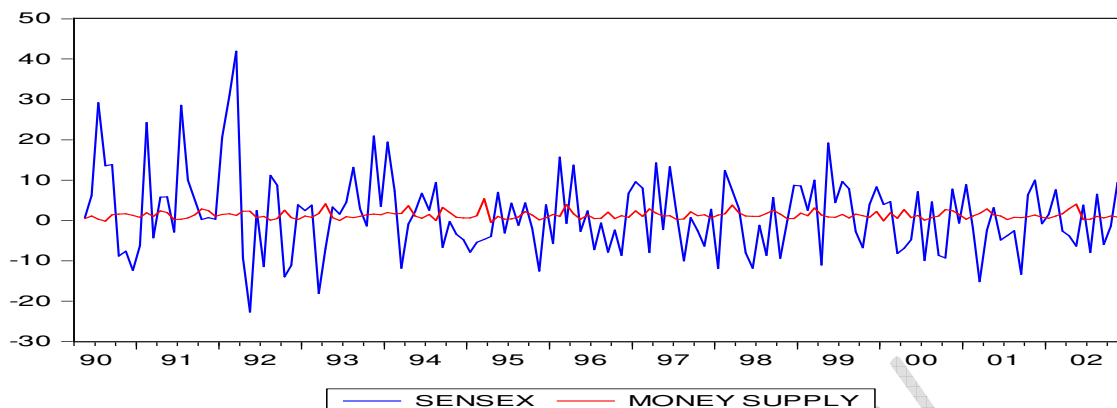
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C. Higher M3 → Higher Money Supply → Higher Money to Invest in Stocks → Higher Demand of Stocks → Higher Stock Prices.

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Pre-2003 (% Change in Values)



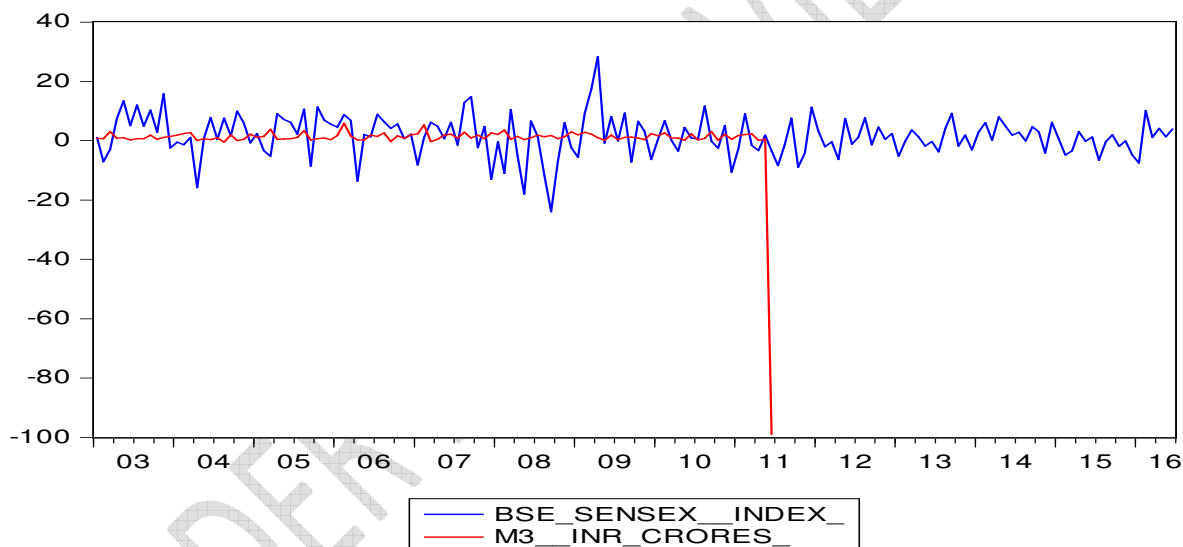
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Post-2003 (% Change in Values)



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5. Call Money rate.

Information: Rate at which short term funds are lent and borrowed in the money market. Call money loan duration is one day. Used to signify domestic interest rates.

Expected Relationship: Negative Relationship. A. Higher Call Money Rate → Higher Interest Rates → Higher Cost of Borrowing → Lower Purchasing Power → Lower Demand → Lower Sales → Lower Profits → Lower Stock Prices.

B. Higher Call Money Rate → Higher Borrowing Rates → Higher Debt Expenses of Companies → Lower Profits → Lower Stock Prices.

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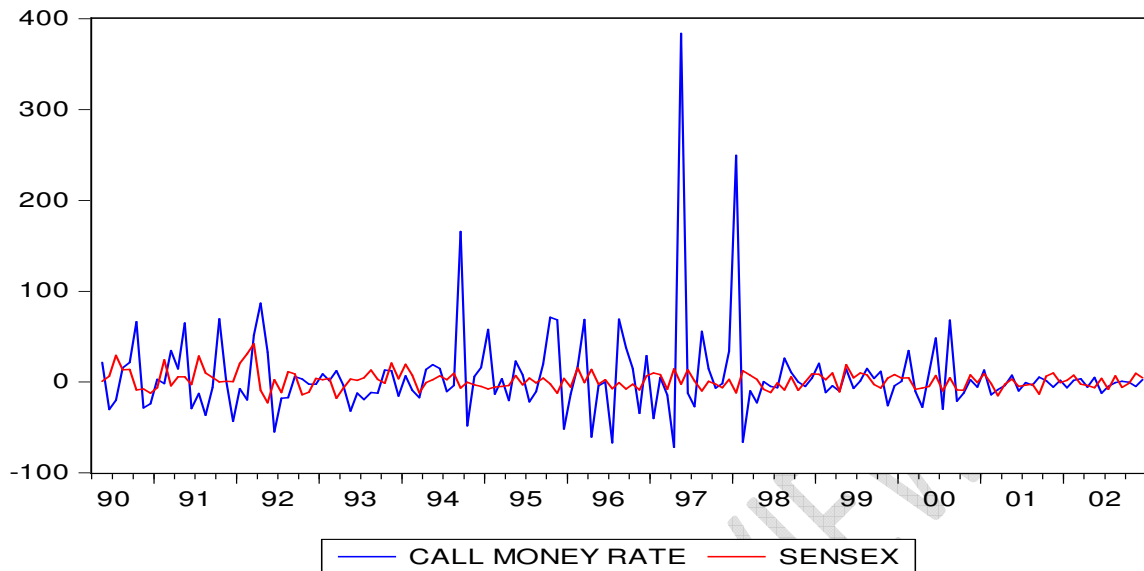
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Pre-2003 (% Change in Values)



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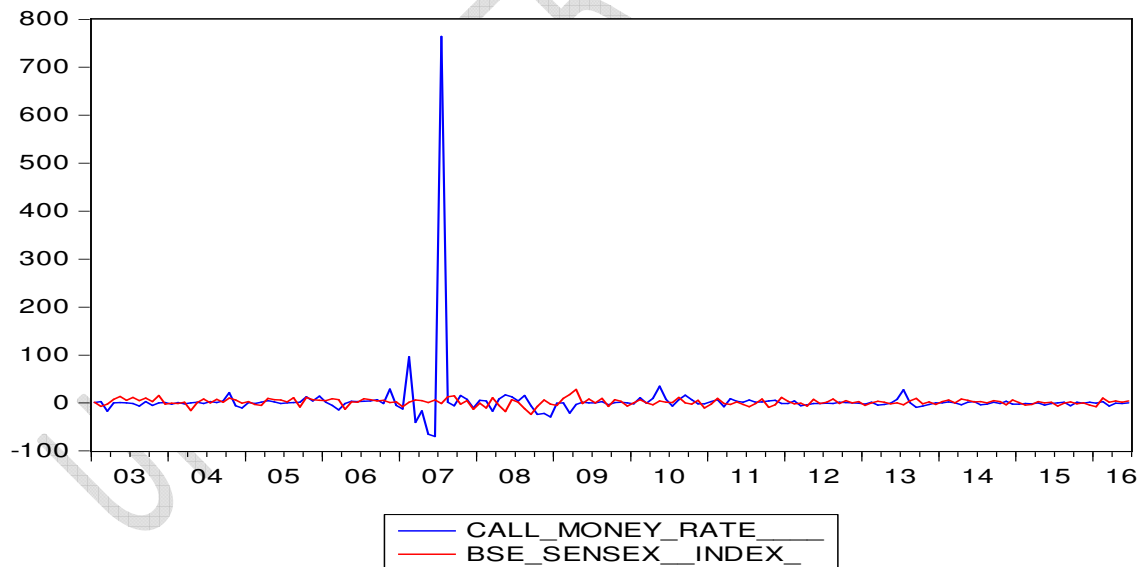
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Post-2003 (% Change in Values)



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187 **6. FIIs.**

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Information: The foreign investment which is made through financial markets like stock exchanges. Post-2003, FIIs investments have become the main driver of the stock prices in India. Quantities taken in INR Crores.

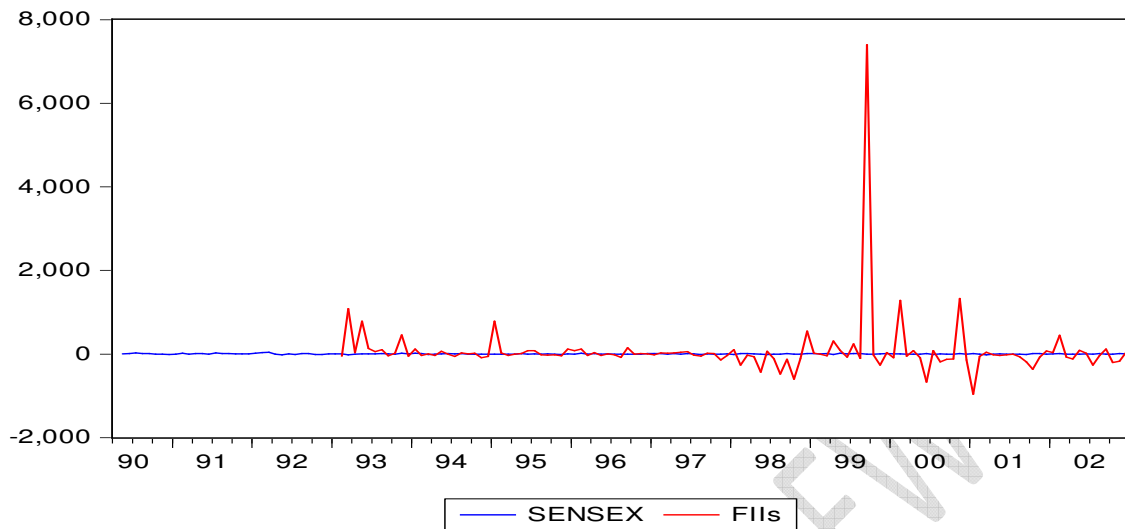
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Expected Relationship: Positive relationship. Higher FIIs investment → Higher Demand of the stocks → Higher Stock Prices.

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Pre-2003 (% Change in Values)

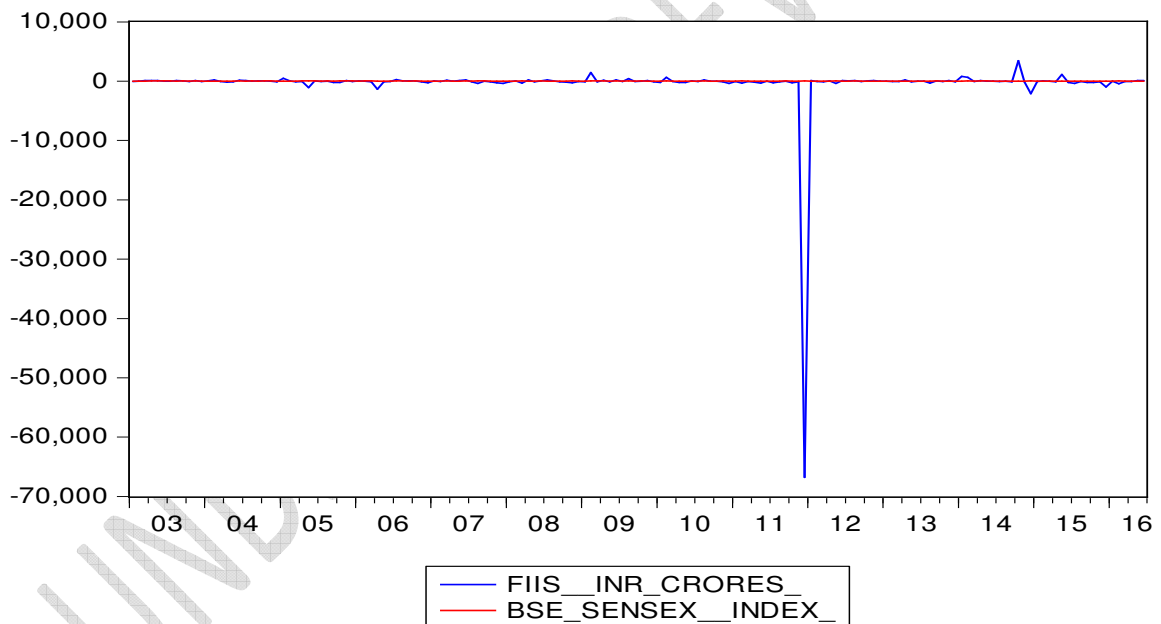


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Post-2003 (% Change in Values)



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199 7. REER.

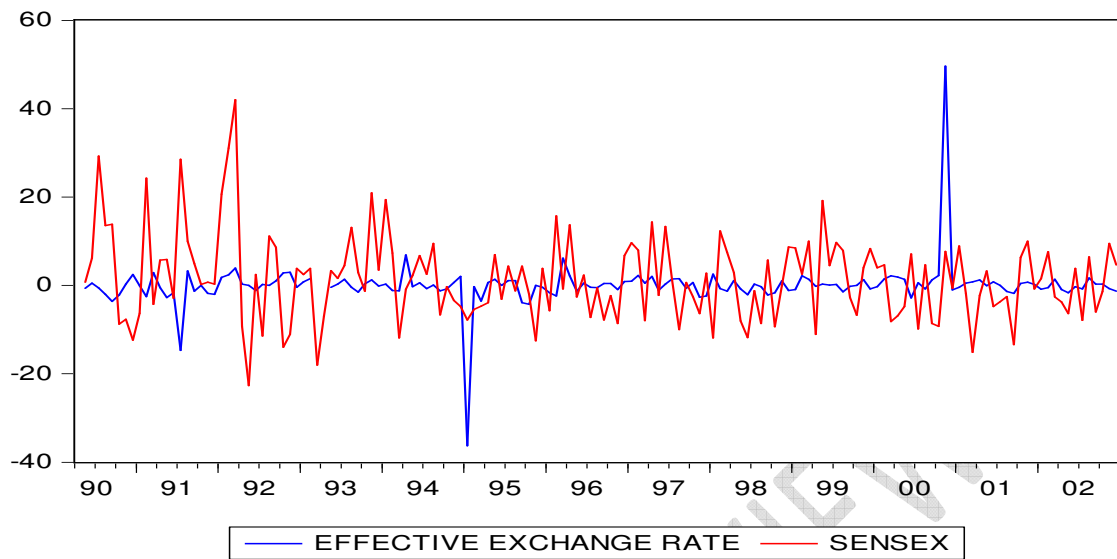
200 **Information:** Real Effective Exchange Rate of Indian Rupee. Calculated by the Reserve Bank
 201 of India by taking bilateral weights of 36 currencies. Used to signify exchange rate.

202 **Expected Relationship:** Negative Relationship. Lower REER → Lower value of Rupee →
 203 Lower Cost of Rupee → Lower Cost of Indian Products in Other Countries → Higher Demand
 204 of Indian Products in Other Countries → Higher Indian Exports → Higher Indian GDP →
 205 Higher Demand of Stocks Listed on Indian Stock Exchanges → Higher Stock Prices.

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Pre-2003 (% Change in Values)

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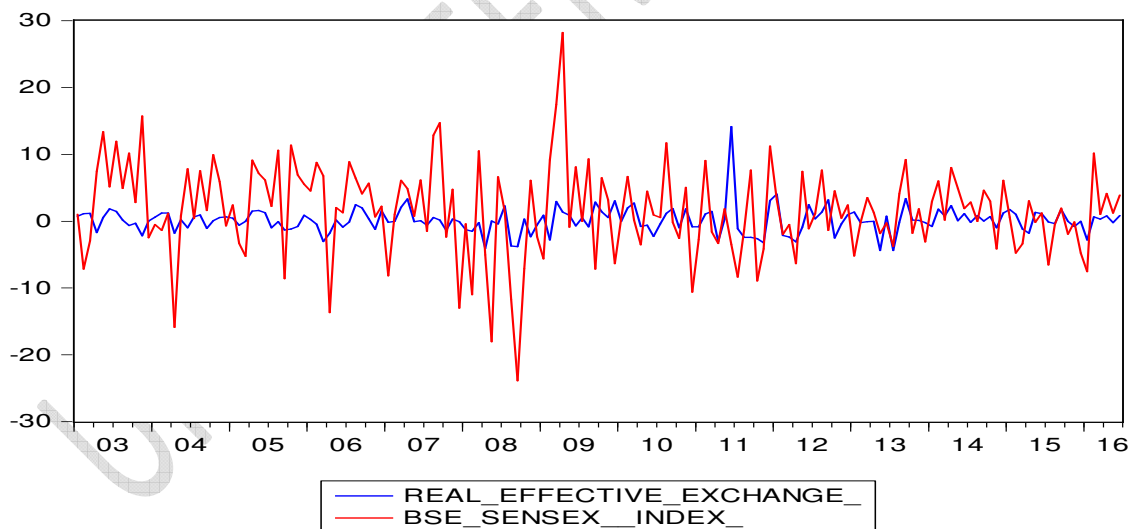
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Post-2003 (% Change in Values)

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8. FER.

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Information: Foreign Exchange Reserves kept by the government in the shape of currencies which helps in a emergency situation and in an exchange rate crisis. Quantities taken in US\$.

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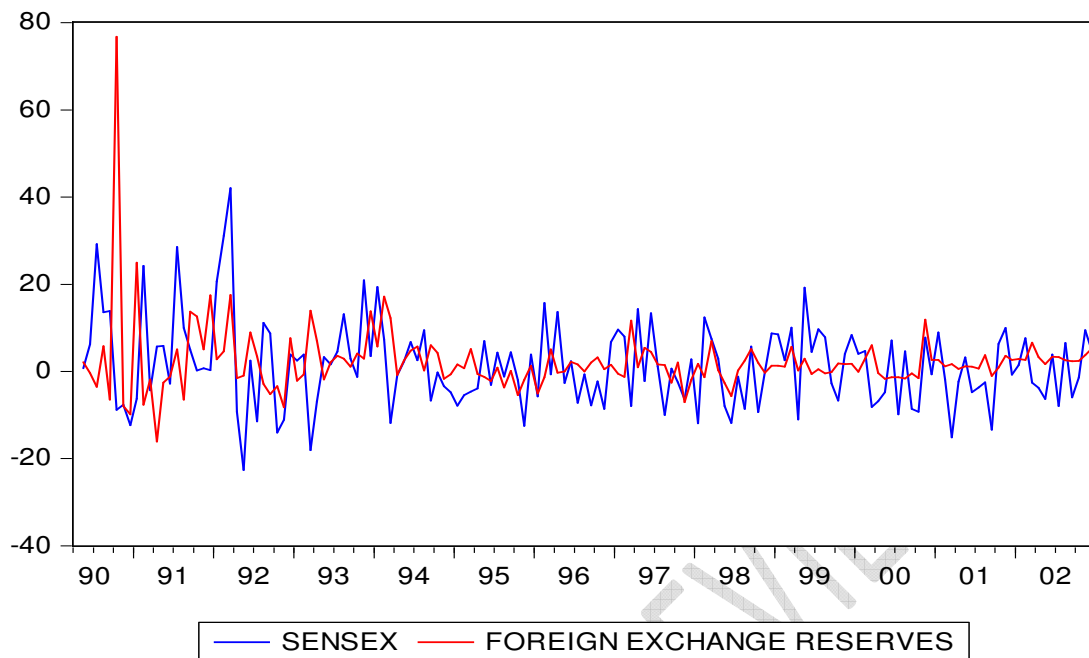
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Expected Relationship: Positive Relationship. Higher Foreign Exchange Reserves → Higher Confidence of the Investors → Higher Investments → Higher Demand of the stocks → Higher Stock Prices.

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Pre-2003 (% Change in Values)



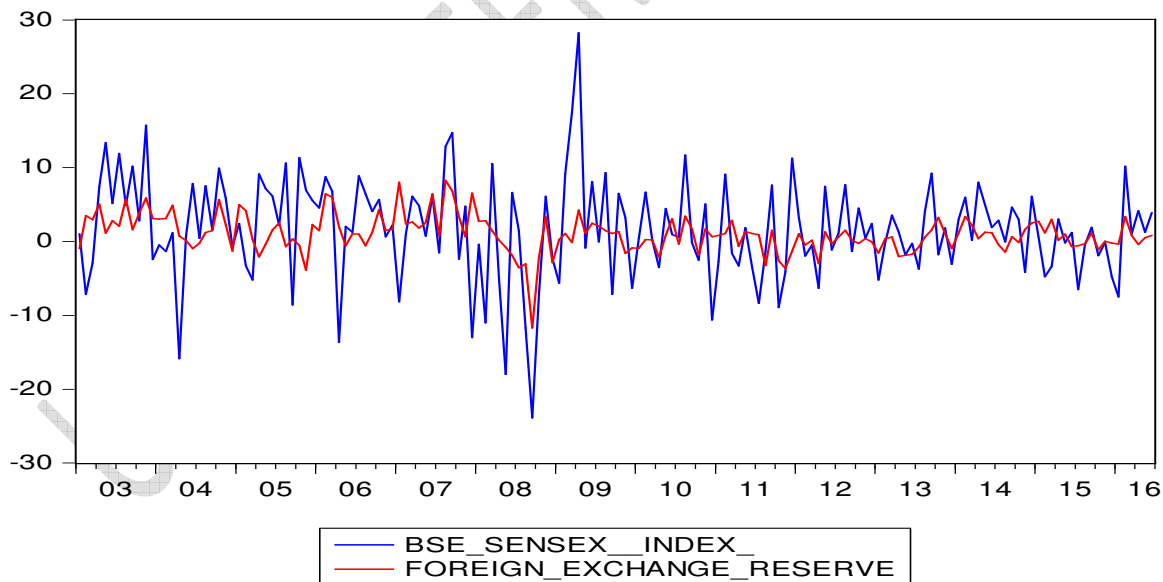
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Post-2003 (% Change in Values)



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231 **6. Econometric Testing and Analysis:**

232 **Dependent Variable:** BSE Sensex as representing the Indian Stock Market.

233 **Independent variables:** IIP, WPI, Gold Price, M3, Call Money Rate, FIIs Investments, Real
234 Effective exchange rate and Foreign exchange reserves.

235 **Period of analysis:** 1991 to 2002 (Pre-2003) and 2003 to 2016 (Post-2003).

236 **Frequency of data:** Monthly observations were taken.

237 **Data source:** RBI handbook of statistics.

238 **Econometric Tests:** Bivariate Johansen cointegration test, multiple stepwise regression and
239 Granger causality test were done. The assumptions for all the tests were checked and data were
240 transformed accordingly. Unit root test was performed and Johansen cointegration test was
241 performed when the variables were found to be of the same order. For lag length selection SC
242 criteria was used.

243 **Statistical Software Used:** SPSS Statistics 24, Eviews 8.0.

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246 **Pre-2003:**

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248 **A. Johansen Cointegration Test:** Long-run cointegration of SENSEX was found with call
249 money rate, effective exchange rate, FIIs, foreign exchange reserves, gold price and money
250 supply (See Table 1).

251

252 **Table 1.**

253 **COINTEGRATION TEST.**

	P value for Trace Statistic		P value for Maximum Eigen value statistic	
	None	At most 1	None	At most 1
Sensex and Call money rate	0.0000	0.0061	0.0000	0.0061
Sensex and effective exchange rate	0.0000	0.0100	0.0000	0.0100
Sensex and FIIs	0.0173	0.0027	0.2493	0.0027
Sensex and foreign exchange reserves	0.0002	0.0073	0.0020	0.0073
Sensex and Gold Price	0.0229	0.0773	0.0445	0.0773
Sensex and IIP	0.0758	0.0109	0.4006	0.0109
Sensex and Money supply	0.0000	0.0159	0.0000	0.0159
Sensex and WPI	0.0654	0.0363	0.1913	0.0363

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255

256 **B. Multiple Stepwise Regression:** Stepwise Regression was performed taking the independent
257 variables which passed the Johansen Cointegration test. The stepwise regression test gave a
258 model with 3 variables Foreign exchange reserves, Real Effective exchange rates and the FIIs
259 to be the most appropriate for explaining the value of BSE SENSEX which explained 65.6%
260 value of the BSE SENSEX, with F statistics of 52.873 (See Table 2).

261 **Table 2.**

262 **STEPWISE REGRESSION**

MODEL	VARIABLES	R SQUARE	ANNOVA (F STATISTIC)	ANNOVA (SIG.)
1.	(Constant), Foreign Exchange Reserves	.420	61.574	.000
2.	(Constant), Foreign Exchange Reserves, Real Effective Exchange Rate	.574	56.662	.000
3.	(Constant), Foreign Exchange Reserves, Real Effective Exchange Rate, FIIS	.656	52.873	.000

263

264 **Most Adequate Model, Model 3:** All the 3 variables found to be having the positive
 265 relationship with BSE SENSEX with unstandardized coefficients to be 0.086, 19.499 and 0.320
 266 for Foreign exchange reserves, real effective exchange rate and FIIs, respectively (See Table
 267 2.2).

268 **Table 2.2.**

269 **Model 3**

VARIABLES	UNSTANDARDIZED B	SIG.
(Constant)	-88.611	.829
Foreign Exchange Reserves	.086	.000
Real Effective Exchange Rate	19.499	.000
FIIs	.320	.000

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271

272 **C. Granger Causality Test:** But when the Granger Causality test was performed it rejected all
 273 the variables and concluded that none of these variable Granger cause Sensex in the pre-2003
 274 period. Foreign exchange reserves were rejected at 0.8453 p-values and F statistic of 0.16822,
 275 the real effective exchange rate at 0.7141 p-values and F statistic 0.33747 and FIIs at 0.8401
 276 p-values and 0.17455 F-statistic (See Table 3).

277

278 **Table 3.**

279 **Granger Causality Test**

Null Hypothesis	F-Statistic	Prob.
Foreign Exchange Reserves does not Granger cause Sensex	0.16822	0.8453
Sensex does not Granger cause Foreign Exchange Reserves	4.47705	0.0130

Real effective exchange Rate does not Granger cause Sensex	0.33747	0.7141
Sensex does not Granger cause Real effective exchange Rate	0.25917	0.7721
FIIS does not Granger cause Sensex	0.17455	0.8401
Sensex does not Granger cause FIIS	0.82631	0.4403

D. Conclusion: For the pre-2003 period, no variable was found to be affecting the Indian stock market.

Post-2003:

A. Johansen Cointegration Test: Long-run cointegration of SENSEX was found with call money rate, FIIs and foreign exchange reserves (See Table 4).

Table 4.

COINTEGRATION TEST

	P value for Trace Statistic		P value for Maximum Eigen value statistic	
	None	At most 1	None	At most 1
Sensex and Call money rate	0.0065	0.3468	0.0052	0.3468
Sensex and effective exchange rate	0.2288	0.2877	0.2398	0.2877
Sensex and FIIS	0.0001	0.3199	0.0001	0.3199
Sensex and foreign exchange reserves	0.0013	0.3318	0.0010	0.3318
Sensex and Gold Price	0.8899	0.9219	0.8428	0.9219
Sensex and IIP	0.0638	0.2311	0.0694	0.2311
Sensex and Money supply	0.5569	0.1106	0.7871	0.1106
Sensex and WPI	0.7220	0.3954	0.7352	0.3954

B. Multiple Stepwise Regression: Stepwise Regression was performed taking the independent variables which passed the Johansen Cointegration test. The stepwise multiple regression gave a model with 3 variables, Foreign exchange reserves, FIIs and Call money rate explaining the 85.2% of the value of BSE SENSEX as the most appropriate model (See Table 5).

Table 5.

299 **Results of step-wise regression.**

MODEL	VARIABLES	R SQUARE	ANNOVA (F STATISTIC)	ANNOVA (SIG.)
1.	(Constant), Foreign Exchange Reserves	.834	811.738	.000
2.	(Constant), Foreign Exchange Reserves, FIIS	.846	439.612	.000
3.	(Constant), Foreign Exchange Reserves, FIIS, Call money Rate	.852	305.527	.000

300

301 **Most adequate model. Model 3:** All the variables were found to be having the positive
 302 relationship with the BSE SENSEX with 0.078, 0.225 and 330.684 unstandardized coefficients
 303 of foreign exchange reserves, FIIS and call money rate, respectively (See Table 5.2)

304

305 **Table 5.2.**

306 **Model 3.**

VARIABLES	UNSTANDARDIZED B	SIG.
(Constant)	-5696.180	.000
Foreign Exchange Reserves	.078	.000
FIIS	.225	.000
Call money rate	330.684	.011

307

308 **C. Granger Causality Test:** But in the Granger causality test Foreign exchange reserves
 309 causing the SENSEX was rejected at 0.7235 p values and 0.32437 F statistic, call money rate
 310 rejected at 0.4167 p value and 0.88039 F statistic but FIIS were accepted as causing the
 311 SENSEX with 0.0036 p values and F statistic of 5.83023. Also in the analysis, it was found that
 312 in the post-2003 period Sensex is responsible for determining the value of foreign exchange
 313 reserves and call money rate (See Table 6).

314

315 **Table 6.**

316 **Results of pairwise Granger Causality (Post 2003).**

Null Hypothesis	F-Statistic	Prob.
Foreign Exchange Reserves does not Granger cause Sensex	0.32437	0.7235
Sensex does not Granger cause Foreign Exchange Reserves	5.86287	0.0035
Call money rate does not Granger cause Sensex	0.88039	0.4167
Sensex does not Granger cause call money Rate	3.40848	0.0356
FIIS does not Granger cause Sensex	5.83023	0.0036

Sensex does not Granger cause FIIS	4.89200	0.0087
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318 **D. Conclusion:** For the post-2003 period, only FIIs were found to be affecting the stock market
319 of India significantly

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321 8. Conclusion:

322 This leads to conclude that the separate periods which we took for analysis were worth taking.
323 As expected in the post-2003 period the stock prices in India are largely determined by the
324 foreign investment in the shape of foreign institutional investors' investment (FIIs) and no
325 other variable was found to be affecting the Sensex in the post-2003 period. This consistent
326 growth of the stock market which we are seeing in the post-2003 era is all because of FIIs.

327 In the pre-2003 period, there was no much growth of the stock market and no variable has been
328 found to be affecting the stock market. If we exclude the FIIs and growth from the stock market
329 in the post-2003 era then it would perhaps give us the same result no much growth of the stock
330 market and no effect of any variable. It is pretty clear from the tests results that main reason
331 behind the stock market's growth in the post-2003 era is FIIs.

332

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