ANALYTICAL STUDY OF IMPACT OF FII ON INDIAN STOCK MARKET WITH SPECIAL REFERENCE TO BSE SENSEX

Vikram K. Joshi* & Miss Richa Saxena**

ABSTRACT

FII is allowed to enter into our country only through stock exchanges either in the form of equity or debt. Thus it makes an impact on the rise or fall of SENSEX, since FII is allowed to be purchased or sold daily. The daily transaction of FII is the reason behind the volatility in the stock markets and has strong impact on the various macro-economic variables and the economy as a whole. Thus, the paper attempts to analyze the impact of variation in FII on Sensex and to study the degree of relationship between them in various FII movement scenarios.

INTRODUCTION

Most of the under developed countries suffer from low level of income and capital accumulation. Though, despite this shortage of investment, these countries have developed a strong urge for industrialization and economic development. As we know the need for Foreign capital arises due to shortage from domestic side and other reasons. Indian economy has experienced the problem of capital in many instances. While planning to start the steel companies under government control, due to shortage of resources it has taken the aid of foreign countries. Likewise we have received aid from Russia, Britain and Germany for establishing Bhilai, Rourkela and Durgapur steel plants. The present paper is a modest attempt to study the impact of Foreign Institutional Investment on Indian Stock Market with special reference to BSE SENSEX India. It is observed that the FIIs investment has shown significant improvement in the liquidity of stock prices of both BSE and NSE. However, it is believed that there exists a high degree of positive correlation between FIIs investment and market capitalization, FIIs investment and BSE & NSE indices, revealing that the liquidity and volatility was highly influenced by FIIs flows. Further, it is also proved that FIIs investment was a significant factor for high liquidity and volatility in the capital market prices. The present study is proposed to analyse the impact of FIIs on Indian capital market with special reference to BSE.

An investor or investment fund that is from or registered in a country outside of the one in which it is currently investing is known as Foreign Institutional Investment and investors are known as **Foreign Institutional Investors**. Institutional investors include hedge funds, insurance companies, pension funds and mutual funds.

The term is used most commonly in India to refer to outside companies investing in the financial markets of India. International institutional investors must register with the Securities and Exchange Board of India to participate in the market. One of the major

* *Asst Professor, Dr Ambedkar Business School, Deeksha Bhoomi, Nagpur.*

** *Student - PGDM IV-Semester, Dr Ambedkar Business School, Deeksha Bhoomi, Nagpur.*

market regulations pertaining to FIIs involves placing limits on FII ownership in Indian companies.

Investment limits for FII

Foreign Institutional Investors (FIIs) are allowed to invest in the primary and secondary capital markets in India through the portfolio investment scheme (PIS).

Under this scheme, FIIs can acquire shares/debentures of Indian companies through the stock exchanges in India. The ceiling for overall investment for FIIs is 24 per cent of the paid up capital of the Indian company. The limit is 20 per cent of the paid up capital in the case of public sector banks, including the State Bank of India. The ceiling of 24 per cent for FII investment can be raised up to sectoral cap/statutory ceiling, subject to the approval of the board and the general body of the company passing a special resolution to that effect. And the ceiling of 10 per cent for NRIs/PIOs can be raised to 24 per cent subject to the approval of the general body of the company passing a resolution to that effect. The ceiling for FIIs is independent of the ceiling of 10/24 per cent for NRIs/PIOs.

The Reserve Bank of India monitors the ceilings on FII/NRI/PIO investments in Indian companies on a daily basis. For effective monitoring of foreign investment ceiling limits, the Reserve Bank has fixed cut-off points that are two percentage points lower than the actual ceilings. The cut-off point, for instance, is fixed at 8 per cent for companies in which NRIs/ PIOs can invest up to 10 per cent of the company's paid up capital. The cut-off limit for companies with 24 per cent ceiling is 22 per cent and for companies with 30 per cent ceiling, is 28 per cent and so on. Similarly, the cut-off limit for public sector banks (including State Bank of India) is 18 per cent.

Once the aggregate net purchases of equity shares of the company by FIIs/NRIs/ PIOs reach the cut-off point, which is 2% below the overall limit, the Reserve Bank cautions all designated bank branches so as not to purchase any more equity shares of the respective company on behalf of FIIs/NRIs/PIOs without prior approval of the Reserve Bank. The link offices are then required to intimate the Reserve Bank about the total number and value of equity shares/convertible debentures of the company they propose to buy on behalf of FIIs/ NRIs/PIOs. On receipt of such proposals, the Reserve Bank gives clearances on a first-come-first served basis till such investments in companies reach 10 / 24 / 30 / 40/ 49 per cent limit or the sectoral caps/statutory ceilings as applicable. On reaching the aggregate ceiling limit, the Reserve Bank advises all designated bank branches to stop purchases on behalf of their FIIs/NRIs/PIOs clients. The Reserve Bank also informs the general public about the 'caution' and the 'stop purchase' in these companies through a press release.

Basis for calculating FII investment limit:

Investment limit by all registered FIIs or sub accounts in primary or secondary markets under Portfolio Investment Scheme is subject to a ceiling of 24% of issued share capital of a company. The limit can be extended upto 49% per sectoral cap if the general body of the company approves it.

Need For Foreign Capital

The need of foreign investment/ foreign capital arises due to the following reasons:

1. Development of basic infrastructure: The development of any economy depends on the available infrastructure in that country. The infrastructure facilities such as Roads, Railways, sea ports, warehouses banking services and insurance services are the prominent players. Due to long gestation period naturally individuals will not come forward to invest in infrastructure industries. Government of India could not able to raise necessary investments. To fill the gap foreign capital is highly suitable.

2. Rapid industrialization: The need for foreign capital arises due to the policy initiatives of the Government to intensify the process of industrialization. For instance the government of India is gradually opening the sectors to foreign capital to expand the industrial sector.

3. To undertake the initial risk: many developing countries suffer from severe scarcity of private investors. The risk problem can be diverted to the foreign capitalists by allowing them to invest. As we know the Indians are comparatively risk averse. The same risk can be transferred to foreign investors by allowing their investment where risk is more.

4. Global imperatives: Globalization is the order of the day. The international agreements between countries are also the reason for the foreign capital. The multinational companies are expanding their presence to many countries; while they are entering into the foreign countries they will bring their capital. The principles of WTO and other regional associations are binding the member countries to allow foreign capital.

5. Comparative advantage: The variations in the cost of capital like interest rate are also one of the important factors which resulting in approaching foreign capital. For example; Interest rates are high in India compared with developed economies. To reduce the cost of capital, companies/organizations are now looking for foreign capital. In several countries the interest rates are very low as 1% to 3%, where as in some countries the interest rates are very high as 8% to 10% per annum.

6. **To remove the technological gap**: The developing countries have very low level of technology compared to the developed countries. However, these developing countries posses a strong urge for industrialization to develop their economies and to wriggle out of the low level equilibrium trap in which they are caught. This raises the necessity for importing technology from the advanced countries. That technology usually comes with foreign capital when it assumes the form of private foreign investment or foreign collaboration.

REGISTERED FIIS IN INDIA

The Indian capital market opened its doors to foreign investors in 1991. The new industrial policy of the government has initiated many measures to attract foreign capital. The following table highlights the registered FIIs in India during the period from 2006 to 2010.

Table – 1
No of Registered FIIs in India

YEAR	NO.OF REGISTERED FIIs
January 2006	833
January 2007	1059
January 2008	1279
January 2009	1609
January 2010	1697
Source: www.sebi.gov.in	

From the above table 1, it is clear that there is constant growth in the number of registered FIIs in India. In the year 2006 (January, 2006), the number of registered FIIs were 833 only. The same number has been increased to 1697 by the year 2010 (January 2010). The number has been increased by more than 100 per cent. In spite of the global financial crisis the number of registered FIIs has shown a significant increase. Irrespective of the situation in Indian stock markets these FIIs has earmarked their presence. But the investment made by FIIs has experienced drastic decline in the recent past. This is mainly because of the global economic meltdown. Though the number of registered FIIs increased the net investment was not increased proportionately.

Bombay Stock Exchange (BSE):

The Stock Exchange, Mumbai (BSE) came out with a stock index in 1986, which is known as BSE Sensex. The base year of BSE Sensex is 1978- 79 and the base value is 100. The exchange is the largest (in terms of market capitalization) in South Asia. In terms of the number of companies traded on the exchange (approximately 4700), it is the largest in the world. The main index which tracks the performance of the exchange is the BSE Sensex.

Bombay Stock Exchange Sensitive Index:

A value – weighted stock market index, which tracks the performance of the 30 largest stocks on the Bombay Stock Exchange. The 30 stocks are chosen at random times, whenever the market has significantly changed enough to warrant the changes, and are chosen by their value of free- float shares. Although the index only tracks a very small percentage of the total stocks traded at the BSE, the index typically comprises about one- fifth of the market capitalization of the entire stock exchange.

Table 2: Listed companies on BSE SENSEX

Name	Sector	Adj. Factor	Weight in Index (%)
ACC	Housing Related	0.55	0.77
BHEL	Capital Goods	0.35	3.26
Bharti Airtel	Telecom	0.35	3
DLF Universal Limited	Housing related	0.25	1.02
Grasim Industries	Diversified	0.75	1.5
HDFC	Finance	0.90	5.21
HDFC Bank	Finance	0.85	5.03
Hero Honda Motors Ltd.	Transport Equipments	0.50	1.43
Hindalco Industries Ltd.	Metal, Metal Products & Mining	0.7	1.75
Hindustan Lever Limited	FMCG	0.50	2.08
ICICI Bank	Finance	1.00	7.86
Infosys	Information Technology	0.85	10.26
ITC Limited	FMCG	0.70	4.99
Jaiprakash Associates	Housing Related	0.55	1.25
Larsen & Toubro	Capital Goods	0.90	6.85
Mahindra & Mahindra Ltd.	Transport Equipments	0.75	1.71
Maruti Suzuki	Transport Equipments	0.50	1.71
NIIT Technologies	Information Technology	0.15	2.03
NTPC	Power	0.15	2.03
NIIT	Information Technology	0.15	2.03
ONGC	Oil & Gas	0.20	3.87
Reliance Communications	Telecom	0.35	0.92
Reliance Industries	Oil & Gas	0.50	12.94

Reliance Infrastructure	Power	0.65	1.19
State Bank of India	Finance	0.45	4.57
Sterlite Industries	Metal, Metal Products, and Mining	0.45	2.39
Sun Pharma Industries	Healthcare	0.40	1.03
Tata Consultancy Services	Information Technology	0.25	3.61
Tata Motors	Transport Equipments	0.55	1.66
Tata Power	Power	0.70	1.63
Tata Steel	Metal, Metal Products & Mining	0.70	2.88
Wipro	Information Technology	0.20	1.61

Source: www .bseindia.com

Data Collection

For analyzing the impact of FII on SENSEX, the data is collected for values of Sensex, FII in terms of Total Investment (Equity+Debt) & FII in terms of Total Turnover (Purchase & Sales of Equity+Debt) for the last quarter of 2011 Financial year (i.e., January, February and March month). Only last quarter which includes three months are taken for the purpose of analysis as it includes six cases which represents different scenarios of inflows and outflows of FII. Also it will facilitate convenience for the researcher to have better insight to analyse the impact of FII on SENSEX under various FII movement scenarios. The following tables give the data of SENSEX & FII for different months as below:

Table 3: DATA OF SENSEX & FII FOR JANUARY 2011

Reporting Date	Sensex (Y)	Equity (Net Investment)	Debt(Net Investment)	TOTAL INVESTMENT (EQUITY+ DEBT)	TOTAL TURNOVER (PURCHASE & SALES) (EQUITY + DEBT)
03-01-2011	20,561.05	615.2	472.3	1087.5	3712.3
04-01-2011	20,449.01	421.8	181.7	603.5	3079.4
05-01-2011	20,243.95	775.4	370	1145.4	7043.2
06-01-2011	20,184.74	-92.7	-138.2	-230.9	8103
07-01-2011	19,691.81	-232	303.8	71.8	8494.2
10-01-2011	19,224.12	-966.6	767.7	-198.9	7230.8
11-01-2011	19,196.34	-1089.4	719.1	-370.3	8149.6
12-01-2011	19,534.10	-1125.4	-248.32	-1373.72	9087.3
13-01-2011	19,182.82	-129.4	1688.8	1559.4	9726.4
14-01-2011	18,860.44	-113.6	1479.3	1365.7	9705.1
17-01-2011	18,882.25	-724.2	3913.2	3189	10250.2
18-01-2011	19,092.25	-118	701.3	583.3	6879.9

19-01-2011	18,978.32	176.3	178.2	354.5	5588.9
20-01-2011	19,046.54	-207.4	87.2	-120.2	7022.1
21-01-2011	19,007.53	-835.9	-298.3	-1134.2	7599
24-01-2011	19,151.28	23.1	218.6	241.7	6419.3
25-01-2011	18,969.45	194	-472.4	-278.4	6559
27-01-2011	18,684.43	426.8	-229.5	197.3	6277.4
28-01-2011	18,395.97	-1399.5	1668.9	269.4	12075.9
31-01-2011	18,327.76	-607.9	-288.2	-896.1	8747.3

Source: Compiled from www.sebi.gov.in & www.bseindia.com.

Table 4
DATA OF SENSEX & FII FOR FEBRUARY 2011

Reporting Date	Sensex (Y)	Equity (Net Investment)	Debt(Net Investment)	TOTAL INVESTMENT (EQUITY+ DEBT)	TOTAL TURNOVER (PURCHASE & SALES) (EQUITY + DEBT)
01-02-2011	18,022.22	-859.9	884.2	24.3	7959.3
02-02-2011	18,090.62	-985.6	271.2	-714.4	8664.2
03-02-2011	18,449.31	-51.3	-1125.4	-1176.7	7713.3
04-02-2011	18,008.15	646.5	379.6	1026.1	5040.9
07-02-2011	18,037.19	199.3	308.8	508.1	5487.1
08-02-2011	17,775.70	-12.8	-108.3	-121.1	7461.1
09-02-2011	17,592.77	-554.4	377.7	-176.7	7393.7
10-02-2011	17,463.04	-288.8	-431	-719.8	8285
11-02-2011	17,728.61	-845.7	238.5	-607.2	7365
14-02-2011	18,202.20	-434.4	295.6	-138.8	7898
15-02-2011	18,273.80	224.9	213.2	438.1	7704.8
17-02-2011	18,506.82	171.6	208.1	379.7	9731.5
18-02-2011	18,211.52	83.5	831.2	914.7	6977.3
21-02-2011	18,438.31	235.2	-221.6	13.6	6300.6
22-02-2011	18,296.16	-203.1	-224.7	-427.8	5186.8
23-02-2011	18,178.33	-207.6	-56	-263.6	6494.2
24-02-2011	17,632.41	-433.8	71.7	-362.1	7979.5
25-02-2011	17,700.91	-2248.9	-166	-2414.9	10469.5
28-02-2011	17,823.40	-527.9	136	-391.9	8502.9

Source: Compiled from www.sebi.gov.in & www.bseindia.com.

Table 5 : DATA OF SENSEX & FII FOR MARCH 2011

Reporting Date	Sensex (Y)	Equity (Net Investment)	Debt(Net Investment)	TOTAL INVESTMENT (EQUITY+ DEBT)	TOTAL TURNOVER (PURCHASE & SALES) (EQUITY + DEBT)
01-03-2011	18,446.50	-79.3	135.4	56.1	8287.7
03-03-2011	18,489.76	463.9	911	1374.9	7588
04-03-2011	18,486.45	274.4	630.5	904.9	7932
07-03-2011	18,222.67	631.9	191.8	823.7	6015.4
08-03-2011	18,439.65	-46.1	-648.2	-694.3	5194.3
09-03-2011	18,469.95	321.3	486.7	808	5132.4
10-03-2011	18,327.98	207.2	-828.9	-621.7	4755.2
11-03-2011	18,174.09	-42.6	142	99.4	4361.6
14-03-2011	18,439.48	-218.8	920.4	701.6	5023.8
15-03-2011	18,167.64	507.4	137.5	644.9	3979.7
16-03-2011	18,358.69	219.5	-296.2	-76.7	5908.2
17-03-2011	18,149.87	-145.7	843.1	697.4	6349.6
18-03-2011	17,878.81	-1008.7	-662.3	-1671	5425.9
21-03-2011	17,839.05	-483.7	86.5	-397.2	5247.8
22-03-2011	17,988.30	73.7	-532.3	-458.6	3394.8
23-03-2011	18,206.16	328.1	-938.5	-610.4	5262.5
24-03-2011	18,350.74	403.3	-620.7	-217.4	5881.5
25-03-2011	18,815.64	345.5	489.3	834.8	6352.4
28-03-2011	18,943.14	1518.2	855.8	2374	6337.8
29-03-2011	19,120.80	1029.4	-34	995.4	6801.3
30-03-2011	19,290.18	1477.6	394.5	1872.1	6319.2
31-03-2011	19,445.22	1022.4	344.4	1366.8	5909.1

Source: Compiled from www.sebi.gov.in & www.bseindia.com.

Data Analysis:

Hypothesis 1: There exists a relationship between SENSEX & FII.

Hypothesis 2: The variation between SENSEX & FII is significant.

Case 1: SENSEX & FII Turnover during 1st – 31st Jan., 2011

HYPOTHESIS PART I:

H_0 : There is no relationship between Sensex and FII.

H_1 : There exists a relationship between Sensex and FII.

HYPOTHESIS PART II:

H_0 : The variation between Sensex and FII is not significant.

H_1 : The variation between Sensex and FII is significant.

TABLE 6:
Computation of statistical estimates & Regression equation for January 2011 (SENSEX vs. Total turnover)

n	20					
R^2	0.32					
Adjusted R^2	0.29					
SE	540.022					
Term	Coefficient	95% CI	SE	t statistic	DF	p
Intercept	20578	19616 to 21540	458	44.93	18	<0.0001
Slope	-0.1707	-0.2930 to -0.0483	0.05823	-2.93	18	0.0089
January - sensex(y) = 20578 - 0.1707January - t.turnover(x1)						
Source of variation	Sum squares	DF	Mean square	F statistic	p	
Model	2,50,50,49.79	1	2,50,50,49.79	8.59	0.0089	
Residual	52,49,231.23	18	2,91,623.957			
Total	7754281.02	19				

As seen in the above table, the slope equation of the above regression equation indicates that as FII increases by 1 unit, Sensex decreases by 0.1707 units. Since Sensex is an index measured in hundreds, the co-efficient of Sensex implies that Sensex decreases by 100 for every Rs.17.07 FII turnover increase. Secondly, value of Adjusted R^2 comes to 0.29 and R^2 comes to be 0.32 which is comparatively weak. Thus we can conclude that, the explanatory variable (FII Turnover) is relatively a weak measure of Sensex as it explains 32% influence on the fluctuation in the Sensex and is unable to determine 68% influence of the other extraneous variables.

Hypothesis Part I

This relationship is tested with the help of t statistic. The t statistics is calculated and it comes out to be 44.93. The tabulated value of t for 18 degrees of freedom at 5% level is 2.101. Thus, t calculated > t tabulated for 18 d.f. and 5 % l.s. So we reject H_0 and accept H_1. Thus, we conclude that there exists a relationship between Sensex & FII.

Hypothesis Part II

This relationship is tested with the help of F statistic. The F statistic is calculated and it comes out to be 8.59. The tabulated value of F for (1, 18) degrees of freedom at 5% level is 4.41. Thus, F calculated > F tabulated for (1, 18) d.f and 5% l.s. So we reject H_0 and accept H_1. Thus we conclude that the variation between FII and Sensex is significant.

Case 2: SENSEX & FII Turnover during 1st – 28th Feb., 2011.

HYPOTHESIS PART I:

H_0 : There is no relationship between Sensex and FII.

H_1 : There exists a relationship between Sensex and FII.

HYPOTHESIS PART II:

H_0 : The variation between Sensex and FII is not significant.

H_1 : The variation between Sensex and FII is significant.

TABLE 7
Computation of statistical estimates & Regression equation for February 2011 (SENSEX vs. Total turnover)

n	19					
R^2	0.05					
Adjusted R^2	-0.01					
SE	314.811					
Term	Coefficient	95% CI	SE	t statistic	DF	p
Intercept	18379	17531 to 19228	402	45.70	17	<0.0001
Slope	-0.04748	-0.15870 to 0.06373	0.052714	-0.90	17	0.3803
February- sensex(y) = 18379 - 0.04748February - t.turnover(x2)						
Source of variation	Sum squares	DF	Mean square	F statistic	p	
Model	80,416.429	1	80,416.429	0.81	0.3803	
Residual	16,84.796.68	17	99,105.687			
Total	17,65,213.11	18				

As seen in the above table, the slope equation of the above regression equation indicates that as FII increases by 1 unit, Sensex decreases by 0.04748 units. Since Sensex is an index measured in hundreds, the co-efficient of Sensex implies that Sensex decreases by 100 for every Rs.4.748 FII turnover increase. Secondly, value of Adjusted R^2 comes to -0.01 and R^2 comes to be 0.05 which is weak. Thus we can conclude that, the explanatory variable (FII Turnover) is relatively a weak measure of Sensex as it explains 5% influence on the fluctuation in the Sensex and is unable to determine 95% influence of the other extraneous variables.

Hypothesis Part I

This relationship is tested with the help of t statistic. The t statistic is calculated which comes out to be 45.70. The tabulated value of t for 17 degrees of freedom at 5% l.s is 2.110. Thus, t calculated > t tabulated for 17 d.f at 5% l.s. So we reject H_0 and accept H_1. Thus we conclude that there exists a relationship between Sensex and FII

Hypothesis Part II

This relationship is tested with the help of F statistic. The F statistic is calculated which comes out to be 0.81. The tabulated value for F at (1, 17) degrees of freedom at 5% level of significance is 4.45. Again, F calculated < F tabulated for (1, 17) d.f at 5% l.s. Hence, we accept H_0 and reject H_1.Thus we conclude that the variation between FII and Sensex is not significant.

Case 3: SENSEX & FII Turnover during 1st – 31st March 2011.

HYPOTHESIS PART I:

H_0 : There is no relationship between Sensex and FII.

H_1 : There exists a relationship between Sensex and FII.

HYPOTHESIS PART II:

H_0 : The variation between Sensex and FII is not significant.

H_1 : The variation between Sensex and FII is significant.

TABLE 8
Computation of statistical estimates & Regression equation for March 2011 (SENSEX vs. Total turnover)

n	22					
R^2	0.17					
Adjusted R^2	0.13					
SE	399.272					
Term	Coefficient	95% CI	SE	t statistic	DF	p
Intercept	17619	16728 to 18509	427	41.27	20	<0.0001
Slope	0.1447	-0.0059 to 0.2953	0.07220	2.00	20	0.0588
March- sensex(y) = 17619 + 0.1447March - t.turnover(x3)						
Source of variation	Sum squares	DF	Mean square	F statistic	p	
Model	6,40,192.067	1	6,40,192.067	4.02	0.0588	
Residual	31,88,361.92	20	1,59,418.096			
Total	38,28,553.99	21				

As seen in the above table, the slope equation of the above regression equation indicates that as FII increases by 1 unit, Sensex increases by 0.1447 units. Since Sensex is an index measured in hundreds, the co-efficient of Sensex implies that Sensex increases by 100 for every Rs.14.47 FII turnover increase. Secondly, value of Adjusted R^2 comes to 0.13 and R^2 comes to be 0.17 which is relatively weak. Thus we can conclude that, the explanatory variable (FII Turnover) is relatively a weak measure of Sensex as it explains 17% influence on the fluctuation in the Sensex and is unable to determine 83% influence of the other extraneous variables.

Hypothesis Part I

This relationship is tested with the help of t statistic. The t statistic is calculated which comes out to be 41.27. The tabulated value of t for 20 degrees of freedom at 5% level of significance is 2.086. Thus, t calculated > t tabulated for 20 d.f at 5% l.s. So we reject H_0 and accept H_1. Thus, we conclude that there exists a relationship between Sensex and FII.

Hypothesis Part II

This relationship is tested with the help of F statistic. The F statistic is calculated which comes out to be 4.02. The tabulated value of F for (1, 20) degrees of freedom at 5% level of significance is 4.35. Again, F calculated < F tabulated for (1, 20) d.f at 5% l.s. So, we accept H_0 and reject H_1. Thus we conclude that the variation between FII and Sensex is not significant.

Case 4: SENSEX & FII Investment during 1st – 31st Jan., 2011.

HYPOTHESIS PART I:

H_0 : There is no relationship between Sensex and FII.

H_1 : There exists a relationship between Sensex and FII.

HYPOTHESIS PART II:

H_0 : The variation between Sensex and FII is not significant.

H_1 : The variation between Sensex and FII is significant.

TABLE 9
Computation of statistical estimates & Regression equation for January 2011 (SENSEX vs. Net investment)

n	20					
R^2	0.01					
Adjusted R^2	-0.04					
SE	652.399					
Term	Coefficient	95% CI	SE	t statistic	DF	p
Intercept	19263	18943 to 19583	152	126.47	18	<0.0001
Slope	0.06745	-0.23583 to 0.37073	0.144355	0.47	18	0.6459
January- sensex(y) = 19263+ 0.06745January - net.invst(x1)						
Source of variation	Sum squares	DF	Mean square	F statistic	p	
Model	92,919.957	1	6,40,192.067	0.22	0.6459	
Residual	76,61,245.41	18	4,25,624.745			
Total	77,54,165.37	19				

As seen in the above table, the slope equation of the above regression equation indicates that as FII increases by 1 unit, Sensex increases by 0.06745 units. Since Sensex is an index measured in hundreds, the co-efficient of Sensex implies that Sensex increases by 100 for every Rs.6.745 FII investment increase. Secondly, value of Adjusted R^2 comes to -0.04 and R^2 comes to be 0.01 which is very weak. Thus we can conclude that, the explanatory variable (FII Investment) is relatively a weak measure of Sensex as it explains 1% influence on the fluctuation in the Sensex and is unable to determine 99% influence of the other extraneous variables.

Hypothesis Part I

This relationship is tested with the help of t statistic. The t statistic is calculated which comes out to be 126.47. The t tabulated value of t for 18 degrees of freedom at 5% level of significance is 2.101. Thus,t calculated > t tabulated for 18 d.f at 5% l.s. So, we reject H_0 and accept H_1. Thus, we conclude that there exists a relationship between Sensex and FII.

Hypothesis Part II

This relationship is tested with the help of F statistic. The F statistic is calculated which comes out to be 0.22. The tabulated value of F for (1, 18) degrees of freedom at 5% level of significance is 4.41. Again, F calculated < F tabulated at (1, 18) d.f at 5% l.s. Hence, we accept H_0 and reject H_1. Thus we conclude that the variation between FII and Sensex is not significant.

Case 5: SENSEX & FII Investment during 1st – 28th Feb., 2011.

HYPOTHESIS PART I:

H_0 : There is no relationship between Sensex and FII.

H_1 : There exists a relationship between Sensex and FII.

HYPOTHESIS PART II:

H_0 : The variation between Sensex and FII is not significant.

H_1 : The variation between Sensex and FII is significant.

TABLE 10
Computation of statistical estimates & Regression equation for February 2011 (SENSEX vs. Net investment)

n	19					
R^2	0.11					
Adjusted R^2	0.05					
SE	304.791					
Term	Coefficient	95% CI	SE	t statistic	DF	p
Intercept	18052	17898 to 18026	73	247.66	17	<0.0001
Slope	0.1314	-0.0646 to 0.3274	0.09288	1.41	17	0.1752
February- sensex(y) = 18052+ 0.1314February – n.invst(x2)						
Source of variation	Sum squares	DF	Mean square	F statistic	p	
Model	18,59,58.801	1	18,59,58.801	2.00	0.1752	
Residual	15,79,254.3	17	92,897.312			
Total	17,65,213.1	18				

As seen in the above table, the slope equation of the above regression equation indicates that as FII increases by 1 unit, Sensex increases by 0.1314 units. Since Sensex is an index measured in hundreds, the co-efficient of Sensex implies that Sensex increases by 100 for every Rs.13.14 FII turnover increase. Secondly, value of Adjusted R^2 comes to 0.05 and R^2 comes to be 0.11 which is weak. Thus we can conclude that, the explanatory variable (FII Investment) is relatively a weak measure of Sensex as it explains 11% influence on the fluctuation in the Sensex and is unable to determine 89% influence of the other extraneous variables.

Hypothesis Part I

This relationship is tested with the help of t statistic. The t statistic is calculated which comes out to be is 247.66. The tabulated value of t for 17 degrees of freedom at 5% level of significance is 2.110. Thus, t calculated > t tabulated for 17 d.f at 5% l.s. Hence, we reject H_0 and accept H_1. Thus, we conclude that there exists a relationship between Sensex & FII.

Hypothesis Part II

This relationship is tested with the help of F statistic which comes out to be 2.00. The tabulated value of F for (1, 17) degrees of freedom at 5% level of significance is 4.45. Again, F calculated < F tabulated for (1, 17) d.f at 5% l.s. Hence, we accept H_0 and reject H_1. Thus we conclude that the variation between FII and Sensex is not significant.

Case 6: SENSEX & FII INVESTMENT DURING 1ST – 31ST MAR., 2011.

HYPOTHESIS PART I:

H_0 : There is no relationship between Sensex and FII.

H_1 : There exists a relationship between Sensex and FII.

HYPOTHESIS PART II:

H_0 : The variation between Sensex and FII is not significant.

H_1 : The variation between Sensex and FII is significant.

TABLE 11
Computation of statistical estimates & Regression equation for March 2011 (SENSEX vs. Net investment)

n	22					
R^2	0.52					
Adjusted R^2	0.50					
SE	302.395					
Term	Coefficient	95% CI	SE	t statistic	DF	p
Intercept	18327	18181 to 18474	70	261.16	20	<0.0001
Slope	0.3238	0.1794 to 0.4682	0.06924	4.68	20	0.0001
March- sensex(y) = 18327+ 0.3238March -n.invst(x3)						

Source of variation	Sum squares	DF	Mean square	F statistic	p
Model	19,99,847.19	1	19,99,847.19	21.87	0.0001
Residual	18,28,849.74	20	91,442.487		
Total	38,28,696.93	21			

As seen in the above table, the slope equation of the above regression equation indicates that as FII increases by 1 unit, Sensex increases by 0.3238 units. Since Sensex is an index measured in hundreds, the co-efficient of Sensex implies that Sensex increases by 100 for every Rs.32.38 FII turnover increase. Secondly, value of Adjusted R^2 comes to 0.50 and R^2 comes to be 0.52 which is moderately high. Thus we can conclude that, the explanatory variable (FII Investment) is not a very weak measure of Sensex as it explains 52% influence on the fluctuation in the Sensex and is unable to determine 48% influence of the other extraneous variables.

Hypothesis Part I

This relationship is tested with the help of t statistic. The t statistic is calculated which comes out to be 261.16. The tabulated value of t for 20 degrees of freedom at 5 % level of significance is 2.086. Thus, t calculated > t tabulated at 20 d.f at 5% l.s. Hence, we reject H_0 and accept H_1. Thus, we conclude that there exists a relationship between Sensex & FII.

Hypothesis Part II

This relationship is tested with the help of F statistic. The F statistic is calculated which comes out to be 21.87.The tabulated value of F for (1, 20) degree of freedom at 5% level of significance is 4.35. Again, F calculated > F tabulated at (1, 20) d.f at 5% l.s. Hence, we reject H_0 and accept H_1. Thus we conclude that the variation between FII and Sensex is significant.

FINDINGS

Table 12: COMPARATIVE ANALYSIS

SENSEX vs TOTAL TURNOVER			
	January 2011	**February 2011**	**March 2011**
R^2	0.32	0.05	0.17
Relationship	Exists	Exists	Exists
Variation	Significant	Not significant	Not significant
SENSEX vs TOTAL INVESTMENT			
	January 2011	**February 2011**	**March 2011**
R^2	0.01	0.11	0.52
Relationship	Exists	Exists	Exists
Variation	Not significant	Not significant	Significant

Fig 1: Trend Line of SENSEX V/s FII Total Turnover for Jan 2011

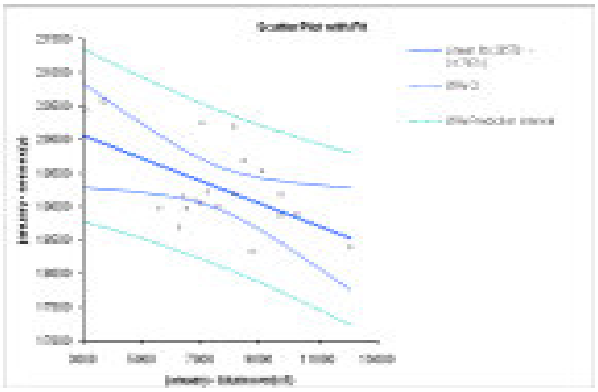


Fig 2: Trend Line of SENSEX V/s FII Net Investment for Jan 2011

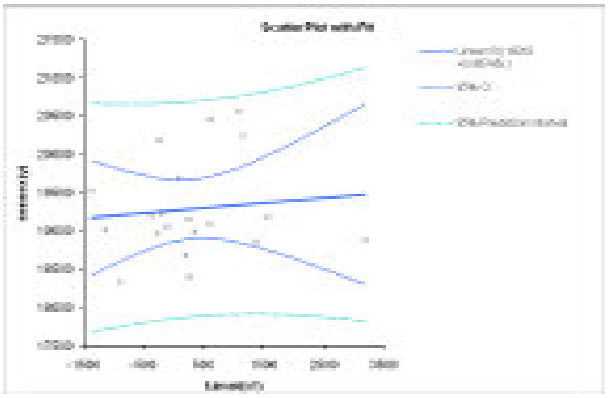


Fig 3: Trend Line of SENSEX V/s FII Total Turnover for Feb 2011

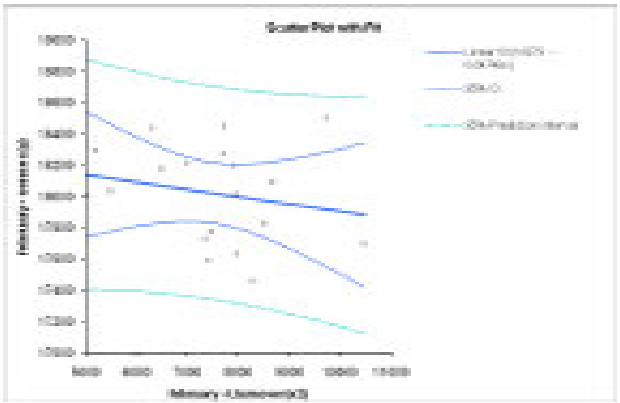


Fig 4: Trend Line of SENSEX V/s FII Net Investment for Feb 2011

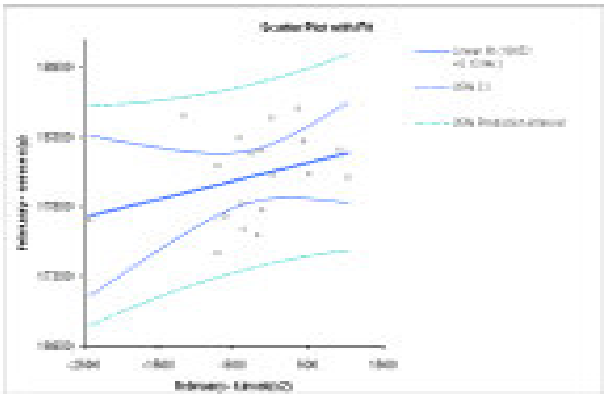


Fig 5: Trend Line of SENSEX V/s FII Total Turnover for March 2011

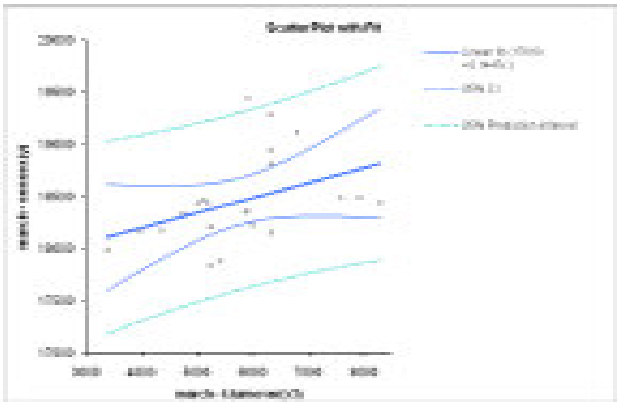
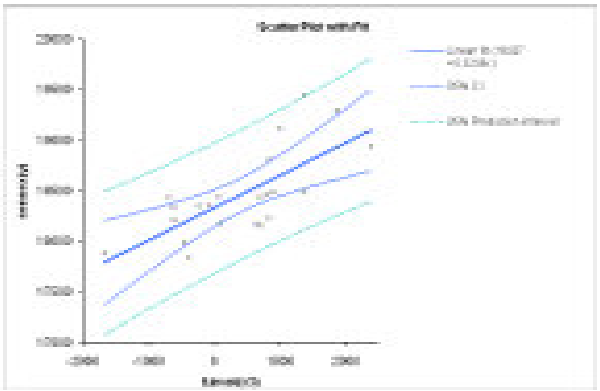


Fig 6: Trend Line of SENSEX V/s FII Net Investment for March 2011



On the basis of the comparative analysis table given above, the following inferences are drawn:

1. For the month of January 2011 (SENSEX vs. FII total turnover), the R^2 comes to be 0.32 or 32% which is relatively high as compared to other R^2 values. Also the relationship between Sensex and FII total turnover is tested and there exists a relationship between the two. The variation between Sensex and FII total turnover during this month comes to be significant. Thus during Jan 2011, when relationship between Sensex and FII exists and variation is also significant, we are getting the value of R^2 comparatively on higher side even though statistically it is weak. The reason for such trend in Sensex due to FII is that on account of high purchase and sales figures of FII, the volume of turnover was very high causing the trend line of SENSEX to fall during the month of January. (Fig. 1)

2. Again, for the month of January 2011 (SENSEX vs. FII net investment), the R^2 comes to be 0.01 or 1% which is very weak as compared to other R^2 values. Also the relationship between Sensex and FII net investment is tested and there exists a relationship between the two. But the variation between Sensex and FII net investment during this month is not significant. Thus, during January, when relationship between Sensex & FII exists & variation is not significant, we are getting the value of R^2 on a very low side. Inflow and outflow was Rs. 79,420 cr. and Rs. 72, 910 cr. respectively during January. Hence, the net investment was very low causing the SENSEX to remain relatively stable and the variation between FII and SENSEX was not very significant. (Fig. 2)

3. When we compare both the relationship that is SENSEX vs. Total turnover & SENSEX vs.Net investment, it is concluded that the European countries showed signs of recovery in the month of January and short and long term investors were not very optimistic about the macroeconomic conditions of India. So, they invested huge amount of money in the form of FII and also withdrew in almost the same proportion immediately from the Indian capital market. This resulted into the strong impact of total turnover on SENSEX as can be seen from R^2 value. But at the same time if we look at the relationship between SENSEX & net investment R^2 comes to be 0.01 which is negligible. This is because of the meagre amount of net investment in the form of FII which was not able to put much impact on SENSEX.

4. For the month of February 2011 (SENSEX vs FII total turnover), the R^2 comes to be 0.05 or 5% which is very weak as compared to other R^2 values. Also the relationship between Sensex and FII total turnover is tested and there exists a relationship between the two. The variation between Sensex and FII total turnover during this month is not significant. Thus, during Jan 2011, when relationship between Sensex and FII exists and variation is not significant, we are getting the value of R^2 on lower side and statistically it is weak. The reason for such trend in Sensex due to FII is that on account of high selling and fewer purchases in comparison of sales figures of FII, the volume of turnover was not very high causing the SENSEX to keep declining. (Fig. 3)

5. For the month of February 2011, FII (SENSEX vs. FII net investment), the R^2 comes to be 0.11 or 11% which is weak as compared to other R^2 values. Also the relationship between Sensex and FII net investment is tested and there exists a relationship between the two. The variation between Sensex and FII net investment during this month is not significant. Thus, during February, when relationship between Sensex & FII exists & variation is not significant, we are getting the value of R^2 on a low side. Inflow and outflow were not in proportion to each other. Heavy selling was observed during this period along with low levels of buying. Hence, the net investment was very low causing the trend line of SENSEX to rise slowly and the variation between FII and SENSEX was not very significant. (Fig. 4)

6. When we compare both the relationship that is SENSEX V/s Total turnover & SENSEX

V/s Net investment, it is concluded that the short and long term investors continued to be pessimist about the macroeconomic conditions of India. So, they invested very less amount of money in the form of FII and also kept withdrawing the money immediately from the Indian capital market. This resulted into a moderate impact of total turnover on SENSEX as can be seen from R^2 value. But at the same time if we look at the relationship between SENSEX & net investment R^2 comes to be 0.11 which is not very high. This is because of the meagre amount of net investment in the form of FII which was not able to put much impact on SENSEX on account of heavy selling leading to huge amounts of outflow. Hence the overall scene for the month of February was unfavourable.

7. For the month of March 2011 (SENSEX vs. FII total turnover), the R^2 comes to be 0.17 or 17% which is moderate as compared to other R^2 values. Also the relationship between Sensex and FII total turnover is tested and there exists a relationship between the two. The variation between Sensex and FII total turnover during this month comes to be significant. Thus during Jan 2011, when relationship between Sensex and FII exists and variation is also significant, we are getting the value of R^2 comparatively moderate even though statistically it is weak. The reason for such trend in Sensex due to FII is that on account of high purchase and sales figures of FII, the volume of turnover was very high causing the trend line of SENSEX to rise as compared to previous months and hence very sharp increase was noticed during March. (Fig. 5)

8. For the month of March 2011, FII (SENSEX vs. FII net investment), the R^2 comes to be 0.52 or 52% which is very strong as compared to other R^2 values. Also the relationship between Sensex and FII net investment is tested and there exists a relationship between the two. The variation between Sensex and FII net investment during this month is significant. Thus, during March, when relationship between Sensex & FII exists & variation is significant, we are getting the value of R^2 on a very high side. Hence, the net investment was very high on account of high levels of buying & comparatively less of selling causing the SENSEX to rise and the variation between FII and SENSEX were very significant. (Fig. 6)

9. Thus, comparing both the relationship that is SENSEX V/s Total turnover & SENSEX V/s Net investment, it is concluded that the investors had an optimistic vision about the macroeconomic conditions of India. So, they invested huge amount of money in the form of FII and also less withdrawals were made in proportion to the investment from the Indian capital market. This resulted into the strong impact of total turnover on SENSEX as can be seen from R^2 value. But at the same time if we look at the relationship between SENSEX & net investment R^2 comes to be 0.52 which is very high. This is because of the substantial amount of net investment in the form of FII which was able to put much impact on SENSEX. Hence the overall scene for the month of March was very favourable.

10. From the comparative analysis done above, it can be concluded that on an overall basis, when the relationship between Sensex vs. Total turnover & Sensex vs.Net investment exists and it is significant, it produces a positive impact in the Sensex as it starts moving up, but when the case is opposite, it tends to remain on a lower side. FII Investment when withdrawn up to a large extent causes the Sensex to fall just as it happened in the case of January & February. But if a proper balance between FII inflow & outflow is there, it prevents the BSE SENSEX from falling as evident from the case of March 2011.

REFERENCES

BOOKS

1. *Dougherty C., "Introduction to Econometrics", 3rd Edition, Oxford University Press, 2009.*
2. *Levin & Rubin, "Statistics for Management", 7 ed., Prentice Hall, India.*
3. *Misra S. K., & Puri V.K., "Economic Environment of Business", Himalaya Publishing House*

WEBSITES

1. *www.sebi.gov.in*
2. *www.bseindia.com*