Project Report on

Investigation of Foreign Institutional Investment in India

Submitted By

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2K11/MBA/17

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Certificate

This is to certify that **Gunjan Batra – 2K11/MBA/17** , student of **Delhi School of Management** has worked on the project "**Investigation of Foreign Institutional Investment in India**" during the month of **Jan - May 2013** as a partial fulfillment of the requirement of the MBA program under the guidance of **Prof. P.K. Suri, H.O.D, Professor, Delhi School of Management, DTU and Mr. Nand Kumar, Assistant Professor, Delhi School of Management, DTU**. She has submitted a satisfactory report of the project. This work has not been submitted in part or full to this or any other university as part of project work to the best of our knowledge.

We wish her success in the future.

Prof. P. K. Suri
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DECLARATION

I, **Gunjan Batra – 2K11/MBA/17** Student of **Delhi School of Management** would like to state that I have worked on the project, "**Investigation of Foreign Institutional Investment in India**" under the guidance of **Prof. P.K. Suri, HOD, Professor, Delhi School of Management, DTU and Mr. Nand Kumar, Assistant Professor, Delhi School of Management, DTU** and have submitted a satisfactory report of the project. This work has not been submitted in part or full to this or any other university as part of project work to the best of my knowledge.

Gunjan Batra – 2K11/MBA/17

DSM, DTU

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It is my privilege to express my profound gratitude to the people who have been instrumental in the successful completion of this project. The knowledge and values inculcated at the very start of my career are conducive to our growth.

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Gunjan Batra

DSM – DTU (4th Semester)

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EXECUTIVE SUMMARY

The economic landscape of India underwent a paradigm change when the economy was liberalized in 1991. It also laid the foundation for a strong regulatory network. India witnessed stellar economic performance through the period 2005-09 .This was manifested through an average 8.5 – 9 percent GDP growth rates, rising domestic savings and investment levels and the amount of foreign capital flowing into the country. Foreign investments can be in the form of Foreign Institutional Investor ("FII"), Foreign Direct Investment – ("FDI"), Foreign Venture Capital Investor ("FVCI")

Foreign Institutional Investors have been a major source of funds into the Indian Capital Markets in the past few years. As per the RBI, Report on Currency & Finance (2003-04), since 1991 there has been continuous move towards the integration of the Indian economy with world economy. Since then the regulations with regard to FIIs investment has become more liberal. As a result of abolishment of barriers to capital inflows in the form of FIIs investment, India attracted huge amount of foreign capital particularly from developed countries. The cumulative net investment by FIIs in Indian stock market crossed Rs. 25000 crore in January 2013(RBI Bulletin).

International capital inflows have both positive as well as negative impact on the health of the recipient economy. On the positive side, these capital inflows raise the level of economic development by augmenting the domestic investment and widen financial intermediation. But these capital inflows also pose several threats to the domestic economic and financial system of the recipient economy like inflation, appreciation in exchange rate, overheating of the economy and possibility of sudden withdrawal. FIIs investment is volatile by nature and is often termed as 'hot money'. The hot money character of FIIs investment adds to the possibilities of 'contagion'.

The dissertation, examines causal relation between FIIs, stock market return and other macroeconomics variables such as exchange rate, index of industrial production (IIP), wholesale price index (WPI), interest rate and money supply in India using "Granger's Causality Test" to find out the possible relation between FII and these economic indicators of India.

Also, in the light of huge and growing FIIs investment inflows to India, appropriate policy formulation is the need of the hour which will help in reducing the impact of possible threats and maximizing the benefits from the same to enhance economic and financial development.

This in turn calls for the need to estimate statistically the determinants of FIIs investment to understand deeply the factors that boost FII inflows into the country.

Therefore, an effort has been made to empirically investigate the determinants of foreign institutional investment in India.

After a thorough analysis, it has been found that FII has bidirectional causality with Sensex, Exchange Rate and crude oil rate. Granger's Causality Test shows risk in US market is affecting FII in India. FII is having a causal effect on the WPI, IIP which is also exhibited by their strong positive correlation.

The main determinants of FII in India found by regression analysis are Lag variable of FII, Sensex, Standard deviation in Sensex, Crude Oil Rate, WPI, MIBOR Rate, Political Environment in India.

Thus, all these variables need to be controlled appropriately in the policies of the Indian government to harness the best from foreign institutional fund flow from abroad.

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CHAPTER 1

INTRODUCTION

1.1. Importance of FII inflow in Developing countries

In this age of transnational capitalism, significant amounts of capital are flowing from developed world to emerging economies. India with its fast growing markets has become an attractive destination for foreign institutional investors (FIIs). Portfolio investments brought in by FIIs have been the most dynamic source of capital to emerging markets in 1990s. At the same time there is unease over the volatility in foreign institutional investment flows and its impact on the stock market and the Indian economy. The stock markets in India had to put up the burden in terms of being the second largest loser of foreign money in Asia accounting for 22% of the total net sales April-May 2006. This signifies that Foreign Institutional Investment plays an important role in growth of emerging economies like India, China and many others. So it is important for emerging economies to construct suitable policies to manage the flow of Foreign Institutional Investment. This paper attempts to test the statistical significance of the key factors which may affect flow of FII in India.

As the Indian equity market is growing, the trend and future prospects in foreign institutional investments has become a topic of great concern. A recent research survey by "Japan Bank for international operation (JBIC)" shows that in the next 3 years, India will be the third most favored investment destination for Japanese investors. A Smith Barney (a CITI group Division) study says estimated market value of foreign institutional investment in the top 200 companies in India (including ADRs and GRDs) at current market prices is US$43 billion. This is 18% of the market capitalization of BSE 200.

In recent times, it has become important to identify the key triggers for such inflows into the economy as foreign inflows have assumed such gargantuan proportions in recent times that managing such inflows have become a challenge in itself. Traditionally, such inflows were absorbed by buying the dollars sloshing in the economy (resulting to an equal increase in the domestic money supply for

unsterilized interventions) and adding them to our forex reserves. However, to prevent inflationary tendencies arising out of such interventions, the government issues bonds to mop up liquidity released on account of dollar purchases. This process is called sterilization. Sterilization, however, has a fiscal cost attached to it. The interest that the government earns by investing its forex reserves in US government treasury bonds is much lower than what has to be paid on domestic bonds issued for sterilization purposes. Thus, there is a limit to sterilized intervention, and unsterilized intervention has a very romantic relationship with inflation, and hence politically unacceptable in India.

This leaves the RBI with no option but to stay away from massive interventions in the forex market as such interventions turn out to be inflationary in the absence of corresponding sterilization, and in the absence of such interventions, the domestic currency tends to appreciate. This is exactly what happened in April-May 2007 when the INR (Indian Rupee) appreciated by a whopping 11 per cent against the USD (US Dollar) in view of continued foreign inflows but no corresponding intervention by the RBI in the forex market 3. After appreciating by more than ten per cent in such a short period, letting the rupee appreciate further will kill our exports and hence even this door is shut for the RBI.

This leaves us with only option, i.e., imposition of capital controls to restrict foreign inflows. However, over the past several years, India has been on a path of capital account liberalization and imposition of capital controls will reverse this process of full convertibility of the rupee on capital account.

1.2. Foreign Institutional Investor (FII)

An investor or investment fund that is from or registered in a country outside of the one in which it is currently investing. 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 market regulations pertaining to FIIs involves placing limits on FII ownership in Indian companies.

Foreign Institutional Investors (FII) includes the following foreign based categories:

- Pension Funds
- Mutual Funds
- Investment Trust
- Insurance or reinsurance companies
- Investment Trusts
- Banks
- Endowments
- University Funds
- Foundations
- Charitable Trusts or Charitable Societies

Further, following entities proposing to invest on behalf of broad based funds, are also eligible to be registered as FIIs:

- Asset Management Companies
- Institutional Portfolio Managers
- Trustees
- Power of Attorney Holders

1.2.1. Parameters on which SEBI decides FII applicants' eligibility

- Applicant's track record, professional competence, financial soundness, experience, general reputation of fairness and integrity. (The applicant should have been in existence for at least one year)
- Whether the applicant is registered with and regulated by an appropriate Foreign Regulatory Authority in the same capacity in which the application is filed with SEBI
- Whether the applicant is a fit & proper person.
- "Form A" as prescribed in SEBI (FII) Regulations, 1995.

SEBI generally takes seven working days in granting FII registration. However, in cases where the information furnished by the applicants is incomplete, seven days shall be counted from the days when all necessary information sought, reaches SEBI.

In cases where the applicant is bank and subsidiary of a bank, SEBI seeks comments from the Reserve Bank of India (RBI). In such cases, 7 working days would be counted from the day no objection is received from RBI.

The FII registration is valid for 5 years. After expiry of 5 years, the registration needs to be renewed.

1.2.2. Financial instruments available for FII investments

- Securities in primary and secondary markets including shares, debentures and warrants of companies, unlisted, listed or to be listed on a recognized stock exchange in India;
- Units of mutual funds;
- Dated Government Securities;

- Derivatives traded on a recognized stock exchange;
- Commercial papers.

1.2.3. Investment limits on equity investments by FII

- FII, on its own behalf, shall not invest in equity more than 10% of total issued capital of an Indian company.
- Investment on behalf of each sub-account shall not exceed 10% of total issued capital of an India company.
- For the sub-account registered under Foreign Companies/Individual category, the investment limit is fixed at 5% of issued capital.

These limits are within overall limit of 24% / 49 % / or the sectoral caps a prescribed by Government of India / Reserve Bank of India.

1.2.4. Investment limits on debt investments by FII

The FII investments in debt securities are governed by the policy if the Government of India. Currently following limits are in effect:

- For FII investments in Government debt, currently following limits are applicable:

100% Debt	US $ 1.55 billion
70 : 30 Route	US $ 200 million
Total Limit	**US $ 1.75 billion**

Table 1.1: FII Debt Limit

- For corporate debt the investment limit is fixed at US $ 500 million.

1.2.5. Other investment limits

Normal FII (70:30 Route)	100% Debt FII
Total investment in equity and equity related instruments shall not be less than 70% of aggregate of all investments.	100% investment shall be made in debt security only.

Table 1.2 : FII investment limits

1.2.6. Derivatives Position Limits

Restrictions on investment in derivatives

a. **The FII position limits in a derivative contracts (Individual Stocks)**

The FII position limits in a derivative contract on a particular underlying stock i.e. stock option contracts and single stock futures contracts are:

- For stocks in which the market wide position limit is less than or equal to Rs. 250 Cr, the FII position limit in such stock shall be 20% of the market wide limit.
- For stocks in which the market wide position limit is greater than Rs. 250 Cr, the FII position limit in such stock shall be Rs. 50 Cr.

b. **FII Position limits in Index options contracts**

FII position limit in all index options contracts on a particular underlying index shall be Rs. 250 crore or 15 % of the total open interest of the market in index options, whichever is higher, per exchange.

This limit would be applicable on open positions in all option contracts on a particular underlying index.

c. **FII Position limits in Index futures contracts:**

FII position limit in all index futures contracts on a particular underlying index shall be Rs. 250 Crore or 15 % of the total open interest of the market in index futures, whichever is higher, per exchange.

This limit would be applicable on open positions in all futures contracts on a particular underlying index. In addition to the above, FIIs shall take exposure in equity index derivatives subject to the following limits:

Short positions in index derivatives (short futures, short calls and long puts) not exceeding (in notional value) the FII's holding of stocks.

Long positions in index derivatives (long futures, long calls and short puts) not exceeding (in notional value) the FII's holding of cash, government securities, T-Bills and similar instruments.

d. **FII Position Limits in Interest rate derivative contracts**

The notional value of gross open position of a FII in exchange traded interest rate derivative contracts shall be:

i. US $ 100 million

ii. In addition to the above, the FII may take exposure in exchange traded in interest rate derivative contracts to the extent of the book value of their cash market exposure in Government Securities.

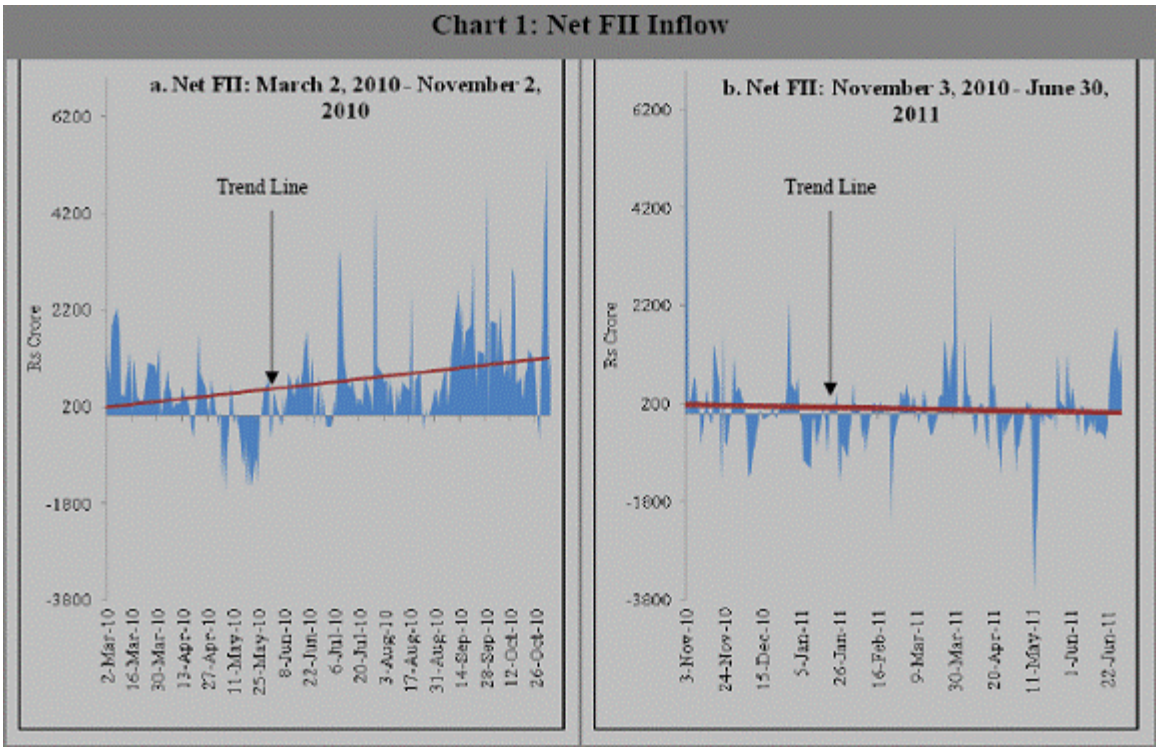

Fig 1.1 :Net FII Inflow in 2010-11

1.3. Econometrics

Literally interpreted, econometrics means "economic measurement." Although measurement is an important part of econometrics, the scope of econometrics is much broader, as can be seen from the following quotations:

Econometrics, the result of a certain outlook on the role of economics, consists of the application of mathematical statistics to economic data to lend empirical support to the models constructed by mathematical economics and to obtain numerical results.

Econometrics may be defined as the quantitative analysis of actual economic phenomena based on the concurrent development of theory and observation, related by appropriate methods of inference.

Econometrics may be defined as the social science in which the tools of economic theory, mathematics, and statistical inference are applied to the analysis of economic phenomena.

Econometric methodology proceeds along the following lines:

1. Statement of theory or hypothesis.
2. Specification of the mathematical model of the theory
3. Specification of the statistical, or econometric, model
4. Obtaining the data
5. Estimation of the parameters of the econometric model
6. Hypothesis testing
7. Forecasting or prediction
8. Using the model for control or policy purposes.

1.3.1. Regression

The term regression was introduced by Francis Galton.

Regression analysis is concerned with the study of the dependence of one variable, the dependent variable, on one or more other variables, the explanatory variables, with a view to estimating and/or predicting the (population) mean or average value of the former in terms of the known or fixed (in repeated sampling) values of the latter.

Example: A labor economist may want to study the rate of change of money wages in relation to the unemployment rate. The historical data are shown in the scatter gram given in Figure 1.3. The curve in Figure 1.3 is an example of the celebrated Phillips curve relating changes in the money wages to the unemployment rate. Such a scatter gram may enable the labor economist to predict the average change in money wages given certain unemployment rate. Such knowledge may be helpful in stating something about the inflationary process in an economy, for increases in money wages are

likely to be reflected in increased prices.

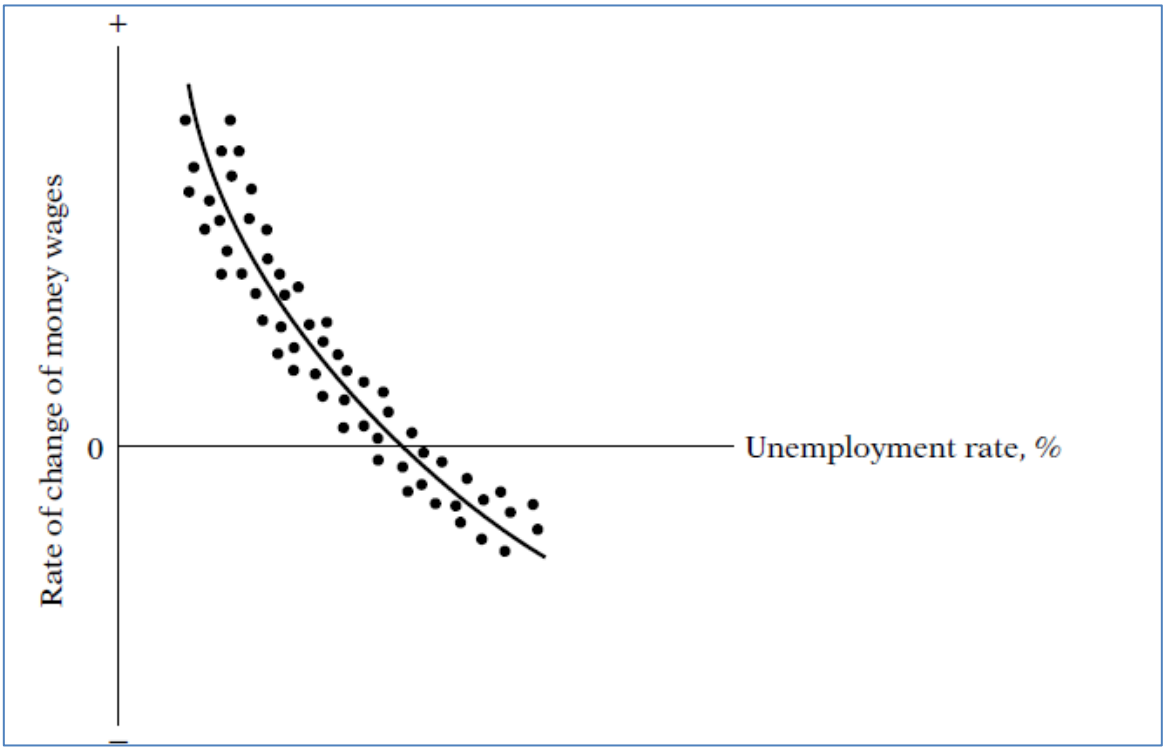

Fig 1.2 : Regression graph between Unemployment Rate and Rate of money wages

1.3.2. Granger's Causality

Correlation does not necessarily imply causation. The Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. y is said to be Granger-caused by x if x helps in the prediction of y, or equivalently if the coefficients on the lagged x's are statistically significant. It is important to note that the statement "Granger causes" does not imply that is the effect or the result of.

The Granger Causality test depicts the causality between two variables when both influence each other. If X causes Y, then changes in X should precede changes in Y. Here, two conditions should be met. First, X should help to predict Y. That is, in a

regression Y against past values of Y, the addition of past values of X as independent variables should contribute significantly to the explanatory power of the regression. Second, Y should not help to predict X. The reason is that if X helps to predict Y and Y helps to predict X, it is likely that one or more other variables are in fact causing both X and Y. The test is based on the following regression equations:

$$Y_t = C_{1t} + \sum_{i=1}^{p} \alpha_i Y_{t-i} + \sum_{i=1}^{p} \beta_i X_{t-i} + u_{1t} \quad (1)$$

$$X_t = C_{2t} + \sum_{i=1}^{p} \phi_i Y_{t-i} + \sum_{i=1}^{p} \varphi_i X_{t-i} + u_{2t} \quad (2)$$

Where p is the number of the optimum lag length, and u_{1t} and u_{2t} are residuals in the regression estimation. It is assumed that disturbances u_{1t} and u_{2t} are not correlated with each other. To evaluate whether each of these two conditions hold, the null hypothesis should be that one variable does not help to predict the other. For this, the two sets of regression equations and their corresponding null hypotheses are as follows:

1. Null hypothesis : X does not Granger cause Y. For this Y is regressed against lagged values of Y and lagged values of X, and then regress Y only against lagged values of Y;
2. Null hypothesis : Y does not Granger cause X. For this X is regressed against lagged values of X and lagged values of Y, and then regress X only against lagged values of X.

The above hypotheses are tested based on F-test statistics calculated for the normal Wald test on coefficient restrictions.

1.4. Objectives of the Study

1.4.1 Examine causal relation between FIIs, stock market return and other macroeconomics variables such as exchange rate, index of industrial production (IIP), wholesale price index (WPI), interest rate and money supply in India using "Granger's Causality Test" to find out the possible relation between FII and these economic indicators of India.

1.4.2 Empirically investigate the determinants of foreign institutional investment in India.

CHAPTER 2

LITERATURE REVIEW

The investment made by FIIs in any capital market has grabbed the attention of researchers' worldwide to identify the relationship between the net inflow of FIIs and capital market performance. Also, a good number of research findings are available by authors' across the globe indicating the shifts in the capital market movement due to immunization of FIIs and vice-versa.

Some of the significant studies in this regard were conducted in the mid-90s by Tesar and Werner (1994, 1995), Bohn and Tesar (1996),Brennan and Cao (1997). These studies examined the aggregate international portfolios and found evidence of positive, contemporaneous correlation between FII inflows and stock market returns. Further, Bekaert and Harvey (1998), and Errunza (2001) have found evidences that FII flows do not have significant effect in increasing volatility of stock returns. Calvo, et al., (1999) suggested that foreign investors pursue irrational trading strategies such as herding and quick changes in sentiments that make the emerging stock markets more volatile and argued that the information disadvantage and diversified international portfolio investment create incentives for rational herd behavior causing financial markets in emerging economies to be volatile.

Bae et.al. (2002) further documented that high unpredictable patterns are identified in the stocks picked by foreign investors in comparison to other stocks. On the contrary, Gordon and Gupta (2003) have documented that lagged domestic stock market returns are an important determinant of FII flows.

In the Indian context, Sivakumar (2003) has examined the net flows of foreign institutional investment over a period of time and documented various evidences on how much the Indian stock market is stabilized or destabilized due the inflows and outflows of Foreign Institutional investments.

Kumar (2006) documented that the movement in Indian stock market can be explained with the direction of funds floated by foreign institutional investors.

At the same time, Agarwal, Chakrabarti et al (2003) have found in their research that the equity return has a significant and positive impact on the FII. But given the huge volume

of investments, foreign investors could play a role of market makers and book their profits, i.e., they can buy financial assets when the prices are declining thereby jacking up the asset prices and sell when the asset prices are increasing.

Hence, there is a big possibility of bi-directional relationship between FII and the equity returns.

Bhattacharya and Mukherjee (2006) applied Granger Causality test to investigate causal relationship of FIIs with stock return and exchange rate in India and found a bi-directional causality between stock return and FIIs investments. But no causal relationship was observed between exchange rates and net investments by FIIs.

Badhani (2005) observed bi-directional causality between FIIs investment flows and stock prices using monthly data from April 1993 to March 2004 on stock prices, net FIIs investment and exchange rate and found that exchange rate causes FIIs investment flows, not vice versa.

Therefore motivated by some interesting and time varying evidences with regard to the relationship between FIIs and many independent variables such as stock market performance and exchange rate, the present study is destined to examine the causal relationship of FIIs and many macroeconomic variables.

Identification of various factors affecting FII creates further interest in the degree of dependence of FII on these econometric variables. There has also been a lot of research suggesting the statistical importance of the factors influencing the foreign institutional investment in India.

Rai and Bhanumurthy (2004) examined the determinants of foreign institutional investments in India with the help of monthly data from January 1994 to November2002.Using econometric estimates and the TARCH procedure, the study found a positive association of FII with return on the Bombay Stock Exchange (BSE).

Singh (2004) analyzed the determinants of FII flows and examined the policy towards foreign institutional investment. The study concluded that that FII flows were positively related with BSE (SENSEX).

Bose and Coondoo (2004) attempted to estimate the quantitative impact of certain regulatory policy decisions relating to FII investment in India using the technique of intervention analysis of time series econometrics. The results strongly suggest that liberalization policies have had the desired expansionary effect and have either increased the mean level of FII inflows and the study concluded that FII investments are more sensitive to the domestic market returns.

Mukherjee and Coondoo (2002) examined the relationship of FII Investments to the Indian equity market and found that FIIs flows tend to be caused by return in domestic equity market. The study also explains that the exchange rate return and fundamentals of the Indian economy also influenced FIIs investment decision.

Gordon and Gupta (2003) used the multiple regression technique on the monthly data from September 1992 to October 2001 to find out the relation between macroeconomic factors and portfolio flows and found that external interest rate and lagged domestic stock market return are key variables for explaining portfolio arrivals.

Dhamija (2008) debated that increase in the volume of FII inflows in the recent years has led to high volatility of these flows and impact on the stock market price indices.

Babu and Prabheesh (2008) as well as Karimullah (2009) examined the impact of FIIs equity investment behavior in the Indian stock market and found bi-directional causality between FII and stock return.

Garg and Bodla (2009) concluded that the rate of FII flows into the country is governed by the performance of the domestic stock market and the foreign investors‟ expectations about this performance.

Kumar (2001) investigated the effects of FII inflows on the Indian stock market represented by the Sensex using monthly data from January 1993 to December 1997.

Kumar (2001) inferred that FII investments are more driven by Fundamentals and they do not respond to short-term changes or technical position of the market. In testing whether Net FII Investment (NFI) has any impact on Sensex, a regression of NFI was estimated on lagged values of the first difference of NFI, first difference of Sensex and one lagged value of the error correction term (the residual obtained by estimating the regression between NFI and Sensex). The study concluded that Sensex causes NFI. Similarly, regression with Sensex as dependent variable showed that one month lag of NFI is significant, meaning that there is causality from FII to Sensex. This finding is in contradiction with the findings of Rai and Bhanumurthy (2003) who did not find any causation from FII to return in BSE using similar data between 1994 and 2002. However, Rai and Bhanumurthy have also found significant impact of return in BSE on NFI.

Thus, a plethora of studies have been attempted to identify the determinants of FIIs in India. In this research, we have tried to re-examine the results offered by the existing studies regarding the determinants of FIIs in India in the period from 2001-2010 so as to draw some useful conclusion regarding the degree of dependence of FII on these variables by analyze the data statistically.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Assortment of Variables

The various variables and their sources which could be possibly related to the study are as follows:

DATA SERIES	SOURCE
Foreign Institutional Investment	RBI Bulletin, Various Issues
BSE sensitivity Index	Yahoo Finance
S&P 500 Index	Yahoo Finance
Standard Deviation(For BSE sensitivity Index)	Calculated from monthly data
Standard Deviation(For S&P 500 Index)	Calculated from monthly data
Gold Rate	www.indexmundi.com
Crude Oil (petroleum) Dubai Fateh Rate	www.indexmundi.com
Nominal Exchange Rate	Yahoo Finance!
Whole Sale Price Index	RBI Hand Book of Statistics, Various issues
Market yield on U.S. Treasury securities at 3-month	http://www.federalreserve.gov/releases/h15/data/Monthly/ H15_TCMNOM_M3.txt
MIBOR rate	National Stock Exchange Website
Index of Industrial Production	RBI Hand Book of Statistics, Various issues

Table 3.1 : Data Series and Source

Foreign Institutional Investment:

FII is basically an investor or investment fund that is from or registered in a country outside of the one in which it is currently investing. 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. The monthly time series data for FII inflows into India were taken from the RBI's Database on Indian Economy and is measured in INR crore.

Standard & Poor's 500 Stock Index:

The S&P 500 is an index containing the stocks of 500 Large-Cap corporations, most of which are American. The S&P 500 is one of the most widely watched index of large-cap US stocks. It is considered to be a bellwether for the US economy. The monthly time series data for S&P 500 has been used as a proxy to gauge the returns one can expect by investing in equities outside of India as it is a world renowned index including 500 leading companies in leading industries of the U.S. economy. The historical data for this variable was taken from Yahoo! Finance.

BSE Sensitive Index (Sensex):

Sensex is not only scientifically designed but also based on globally accepted construction and review methodology. First compiled in 1986, SENSEX is a basket of 30 constituent stocks representing a sample of large, liquid and representative companies in India. The base year of Sensex is 1978-79 and the base value is 100. The index is widely reported in both domestic and international markets through print as well as electronic media6.The BSE Sensex has been used as an index to measure returns from investing in Indian equities. The historical data for this variable was also taken from Yahoo! Finance.

Standard Deviation for Sensex:

The standard deviation for Sensex was calculated to measure the volatility (used as a proxy for risk associated with investing in Indian equities) of the index. The SD was calculated by taking the data on daily returns for each month, and calculating the SD for the individual months.

Standard Deviation for S&P 500:

Here too, the standard deviation for S&P 500 was calculated to measure the volatility (to be used as a proxy for risk associated with investing in US equities) of the index. The procedure adopted is similar to that for calculating standard deviation for the Sensex.

Exchange Rate:

The nominal exchange rate is defined in the model as the number of units of domestic currency obtained per foreign currency, i.e., the number of Indian Rupee that can be exchanged for one US Dollar. The exchange rate plays an important role in decision making process of an FII investment as a depreciation of the domestic currency results in losses when an FII investment is converted back into the foreign currency while an appreciation of the domestic currency would result in higher returns for the foreign investments.

Wholesale Price Index (for the Indian economy):

The monthly time series data for Wholesale Price Index (WPI) has been used as a measure for inflation in the Indian economy. The monthly data was collected from the RBI's Database on Indian Economy.

Gold Rate:

The Gold price is a representation of an economy's health and therefore Gold's Monthly Price in Indian Rupee per Troy ounce has been included to study its relation with FII. The monthly price of gold has been taken from www.indexmundi.com

Crude Oil Rate:

Crude Oil is the economic engine of growth of any country. Though this is expected to have no direct relation with FII. But, indirectly, by increase in crude oil price, inflation increases, government will have to spend too much on subsidies, exports will become weaker and investment decrease. Thus it is important to study its relationship with FII. The crude oil price was taken from www.indexmundi.com

Federal Bank 3 month treasury bills interest rate:

A United States Treasury Bill is a government debt financing instruments of the United States federal government. Market yield on U.S. Treasury securities at 3-month (91day T-Bill) represents the interest rate US investors would get in their home country and hence plays an important role in their investment decision. This data was taken from the official website of Federal Reserve.

MIBOR Rate:

In India, the Treasury Bills market is not matured and deep, the NSE itself uses the MIBOR and MIBID rates as the risk-free rate of interest. Hence, in this study we have also used the same as a representation of the Interest Rate for India. If the interest rate of a country is high of course FII will want to invest in that country to make good capital gain. The interest rate for Mibor-3months has been taken from NSE website.

Index of Industrial Production:

The Index of Industrial Production (IIP) was used as a representative of the sectors like manufacturing, mining, electricity, and so on. It shows the overall changes in the industrial production of the country. It is an indicator of growth rate of Indian economy. Monthly IIP data from Jan'01 to Jul'10 was collected from the Reserve Bank of India website www.rbi.org.in. The variable used in the study was the monthly value of IIP.

Lag Variables:

Two lag variables have been introduced in the model, fiit-1 and fiit-2. This has been done to capture the lagged effect of FII investments in India as it is expected that FII investment in time period t is also a function of past FII investments.

Political factor:

Political factor is a dummy variable which refers to the political environment in India. Congress government has always shown policies supporting foreign investment in India compared to any other ruling party.

Type	Variable	Unit	Label	Observations
Dependent	FII_t	INR Crores	Foreign Institution Investment	115
Independent	Sensex_t	Points	BSE sensitivity Index	115
Independent	Snp500_t	Points	S&P 500 Index	115
Independent	StdDev_Sensex_t		Standard Deviation(For BSE sensitivity Index)	115
Independent	StdDev_Snp500_t		Standard Deviation(For S&P 500 Index)	115
Independent	Gold_t	Indian Rupee perTroy ounce	Gold Rate	115
Independent	Crudeoil_t	Indian Rupee per Barrel	Crude Oil (petroleum) Dubai Fateh Rate	115
Independent	Exchange_Rate_t	Rs. Per USD	Nominal Exchange Rate	115
Independent	WPI_t	Points	Whole Sale Price Index	115
Independent	US_TBill_Rate	Percent_Per_ Year	Market yield on U.S. Treasury securities at 3-month	115
Independent	Mibor_Rate_t	Percent	Mumbai Interbank 3-month rate	115
Independent	IIP_t	Points	Index of Industrial Production	115
Independent	FIIt-1	INR Crores	Lag Variable=1	115
Independent	FIIt-2	INR Crores	Lag Variable=2	115
Independent	D1		Political Factor	115

Table 3.2 : Data Description

3.2. Research Methodology

In order to examine the impact of Indian stock market and various other macroeconomic variables on FII, both correlation and regression analyses have been done.

The **correlation analysis** helps to identify the degree of co-movement in the flows by FIIs and performance of Indian capital market and other factors.
To calculate correlation coefficient, simple Karl Pearson's method has been used.

In addition to this, the **classical linear regression analysis** will help to identify the degree of dependence of the FII on Indian capital market performance and macroeconomic factors.
Further the regression analysis shows the dependence of dependent variable on the independent variables but it does not necessarily imply causation.

The **Granger (1969) Causality method** was used to understand the effect of FII on macroeconomic variables of the Indian economy and vice versa i.e. the effect of Sensex, S&P 500,Inflation, etc. on Foreign Investment in India.

3.2.1. Regression Model

We have assumed a linear model between the dependent variable FII and the independent explanatory variables. A model for FII inflows in India would require certain macroeconomic and financial parameters for the Indian economy to be compared with the ROW to gauge which factors make India attract FII from abroad. However, it is not possible to do an analysis on all important foreign economies vis-à-vis the Indian economy and hence, we have used the US economy as a proxy for the ROW while comparing indicators such as return on equities, risk, inflation, exchange rate, etc.

We have introduced a dummy variable to incorporate Qualitative factor like Political environment in our model.

The US economy can be used as an effective proxy as over 40 per cent of FII inflows into India originate from the US. Using the US economy as a proxy for the ROW in analyzing FII investments in India is not without precedent. It is assumed that the results thrown up by analyzing the US financial and macroeconomic variables vis-à-vis the Indian variables in this study can be extended to other countries also. For measuring attractiveness of a destination to FII investments, we have primarily relied on the data for stock market returns as a substantial flow of FII investments is channeled into equities.

FII_t = β1 + β2(Sensex_t) + β3(Snp500_t) + β4(StdDev_Sensex_t) + β5(StdDev_Snp500_t) +β6(Gold_t) + β7(Crudeoil_t) + β8(Exchange_Rate_t) + β9(WPI_t) + β10(US_TBill_Rate_t) + β11(Mibor_Rate_t) + β12(IIP_t) + β13(FIIt-1) + β14(FIIt-2) + D1

β1 = the intercept term
β2 to β14 = the partial regression slope coefficients
D1 = Dummy Variable
D1 = 1.....when ruling party is Congress
D1 = 0.....when ruling party is Non-Congress

The above model specifies that foreign institutional investments in India is a linear function of the value of the BSE Sensex, the value of S&P 500 stock index in the US, the riskiness of investing in Indian equities and US equities, as given by the standard deviation of the movements in Sensex and S&P 500 respectively, gold rate, crude oil rate, the inflation rate in India, the nominal exchange rate ,Rate of Interest in US and India represented by 91day-TBill in US and Mibor Rate in India, FII inflows in the

corresponding previous two time periods (in our case, previous 2 months) and the dummy variable.

Relaxing the assumptions of Classical Linear Regression Model

As our data is real time it does not follow all assumptions of Classical Linear Regression Model.

1) The data is hetroscedastic verified by Rank Spearman Coefficient Test.
2) The data is auto-correlated verified by graphical method.
3) The Data is multi-collinear.

3.2.2. Augmented Dickey–Fuller (ADF) test & Granger's Causality Approach

The dissertation has attempted to study the impact of inflows from FIIs on the Indian financial markets & other macro-economic variables and vice-versa through the pair-wise Granger Causality tests. The tests have been conducted between FII inflows and macro-economic variables such as WPI and IIP to establish the linkages between them.

As the data are time series in nature, the macroeconomic variables were tested for 'stationarity' by using the Augmented Dickey–Fuller (ADF) test. The test is performed as follows:

Null Hypothesis: FII has a Unit Root ADF test statistic

If p value<=0.05, null hypothesis was rejected.

Null Hypothesis: FII_INR_CRORES_ has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.704679	0.4261
Test critical values:	1% level	-3.490772	
	5% level	-2.887909	
	10% level	-2.580908	

Table 3.3 : ADF Test Example

Decision rule:

If ADF t-Statistic > Test critical values, ==> do not reject null hypothesis, i.e., unit root exists.

If ADF t-Statistic < Test critical values, ==> reject null hypothesis, i.e., unit root does not exist.

If the computed ADF test-statistic (-1.704679) is greater than the critical values - **"tau" (**-3.490772, -2.887909, -2.580908 at 1%, 5% and 10% significant level, respectively), thus we cannot conclude to reject the Ho. That means the FII series is a non-stationary series.

So the first difference of the series using the **Difference Stationary Process** was calculated to get a stationary time series (without Unit Root)

This was performed for each variable separately. It is well known that the Granger Causality test is sensitive to the choice of lag length. To avoid this problem, the **Akaike information criterion (AIC)** was applied to choose the optimum lag length.

After making all the variables stationary using ADF and identifying the corresponding lag lengths, **Grangers Causality Test** was applied. To evaluate the Causality criteria of the macro-economic variables with FII the following Hypothesis were used:

Null Hypothesis : Sensex does not Granger cause FII
Alternate Hypothesis : FII does not Granger cause Sensex

Pairwise Granger Causality Tests
Date: 05/09/13 Time: 19:02
Sample: 2001M01 2010M07
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
SENSEX does not Granger Cause FII_INR_CRORES_	112	3.94076	0.0005
FII_INR_CRORES_ does not Granger Cause SENSEX		3.03075	0.0047

Table 3.4 : Granger's Causality Test Example

Decision Rule

If Prob. > 0.05 ==> Do not reject null hypothesis

If Prob. < 0.05 ==> Reject null hypothesis

Hence, Sensex Granger causes FII & FII Granger causes Sensex

The same approach was followed with all the macroeconomic variable and FII to test the relation between FII and economic indicators of India.

CHAPTER 4

DATA ANALYSIS

&

INTERPRETATION

4.1. Correlation Test

Correlation Analysis SPSS Output and interpretation is as follow :

Variables	Pearson Correlation Coefficient with FII	Sig.(2 - tailed)
FII_t-1	.193*	0.039
FII_t-2	0.131	0.162
SnP	0.12	0.201
Sensex	.328**	0
StdDev_SnP	-.353**	0
StdDev_Sensex	-.313**	0.001
Gold	.255**	0.006
CrudeOil	0.094	0.317
Exchange_Rate	-0.111	0.237
WPI	.253**	0.006
US_TBill_Rate	-0.035	0.713
Mibor_Rate	-.325**	0
IIP	.306**	0.001

Table 4.1: Correlation Test Result

Interpretation of Correlation with FII:

1. FII_t-1 : Positive correlation which is Statistically significant.
2. FII_t-2 : No statistically significant correlation
3. S&P 500 : No statistically significant correlation
4. Sensex : Strong positive correlation exists with 0 as p value(high statistical significance)The movement in Sensex and FII is in the same direction as expected.
5. StdDev_SnP : Strong negative correlation exists which is statistically significant

6. StdDev_Sensex : Strong negative correlation exists between FII and Std_Sensex which is statistically significant. The correlation coefficient is negative implying that as the Standard Deviation in Sensex reduces the FII inflow increases.
7. Gold : Positive correlation exists between FII and Gold rate. Also since p=0.006 it is significant statistically.
8. Crude Oil Rate : No statistically significant correlation
9. Exchange_Rate : No statistically significant correlation between FII and Exchange Rate. The value of Pearson Correlation Coefficient is also less, indicating low negative correlation.
10. WPI : Positive correlation which is Statistically significant.
11. US_TBill_Rate : No statistically significant correlation
12. Mibor_Rate : Negative correlation of FII with Mibor Rate at a statistically significant p value of 0
13. IIP : Strong positive correlation between FII and IIP, which is statistically significant at p value of 0.001

Thus FII has **positive correlation** with **FII(t-1), Sensex, Gold Rate, WPI, IIP**

Thus FII has **negative correlation** with **Standard Deviation of S&P500, Standard deviation of Sensex, Mibor Rate**

4.2. Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.734[a]	.539	.474	5117.05571

a. Predictors: (Constant), Dummy_Variable, StdDev_SnP, FII_t2, FII_t1, US_TBill_Rate, StdDev_Sensex, Exchange_Rate, Mibor_Rate, CrudeOil, IIP, SnP, Sensex, Gold, WPI

Table 4.2 :Regression Model summary

R Square (R^2): This is an indication of explanatory power of the regression model.
The Model summary gives us an adjusted R square of 53.9%.It can be interpreted that 53.9 percent of the variation in the dependent variable FII can be explained by variation(s) in the causing factors.

Adjusted R-square: Measures the proportion of the variance in the dependent variable (*FII*) that was explained by variations in the independent variables. The "**Adjusted** R-Square" shows that 47.4 % of the variance was explained by macro-economic factors.

Standard Error of Estimate: Std. error of the estimate measures the dispersion of the dependent variables estimate around its mean. Std. Error of the Estimate of FII is 5117.05571

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.060E9	14	2.186E8	8.348	.000[a]
	Residual	2.618E9	100	2.618E7		
	Total	5.679E9	114			

a. Predictors: (Constant), Dummy_Variable, StdDev_SnP, FII_t2, FII_t1, US_TBill_Rate, StdDev_Sensex, Exchange_Rate, Mibor_Rate, CrudeOil, IIP, SnP, Sensex, Gold, WPI

b. Dependent Variable: FII

Table 4.3 :Regression ANOVA Table

Since, Sig. =.000

Null Hypothesis: None of the macroeconomic factors are significant predictors of FII

Alternate Hypothesis : At least one macroeconomic factor is a significant predictor of FII

Since p-value < 0.05 , Null Hypothesis Rejected

Coefficients					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
1 (Constant)	-57276.523	29878.567		-1.917	0.058
FII_t1	-0.245	0.087	-0.235	-2.799	0.006
FII_t2	-0.31	0.089	-0.296	-3.498	0.001
SnP	-1.451	9.95	-0.038	-0.146	0.884
Sensex	1.893	0.458	1.442	4.131	0
StdDev_SnP	-2388.559	1433.694	-0.258	-1.666	0.099
StdDev_Sensex	-1584.405	781.427	-0.188	-2.028	0.045
Gold	-0.511	0.288	-0.915	-1.776	0.079
CrudeOil	-5.771	1.368	-0.882	-4.22	0
Exchange_Rate	657.895	451.103	0.25	1.458	0.148
WPI	299.971	128.091	1.263	2.342	0.021
US_TBill_Rate	489.287	706.134	0.117	0.693	0.49
Mibor_Rate	-1225.061	577.404	-0.338	-2.122	0.036
IIP	1.251	47.757	0.009	0.026	0.979
Political_Factor	-6419.71	2681.542	-0.438	-2.394	0.019

a. Dependent Variable: FII Table 4.4 :Regression Coefficients Table

Regression Coefficients:

FII_t = -57276.523 + 1.893**(Sensex_t)** - 1.451**(Snp500_t)** - 1584.405**(StdDev_Sensex_t)** -2388.559**(StdDev_Snp500_t)** - 0.511**(Gold_t)** - 5.771**(Crudeoil_t)** + 657.895**(Exchange_Rate_t)** + 299.971**(WPI_t)** + 489.287**(US_TBill_Rate_t)** -1225.061**(Mibor_Rate_t)** + 1.251**(IIP_t)** - 0.245**(FIIt-1)** - 0.31**(FIIt-2)** + **Ut**

The interpretation of the above result has been presented in the following points:-

1. When the average monthly increase in Sensex (computed as a 30 day average of the daily closing values) is one unit, monthly FII investments into India increases by (1.893 X 100,00,000) or INR 1.893 crore.(100% Confidence Level).
2. When the average monthly increase in S&P 500 (computed as a 30 day average of the daily closing values) is one unit, monthly FII investments into India decreases by (1.451 X 10,00,000) or INR 1.451 crore.(11.6% Confidence Level).Thus S&P 500 is not a significant predictor of FII.
3. When the risk of investing in Indian equities (as measured by the monthly standard deviation of daily Sensex returns) increases by one unit in a month, monthly FII investments into India falls by (1584.405 X 100,00,000) or INR 1584.405 crore .(55% Confidence level).Not reliable.
4. When the risk of investing in foreign equities (as measured by the monthly standard deviation of daily S&P 500 returns) increases by one unit in a month, monthly FII investments into India falls by (2388.559 X 100,00,000) or INR 2388.559 crore.(1% confidence level)Standard deviation of S&P 500 does not have any impact on FII.
5. When the average monthly gold price increases by one unit in a month, monthly FII investments into India falls by (0.511 X 100,00,000) or INR 0.511 crore(92.1% Confidence level)
6. When the average crude oil price increases by one unit in a month, monthly FII investments into India falls by (5.771 X 100,00,000) or INR 5.771 crore (100% Confidence level)

7. When the nominal exchange rate depreciates by one unit, i.e., when the nominal exchange rate increases10 by one unit in a month, monthly FII investments into India falls by (657.895 X10,00,000) or INR 657.895 crore (45.6% Confidence level).Not reliable.
8. When monthly inflation in India (as measured by the WPI) increases by one unit, monthly FII investments into India falls by (299.971 X 100,00,000) or INR 299.971 crore.(96.2% Confidence Level).
9. When the monthly T-Bill interest Rate in US increases by one unit, monthly FII investments into India increases by (489.287 X 100,00,000) or INR 489.287 crore.(51% Confidence Level).Not reliable.
10. When the monthly MIBOR interest Rate in Indian Banks increases by one unit, monthly FII investments into India decreases by (1225.061 X 100,00,000) or INR 1225.061 crore.(96.4% Confidence Level)
11. When the monthly IIP in India increases by one unit, monthly FII investments into India decreases by (1.251 X 100,00,000) or INR 1.251 crore.(2.1% Confidence Level).Thus IIP does not have any significant impact on FII.
12. When ruling political party is not Congress the intercept is -57276.523 is INR 57276.523 crore of efflux means this is the value of FII inflow when all other factors are absent.(42% Confidence Level).Not reliable.
13. A literal interpretation of the lag variables will be that when monthly FII investments in the previous time period, i.e., t-1 increases by 1 million USD, FII investments in the succeeding month, i.e., in time period t, falls by (0.245 X 10,00,000) or INR 0.245 crore.(94% Confidence level).
14. Similarly, when monthly FII investments in time period t-2 increases by 1 million USD, FII investments in the present time period t falls by (0.31 X 100, 00,000) or INR 0.31 crore. This is to say that FII investments in the present time period also depend on the inflows that have already taken place in the previous two months. (99% confidence level)

4.3. Causality Test

4.3.1. Augmented Dickey Fuller Test Analysis

The table below shows the value of t-Statistic, p-value and Lag length for the Null Hypothesis corresponding to all the data series on EViews . Also or the series that were non stationary, we took the 1st difference or de-trend to generate a stationary series to be utilized for Grangers Causality test.

ADF TEST HYPOTHESIS	t-Statistic	p-Value	Lag Length
FII has a Unit Root ADF test statistic	-1.704679	0.4261	4
D(FII) has a Unit Root ADF test statistic	**-10.48513**	**0**	**3**
Sensex has a Unit Root ADF test statistic	-0.390099	0.9061	0
D(Sensex) has a Unit Root ADF test statistic	**-9.794097**	**0**	**0**
S&P 500 has a Unit Root ADF test statistic	-2.169931	0.2185	4
D(S&P 500) has a Unit Root ADF test statistic	**-3.994633**	**0.0021**	**3**
Standard Deviation in Sensex has a Unit Root ADF test statistic	**-4.381744**	**0.0005**	**1**
Standard Deviation in S&P 500 has a Unit Root ADF test statistic	**-3.654506**	**0.0061**	**0**
Gold Rate has a Unit Root ADF test statistic	1.323022	0.9987	0
D(Gold Rate) has a Unit Root ADF test statistic	**-10.65821**	**0**	**0**
Crude Oil Rate has a Unit Root ADF test statistic	-0.926774	0.7761	12
D(Crude Oil Rate) has a Unit Root ADF test statistic	**-4.615304**	**0.0002**	**11**
Exchange Rate has a Unit Root ADF test statistic	-2.927743	0.0454	5
D(Exchange Rate) has a Unit Root ADF test statistic	**-4.279175**	**0.0008**	**12**
WPI has a Unit Root ADF test statistic	1.597919	0.9995	12
D(WPI) has a Unit Root ADF test statistic	**-4.546299**	**0.0003**	**12**
US T-Bill Interest Rate has a Unit Root ADF test statistic	-1.964503	0.3021	8
D(US T-Bill Interest Rate) has a Unit Root ADF test statistic	-2.583591	0.0996	7
D2(US T-Bill Interest Rate) has a Unit Root ADF test statistic	**-7.27146**	**0**	**6**
Mibor Rate has a Unit Root ADF test statistic	-2.55724	0.1051	3
D(Mibor Rate) has a Unit Root ADF test statistic	**-9.061769**	**0**	**0**
IIP has a Unit Root ADF test statistic	1.510607	0.9993	12
D(IIP) has a Unit Root ADF test statistic	-1.259957	0.6457	12
D2(IIP) has a Unit Root ADF test statistic	**-10.76544**	**0**	**11**

Table 4.5 : ADF Test Result

4.3.2. Granger Causality Test

HYPOTHESIS	F-STATISTICS LEVEL	SIGNIFICANCE	RESULT
Sensex does not Granger cause FII	3.94076	0.0005	Rejected
FII does not Granger cause Sensex	3.03075	0.0047	Rejected
S&P 500 does not Granger cause FII	1.37073	0.2583	Accepted
FII does not Granger cause S&P 500	0.02692	0.9734	Accepted
FII does not Granger cause Standard Deviation in Sensex	1.18139	0.3108	Accepted
Standard Deviation in Sensex does not Granger cause FII	1.15972	0.3175	Accepted
Standard Deviation in S&P 500 does not Granger cause FII	0.9857	0.4701	Accepted
FII does not Granger cause Standard Deviation in S&P 500	2.37731	0.0115	Rejected
Gold does not Granger cause FII	0.72087	0.4887	Accepted
FII does not Granger cause Gold Rate	0.38601	0.6807	Accepted
Crude Oil Rate does not Granger cause FII	2.10308	0.0261	Rejected
FII does not Granger cause Crude Oil Rate	2.1008	0.0263	Rejected
Exchange Rate does not Granger cause FII	2.0757	0.0283	Rejected
FII does not Granger Cause Exchange Rate	2.1738	0.0212	Rejected
IIP does not Granger cause FII	1.79006	0.0895	Accepted
FII does not Granger cause IIP	2.51249	0.0164	Rejected
Mibor Rate does not Granger cause FII	1.6181	0.2031	Accepted
FII does not Granger cause Mibor Rate	0.12643	0.8814	Accepted
FII does not Granger cause US Tbill Interest Rate	1.22513	0.2978	Accepted
US Tbill Interest Rate does not Granger cause FII	1.64498	0.1979	Accepted
WPI does not Granger cause FII	0.03656	0.9641	Accepted
FII does not Granger cause WPI	3.71398	0.0276	Rejected

Table 4.6: Granger's Causality Test Result

The table above shows the results of Granger Causality Test. The F-Statistics level and Significance corresponding to Granger Causation hypothesis. Also when Significance level is less than 0.05, the Null Hypothesis is rejected, and causal behavior is predicted as shown in the inference column.

Interpretations

1. Sensex Granger causes FII
2. FII Granger causes Sensex

   Foreign Investments have a bidirectional causality with the Stock Market Returns(Sensex) of the host country during the period of the study, i.e., January 2001– July 2010, with the variables mutually reinforcing each other. With net FII flows into India growing rapidly since January 2001, the BSE Sensex also exhibited a similar trend in its movement during the period of the study.
3. Std Dev in S&P 500 Granger cause FII

   Risk in the investing country(US market--S&P 500) affects the quatum of FII in host country. This could be due to dominant position of US stock market in the world.
4. Crude Oil Rate Granger causes FII
5. FII Granger causes Crude oil Rate
6. Exchange Rate Granger causes FII
7. FII Granger causes Exchange Rate

   Huge amount of FII causes appreciation in the home currency rate. High fluctuations in exchange rate may attract FII's for speculative purposes to earn super normal profits in the market.
8. FII Granger causes IIP

   IIP which is used as a proxy of GDP is affected by FII, as these investments lead to further development in the host country economy.
9. FII Granger causes WPI

   Huge amount of FII fund inflow into the country creates a lot of demand for rupee, results into the inflation in the country.

CHAPTER 5

CONCLUSION

&

POLICY

RECOMMENDATION

Conclusions:

1. Evidence shows FII has bidirectional causality with Sensex, Exchange Rate and crude oil rate. This is supported by the strong positive correlation between FII and Sensex.
2. Granger's Causality Test shows risk in US market is affecting FII in India. In addition there is the strong negative correlation between Standard Deviation of S&P 500 and FII.
3. FII is having a causal effect on the WPI, IIP which is also exhibited by their strong positive correlation.
4. The main determinants of FII in India found by regression analysis are Lag variable of FII, Sensex, Standard deviation in Sensex, Crude Oil Rate, WPI, MIBOR Rate, and Political Environment in India. These results are complemented by the strong correlation between FII and Sensex, Crude oil, WPI, MIBOR rate.

These conclusions bring forth many implications and suggestions for the flow of foreign funds in Indian markets. The Indian equity market return (BSE Sensex) is found as the prime factor having bidirectional relationship with the FII net flows into India. Thus the government will have to move fast to improve the functioning of stock market and regulatory system to bring more stability in our entire financial system to attract more FIIs in the market.

High fluctuations in the exchange rate may cause FIIs investment more volatile which create speculation and manipulation, thus destabilized the stock market. So, there is a need to stabilize the frequent ups and downs in the exchange rate for better management of FIIs flows.The huge amount of FII fund inflow into the country creates a lot of demand for rupee, and the RBI pumps the amount of Rupee in the market as a result of demand created by the FII's. This situation could be leading to excess liquidity (amount of excess cash floating in the market) thereby leading to Inflation, shown by the FII causality of WPI. Thus there should be a limit to the FII inflow in the country.

The study also found that growth in FII flows improved the market sentiment and increased the Index of Industrial Production indicating growth and prosperity in the country. Clearly, FII flows into India act as catalyst for high WPI and IIP so the extent of fund flow should be regulated keeping in mind both these factors. Adding further, the MIBOR Interest rates in India propel FIIs to invest further on account of the positive interest rate differential determining the flow of FII.

Hence, the dissertation provides an analysis of FII inflows to India and their relationship with several relevant variables. Broader and more long-term issues involving foreign portfolio investment in India and their economy-wide implications have not been addressed in this paper. Such issues would invariably require an estimation of the societal costs of the volatility and uncertainty associated with FII flows. A detailed understanding of the nature and determinants of FII flows to India would help us address such questions in a more informed manner and allow us to better evaluate the risks and benefits of foreign portfolio investment in India.

CHAPTER 6

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CHAPTER 7

ANNEXURE

7.1. Data Series

The following table shows the time series data for the variables under study from January 2001 to July 2010.

Date	FII (INR crores)	FII (t-1)	FII (t-2)	S&P	Sensex	SD (S&P)	SD (Sensex)	Gold (Monthly Price (Indian Rupee per Troy ounce))	Crude Oil (petroleum) Dubai Fateh - Monthly Price (Indian Rupee per Barrel)	Average Exchange Rate(ask)	WPI	US 3 Month _mnthclose T-Bill Interest Rate(percent_per_year)	NSE MIBOR 3month Rate_close	Index of Industrial Production (IIP general)	Dummy Variable
Jul 10	24724.00	11249.10	-6986.10	1101.60	17868.29	1.25	0.62	55916.83	3405.26	46.719452	261.0	0.15	6.53	346.3	1
Jun 10	11249.10	-6986.10	12393.10	1030.71	17700.90	1.61	1.15	57410.36	3444.85	46.4813	259.8	0.18	6.50	325.9	1
May 10	-6986.10	12393.10	29437.50	1089.41	16944.63	2.02	1.51	55173.35	3506.94	45.669935	260.4	0.16	5.33	323.9	1
Apr 10	12393.10	29437.50	4363.00	1186.69	17558.71	0.94	0.85	51115.41	3692.52	44.4562	253.4	0.16	5.01	323.9	1
Mar 10	29437.50	4363.00	8412.60	1169.43	17527.77	0.47	0.69	50654.61	3520.18	45.46429	257.5	0.16	5.69	373.8	1
Feb 10	4363.00	8412.60	8710.70	1104.49	16429.55	1.14	1.19	50745.87	3407.26	46.3145	250.5	0.13	4.97	331.1	1
Jan 10	8412.60	8710.70	6181.40	1073.87	16357.96	1.03	0.97	51344.51	3519.83	45.981774	250.5	0.08	4.59	347.2	1
Dec 09	8710.70	6181.40	15972.60	1115.10	17464.81	0.66	1.02	52912.18	3520.10	46.532468	248.3	0.06	4.60	334.3	1
Nov 09	6181.40	15972.60	20572.70	1095.63	16926.22	0.98	1.57	52484.94	3615.15	46.569183	247.2	0.06	4.44	299.8	1
Oct 09	15972.60	20572.70	4523.30	1036.19	15896.28	1.36	1.09	48737.49	3423.72	46.705242	242.5	0.05	4.61	289.7	1
Sep 09	20572.70	4523.30	13181.70	1057.08	17126.84	0.96	0.9	48273.82	3289.49	48.3977	242.6	0.14	4.67	302	1
Aug 09	4523.30	13181.70	4898.30	1020.62	15666.64	1.03	1.78	45872.80	3446.11	48.271903	240.8	0.15	4.58	292.8	1
Jul 09	13181.70	4898.30	17405.80	987.48	15670.31	1.3	2.19	45317.28	3151.55	48.398962	238.7	0.18	4.52	290.8	1
Jun 09	4898.30	17405.80	8998.50	919.32	14493.84	1.29	1.75	45178.09	3306.41	47.671474	235.0	0.19	4.72	291.6	1
May 09	17405.80	8998.50	-5890.00	919.14	14625.25	1.81	4.47	45070.86	2785.85	48.605316	234.3	0.14	5.29	280.3	1
Apr 09	8998.50	-5890.00	-3124.40	872.81	11403.25	1.89	2.13	44573.36	2512.57	50.03327	231.5	0.14	5.64	269.3	1
Mar 09	-5890.00	-3124.40	-3443.00	797.87	9708.50	3.08	2.61	47387.48	2336.89	51.113321	228.2	0.21	7.64	305.9	1
Feb 09	-3124.40	-3443.00	2376.60	735.09	8891.61	2.27	1.87	46416.55	2123.45	49.179551	227.6	0.26	7.64	276.8	1
Jan 09	-3443.00	2376.60	1616.70	825.88	9424.24	2.47	3.04	41938.42	2196.34	49.043306	228.9	0.24	7.83	284.8	1
Dec 08	2376.60	1616.70	-17205.40	903.25	9647.31	3.09	2.55	39696.27	1994.32	49.906565	229.7	0.11	8.89	284	1
Nov 08	1616.70	-17205.40	-5073.90	896.24	9092.72	4.48	3.85	37284.82	2517.79	49.842751	234.2	0.01	10.43	267.6	1
Oct 08	-17205.40	-5073.90	46.10	968.75	9788.06	5.09	5.14	39235.79	3337.83	50.055371	239.0	0.46	11.73	262.9	1
Sep 08	-5073.90	46.10	1782.10	1166.36	12860.43	3.29	2.51	37815.02	4372.78	45.544457	241.5	0.92	11.86	276.2	1
Aug 08	46.10	1782.10	-11094.50	1282.83	14564.53	1.31	1.73	36026.85	4861.12	43.108455	241.2	1.72	11.22	264.7	1
Jul 08	1782.10	-11094.50	-5174.40	1267.38	14355.75	1.46	3.31	40256.56	5621.01	43.001054	240.0	1.68	10.39	271.3	1

Jun 08	-11094.50	-5174.40	-626.90	1280.00	13461.60	1.24	1.91	38087.88	5463.40	42.842487	237.4	1.9	9.94	269.2	1
May 08	-5174.40	-626.90	-1010.10	1400.38	16415.57	0.9	1.3	37435.38	5010.83	42.047174	231.1	1.89	8.87	274.6	1
Apr 08	-626.90	-1010.10	4230.10	1385.59	17287.31	1.15	1.4	36416.00	4141.96	40.02689	228.5	1.43	8.77	266.3	1
Mar 08	-1010.10	4230.10	-11081.90	1322.70	15644.44	1.83	3.18	39082.77	3905.72	40.340833	225.5	1.38	9.82	304.9	1
Feb 08	4230.10	-11081.90	8891.10	1330.63	17578.72	1.29	2.37	36642.46	3574.07	39.720893	219.9	1.85	9.61	276.2	1
Jan 08	-11081.90	8891.10	-6319.20	1378.55	17648.71	1.52	2.94	35025.78	3432.12	39.366685	218.1	1.96	8.54	281.9	1
Dec 07	8891.10	-6319.20	23090.40	1468.36	20286.99	1.11	1.48	31678.33	3381.98	39.465375	216.4	3.36	8.56	284.7	1
Nov 07	-6319.20	23090.40	18788.40	1481.14	19363.19	1.65	1.74	31798.42	3420.63	39.439205	215.9	3.15	8.50	261	1
Oct 07	23090.40	18788.40	-7162.10	1549.38	19837.99	0.85	2.36	29816.80	3048.05	39.548261	215.2	3.94	7.90	262.6	1
Sep 07	18788.40	-7162.10	22609.40	1526.75	17291.10	1	1.08	28748.42	2954.91	40.388438	215.1	3.82	8.45	260.5	1
Aug 07	-7162.10	22609.40	1101.70	1473.99	15318.60	1.56	1.99	27160.49	2743.35	40.843125	213.8	4.01	8.47	260.3	1
Jul 07	22609.40	1101.70	5319.80	1455.27	15550.99	1.06	1.06	26892.24	2807.32	40.420952	213.6	4.96	7.54	255	1
Jun 07	1101.70	5319.80	7721.50	1503.35	14650.51	0.83	0.82	26726.01	2680.51	40.753571	212.3	4.82	9.31	255.3	1
May 07	5319.80	7721.50	360.60	1530.62	14544.46	0.56	0.81	27220.91	2632.72	40.870669	212.3	4.73	9.72	263.1	1
Apr 07	7721.50	360.60	8195.10	1482.37	13872.37	0.51	1.21	28636.08	2690.92	42.276563	211.5	4.91	11.12	250.7	1
Mar 07	360.60	8195.10	-1681.90	1420.86	13072.10	0.87	1.95	28832.08	2599.71	44.014345	209.8	5.04	11.65	289.1	1
Feb 07	8195.10	-1681.90	-2766.00	1406.82	12938.09	0.9	1.53	29356.70	2458.96	44.123729	208.9	5.16	10.22	252.2	1
Jan 07	-1681.90	-2766.00	10186.50	1438.24	14090.92	0.48	1.17	27985.57	2306.10	44.30621	208.8	5.12	9.19	265.5	1
Dec 06	-2766.00	10186.50	8669.60	1418.30	13786.91	0.43	1.49	28110.41	2618.71	44.6325	208.4	5.02	9.56	263.7	1
Nov 06	10186.50	8669.60	6133.40	1400.63	13696.31	0.52	0.59	28162.44	2548.78	44.811532	209.1	5.03	7.70	248.8	1
Oct 06	8669.60	6133.40	5447.60	1377.94	12961.90	0.44	0.96	26634.49	2568.97	45.438276	208.7	5.08	7.63	234	1
Sep 06	6133.40	5447.60	1297.40	1335.85	12454.42	0.51	1.05	27588.91	2756.65	46.119517	207.8	4.89	7.21	243.5	1
Aug 06	5447.60	1297.40	875.10	1303.82	11699.05	0.44	0.67	29440.30	3200.96	46.491078	205.3	5.05	7.21	234.8	1
Jul 06	1297.40	875.10	-6647.40	1276.66	10743.88	0.95	1.97	29439.75	3207.80	46.384958	204.0	5.1	7.20	235.5	1
Jun 06	875.10	-6647.40	770.40	1270.20	10609.25	1	3.34	27455.73	2997.29	45.893571	203.1	5.01	7.09	234.4	1
May 06	-6647.40	770.40	6430.40	1270.09	10398.61	0.79	2.6	30668.98	2947.50	45.253648	201.3	4.86	6.82	237.9	1
Apr 06	770.40	6430.40	7436.20	1310.61	11851.93	0.57	1.67	27448.49	2879.46	44.801205	199.0	4.77	6.97	225.2	1
Mar 06	6430.40	7436.20	2756.00	1294.87	11279.96	0.49	0.88	24776.99	2564.01	44.370555	196.8	4.63	8.48	251.9	1
Feb 06	7436.20	2756.00	8360.60	1280.66	10370.24	0.6	0.91	24603.51	2552.58	44.254711	196.4	4.62	7.65	227.3	1
Jan 06	2756.00	8360.60	1874.20	1280.08	9919.89	0.7	1.04	24413.14	2588.88	44.351481	196.3	4.47	7.62	237.9	1
Dec 05	8360.60	1874.20	-4627.40	1248.29	9397.93	0.47	1.09	23290.06	2425.82	45.694401	197.2	4.08	6.88	232.5	1
Nov 05	1874.20	-4627.40	4458.40	1249.48	8788.81	0.49	1.03	21796.08	2346.21	45.629655	198.2	3.95	6.30	214.8	1
Oct 05	-4627.40	4458.40	4621.20	1207.01	7892.32	0.93	1.43	21062.00	2405.62	44.729667	197.8	3.98	6.10	223.9	1
Sep 05	4458.40	4621.20	7760.20	1228.81	8634.48	0.6	1.1	20028.03	2483.04	43.876667	197.2	3.55	6.06	217.4	1
Aug 05	4621.20	7760.20	5258.20	1220.33	7805.43	0.57	0.95	19105.09	2470.54	41.960666	195.3	3.52	5.96	212.9	1
Jul 05	7760.20	5258.20	-1385.80	1234.18	7635.42	0.56	0.94	18480.70	2300.95	43.490185	194.6	3.42	6.02	208.1	1
Jun 05	5258.20	-1385.80	-1475.50	1191.33	7193.85	0.51	0.78	18770.58	2222.01	43.557322	193.2	3.13	5.94	213.6	1
May 05	-1385.80	-1475.50	7926.60	1191.50	6715.11	0.66	0.63	18347.86	1957.11	43.452903	192.1	2.99	5.93	213	1
Apr 05	-1475.50	7926.60	9209.40	1156.85	6154.44	0.93	1.24	18775.16	2060.21	43.696167	191.6	2.9	5.98	204.9	1
Mar 05	7926.60	9209.40	-316.60	1180.59	6492.82	0.63	1.02	18954.91	1991.39	43.638871	189.4	2.79	6.11	241.5	1

Feb 05	9209.40	-316.60	10139.70	1203.60	6713.86	0.67	0.82	18490.66	1739.22	43.6175	188.8	2.76	6.10	216.1	1
Jan 05	-316.60	10139.70	8185.30	1181.27	6555.94	0.64	1.54	18554.21	1654.45	43.735192	188.6	2.51	5.70	225.2	1
Dec 04	10139.70	8185.30	2028.00	1211.92	6602.69	0.57	0.77	19442.83	1506.77	43.760714	188.8	2.22	5.68	226.9	1
Nov 04	8185.30	2028.00	2575.30	1173.82	6234.29	0.61	0.71	19821.18	1573.51	45.110681	190.2	2.23	5.57	209.1	1
Oct 04	2028.00	2575.30	2520.90	1130.20	5672.27	0.76	0.94	19250.39	1720.55	43.929104	188.9	1.91	5.31	209.7	1
Sep 04	2575.30	2520.90	713.20	1114.58	5583.61	0.58	0.73	18682.41	1635.56	45.860485	189.4	1.71	5.03	208.7	1
Aug 04	2520.90	713.20	-273.60	1104.24	5192.08	0.83	0.92	18560.59	1774.91	46.304	188.4	1.59	4.94	203.9	1
Jul 04	713.20	-273.60	-3546.40	1101.72	5170.32	0.6	1.06	18329.56	1587.59	45.9965	186.6	1.45	4.89	204.6	1
Jun 04	-273.60	-3546.40	6719.50	1140.84	4795.46	0.6	1.36	17859.21	1520.69	45.4705	185.2	1.33	4.83	196	1
May 04	-3546.40	6719.50	6444.30	1120.68	4759.62	0.71	3.81	17362.97	1559.50	45.123948	182.1	1.08	4.83	197.5	0
Apr 04	6719.50	6444.30	2673.50	1107.30	5655.09	0.76	1.34	17716.56	1365.01	43.820866	180.9	0.98	4.90	194.3	0
Mar 04	6444.30	2673.50	3869.40	1126.21	5590.60	0.94	1.45	18306.02	1371.15	45.05465	179.8	0.95	5.05	210.7	0
Feb 04	2673.50	3869.40	6381.90	1144.94	5667.51	0.58	1.5	18329.50	1285.72	45.235938	179.8	0.96	5.00	197.3	0
Jan 04	3869.40	6381.90	3594.10	1131.13	5695.67	0.71	2.08	18806.25	1303.48	45.432223	178.7	0.92	5.00	203.9	0
Dec 03	6381.90	3594.10	6722.80	1111.92	5838.96	0.61	0.91	18553.38	1270.16	45.564722	176.8	0.95	4.91	202	0
Nov 03	3594.10	6722.80	4175.50	1058.20	5044.82	0.71	1.37	17748.70	1251.80	45.486158	176.9	0.93	4.93	188.2	0
Oct 03	6722.80	4175.50	2227.50	1050.71	4906.87	0.64	1.4	17199.35	1231.44	45.385	176.1	0.96	5.21	184.4	0
Sep 03	4175.50	2227.50	2160.90	995.97	4453.24	0.95	1.69	17374.81	1158.64	45.846923	175.6	0.95	4.94	184.7	0
Aug 03	2227.50	2160.90	3461.80	1008.01	4244.73	0.67	1.4	16526.12	1268.74	45.943763	173.7	0.98	4.94	182.1	0
Jul 03	2160.90	3461.80	3060.50	990.31	3792.61	0.98	1.04	16229.25	1231.23	46.245625	173.4	0.96	5.39	183.1	0
Jun 03	3461.80	3060.50	992.50	974.50	3607.13	1.02	1.02	16649.12	1189.98	46.74645	173.5	0.9	5.52	177.3	0
May 03	3060.50	992.50	962.80	963.59	3180.75	1	0.72	16746.68	1141.77	47.098325	173.4	1.11	5.60	180	0
Apr 03	992.50	962.80	428.20	916.92	2959.79	1.24	1.21	15548.35	1107.69	47.403571	173.1	1.13	5.76	174	0
Mar 03	962.80	428.20	985.30	848.18	3048.72	1.75	1.08	16224.16	1306.32	47.664501	171.6	1.14	6.36	195	0
Feb 03	428.20	985.30	647.90	841.15	3283.66	1.19	0.79	17135.72	1441.62	47.740106	169.4	1.2	6.27	182.2	0
Jan 03	985.30	647.90	737.70	855.70	3250.38	1.56	0.71	17104.25	1345.40	47.937694	167.8	1.18	6.30	188.8	0
Dec 02	647.90	737.70	-875.10	879.82	3377.28	1.08	0.84	15977.80	1237.62	48.176333	167.2	1.22	6.21	188	0
Nov 02	737.70	-875.10	322.40	936.31	3228.82	1.5	0.68	15396.81	1125.31	48.251105	167.8	1.22	6.10	173.9	0
Oct 02	-875.10	322.40	174.10	885.76	2949.32	2.17	0.97	15311.83	1266.31	48.362591	167.5	1.44	6.23	173.6	0
Sep 02	322.40	174.10	238.40	815.28	2991.36	1.88	0.83	15459.50	1299.68	48.44445	167.4	1.57	6.81	171.8	0
Aug 02	174.10	238.40	-866.00	916.07	3181.23	2.12	0.91	15075.69	1230.31	48.603228	167.1	1.69	6.81	172.2	0
Jul 02	238.40	-866.00	46.20	911.62	2987.65	2.68	1.07	15277.25	1198.13	48.787774	165.6	1.71	6.84	171.8	0
Jun 02	-866.00	46.20	-112.90	989.82	3244.70	1.35	1.18	15725.33	1166.74	48.963447	164.7	1.7	7.50	166.2	0
May 02	46.20	-112.90	329.00	1067.14	3125.73	1.4	1.55	15410.01	1204.91	49.00224	162.8	1.74	8.24	169.2	0
Apr 02	-112.90	329.00	2336.80	1076.92	3338.16	1.01	0.99	14806.95	1194.13	48.908614	162.3	1.77	8.19	167	0
Mar 02	329.00	2336.80	699.40	1147.39	3469.35	1.01	1.32	14332.32	1113.70	48.7337	161.9	1.79	8.29	184.2	0
Feb 02	2336.80	699.40	227.90	1106.73	3562.31	1.19	1.54	14388.34	920.76	48.664774	160.8	1.79	8.37	170.3	0
Jan 02	699.40	227.90	3.80	1130.20	3311.03	1.04	0.92	13606.99	884.06	48.271182	161.0	1.76	8.41	176.9	0
Dec 01	227.90	3.80	884.40	1148.08	3262.33	0.97	1.33	13217.92	845.26	47.9048	161.8	1.74	8.57	177.1	0
Nov 01	3.80	884.40	-533.30	1139.45	3287.56	0.96	1.27	13254.95	841.39	47.9843	162.3	1.78	8.32	167	0

Oct 01	884.40	-533.30	502.20	1059.78	2989.35	1.24	1.44	13592.68	938.32	47.996628	162.5	2.05	8.37	162.2	0
Sep 01	-533.30	502.20	477.70	1040.94	2811.60	2.19	2.8	13503.83	1141.60	47.589111	161.7	2.4	8.98	161.7	0
Aug 01	502.20	477.70	1179.70	1133.58	3244.95	0.97	0.71	12836.74	1145.64	47.108333	161.7	3.37	8.32	162.2	0
Jul 01	477.70	1179.70	-128.50	1211.23	3329.28	1.17	1.18	12611.85	1104.53	47.121652	161.1	3.54	8.69	160.4	0
Jun 01	1179.70	-128.50	1978.80	1224.38	3456.78	0.85	1.28	12702.23	1203.81	46.972248	160.8	3.65	8.87	159	0
May 01	-128.50	1978.80	1765.90	1255.82	3631.91	1.1	0.94	12778.39	1200.14	46.898772	160.3	3.63	9.08	162.5	0
Apr 01	1978.80	1765.90	1863.20	1249.46	3519.16	1.94	2.41	12186.79	1125.67	46.75567	159.9	3.95	9.54	160.4	0
Mar 01	1765.90	1863.20	4273.00	1160.33	3604.38	1.82	2.83	12262.59	1092.32	46.609354	159.1	4.3	10.25	177.1	0
Feb 01	1863.20	4273.00	-635.00	1239.94	4247.04	1.07	1.68	12181.90	1150.88	46.514595	158.6	4.85	10.10	166	0
Jan 01	4273.00	-635.00	905.00	1366.01	4326.72	1.55	1.37	12355.90	1055.99	46.536033	158.6	4.99	10.57	170.2	0

7.2. Stationary Data Series

The following table shows the time difference stationary data for the variables under study from January 2001 to July 2010.

Date	FII(INR crores)	FII(t-1)	FII(t-2)	FII(t-3)	S&P	Sensex	SD (S&P)	SD (Sensex)	Gold (Monthly Price (Indian Rupee per Troy ounce))	Crude Oil (petroleum) Dubai Fateh - Monthly Price (Indian Rupee per Barrel)	Average Exchange Rate(ask)	WPI	US 3 Month_mnthclose T-Bill Interest Rate (percent_per_year)	NSE MIBOR 3month Rate_close	Index of Industrial Production (IIP general)	Dummy Variable
Jan 01	NA	-635.00	905.00	-218.60	1366.01	4326.72	1.55	1.37	12355.90	1055.99	46.536033	158.6	4.99	10.57	170.2	0
Feb 01	-2409.80	4273.00	-635.00	905.00	1239.94	4247.04	1.07	1.68	12181.90	1150.88	46.514595	158.6	4.85	10.10	166	0
Mar 01	-97.30	1863.20	4273.00	-635.00	1160.33	3604.38	1.82	2.83	12262.59	1092.32	46.609354	159.1	4.3	10.25	177.1	0
Apr 01	212.90	1765.90	1863.20	4273.00	1249.46	3519.16	1.94	2.41	12186.79	1125.67	46.75567	159.9	3.95	9.54	160.4	0
May 01	-2107.30	1978.80	1765.90	1863.20	1255.82	3631.91	1.1	0.94	12778.39	1200.14	46.898772	160.3	3.63	9.08	162.5	0
Jun 01	1308.20	-128.50	1978.80	1765.90	1224.38	3456.78	0.85	1.28	12702.23	1203.81	46.972248	160.8	3.65	8.87	159	0
Jul 01	-702.00	1179.70	-128.50	1978.80	1211.23	3329.28	1.17	1.18	12611.85	1104.53	47.121652	161.1	3.54	8.69	160.4	0
Aug 01	24.50	477.70	1179.70	-128.50	1133.58	3244.95	0.97	0.71	12836.74	1145.64	47.108333	161.7	3.37	8.32	162.2	0
Sep 01	-1035.50	502.20	477.70	1179.70	1040.94	2811.60	2.19	2.8	13503.83	1141.60	47.589111	161.7	2.4	8.98	161.7	0
Oct 01	1417.70	-533.30	502.20	477.70	1059.78	2989.35	1.24	1.44	13592.68	938.32	47.996628	162.5	2.05	8.37	162.2	0
Nov 01	-880.60	884.40	-533.30	502.20	1139.45	3287.56	0.96	1.27	13254.95	841.39	47.9843	162.3	1.78	8.32	167	0
Dec 01	224.10	3.80	884.40	-533.30	1148.08	3262.33	0.97	1.33	13217.92	845.26	47.9048	161.8	1.74	8.57	177.1	0
Jan 02	471.50	227.90	3.80	884.40	1130.20	3311.03	1.04	0.92	13606.99	884.06	48.271182	161.0	1.76	8.41	176.9	0
Feb 02	1637.40	699.40	227.90	3.80	1106.73	3562.31	1.19	1.54	14388.34	920.76	48.664774	160.8	1.79	8.37	170.3	0
Mar 02	-2007.80	2336.80	699.40	227.90	1147.39	3469.35	1.01	1.32	14332.32	1113.70	48.7337	161.9	1.79	8.29	184.2	0
Apr 02	-441.90	329.00	2336.80	699.40	1076.92	3338.16	1.01	0.99	14806.95	1194.13	48.908614	162.3	1.77	8.19	167	0
May 02	159.10	-112.90	329.00	2336.80	1067.14	3125.73	1.4	1.55	15410.01	1204.91	49.00224	162.8	1.74	8.24	169.2	0
Jun 02	-912.20	46.20	-112.90	329.00	989.82	3244.70	1.35	1.18	15725.33	1166.74	48.963447	164.7	1.7	7.50	166.2	0
Jul 02	1104.40	-866.00	46.20	-112.90	911.62	2987.65	2.68	1.07	15277.25	1198.13	48.787774	165.6	1.71	6.84	171.8	0
Aug 02	-64.30	238.40	-866.00	46.20	916.07	3181.23	2.12	0.91	15075.69	1230.31	48.603228	167.1	1.69	6.81	172.2	0
Sep 02	148.30	174.10	238.40	-866.00	815.28	2991.36	1.88	0.83	15459.50	1299.68	48.44445	167.4	1.57	6.81	171.8	0
Oct 02	-1197.50	322.40	174.10	238.40	885.76	2949.32	2.17	0.97	15311.83	1266.31	48.362591	167.5	1.44	6.23	173.6	0
Nov 02	1612.80	-875.10	322.40	174.10	936.31	3228.82	1.5	0.68	15396.81	1125.31	48.251105	167.8	1.22	6.10	173.9	0
Dec 02	-89.80	737.70	-875.10	322.40	879.82	3377.28	1.08	0.84	15977.80	1237.62	48.176333	167.2	1.22	6.21	188	0

Jan 03	337.40	647.90	737.70	-875.10	855.70	3250.38	1.56	0.71	17104.25	1345.40	47.937694	167.8	1.18	6.30	188.8	0
Feb 03	-557.10	985.30	647.90	737.70	841.15	3283.66	1.19	0.79	17135.72	1441.62	47.740106	169.4	1.2	6.27	182.2	0
Mar 03	534.60	428.20	985.30	647.90	848.18	3048.72	1.75	1.08	16224.16	1306.32	47.664501	171.6	1.14	6.36	195	0
Apr 03	29.70	962.80	428.20	985.30	916.92	2959.79	1.24	1.21	15548.35	1107.69	47.403571	173.1	1.13	5.76	174	0
May 03	2068.00	992.50	962.80	428.20	963.59	3180.75	1	0.72	16746.68	1141.77	47.098325	173.4	1.11	5.60	180	0
Jun 03	401.30	3060.50	992.50	962.80	974.50	3607.13	1.02	1.02	16649.12	1189.98	46.74645	173.5	0.9	5.52	177.3	0
Jul 03	-1300.90	3461.80	3060.50	992.50	990.31	3792.61	0.98	1.04	16229.25	1231.23	46.245625	173.4	0.96	5.39	183.1	0
Aug 03	66.60	2160.90	3461.80	3060.50	1008.01	4244.73	0.67	1.4	16526.12	1268.74	45.943763	173.7	0.98	4.94	182.1	0
Sep 03	1948.00	2227.50	2160.90	3461.80	995.97	4453.24	0.95	1.69	17374.81	1158.64	45.846923	175.6	0.95	4.94	184.7	0
Oct 03	2547.30	4175.50	2227.50	2160.90	1050.71	4906.87	0.64	1.4	17199.35	1231.44	45.385	176.1	0.96	5.21	184.4	0
Nov 03	-3128.70	6722.80	4175.50	2227.50	1058.20	5044.82	0.71	1.37	17748.70	1251.80	45.486158	176.9	0.93	4.93	188.2	0
Dec 03	2787.80	3594.10	6722.80	4175.50	1111.92	5838.96	0.61	0.91	18553.38	1270.16	45.564722	176.8	0.95	4.91	202	0
Jan 04	-2512.50	6381.90	3594.10	6722.80	1131.13	5695.67	0.71	2.08	18806.25	1303.48	45.432223	178.7	0.92	5.00	203.9	0
Feb 04	-1195.90	3869.40	6381.90	3594.10	1144.94	5667.51	0.58	1.5	18329.50	1285.72	45.235938	179.8	0.96	5.00	197.3	0
Mar 04	3770.80	2673.50	3869.40	6381.90	1126.21	5590.60	0.94	1.45	18306.02	1371.15	45.05465	179.8	0.95	5.05	210.7	0
Apr 04	275.20	6444.30	2673.50	3869.40	1107.30	5655.09	0.76	1.34	17716.56	1365.01	43.820866	180.9	0.98	4.90	194.3	0
May 04	-10265.90	6719.50	6444.30	2673.50	1120.68	4759.62	0.71	3.81	17362.97	1559.50	45.123948	182.1	1.08	4.83	197.5	0
Jun 04	3272.80	-3546.40	6719.50	6444.30	1140.84	4795.46	0.6	1.36	17859.21	1520.69	45.4705	185.2	1.33	4.83	196	1
Jul 04	986.80	-273.60	-3546.40	6719.50	1101.72	5170.32	0.6	1.06	18329.56	1587.59	45.9965	186.6	1.45	4.89	204.6	1
Aug 04	1807.70	713.20	-273.60	-3546.40	1104.24	5192.08	0.83	0.92	18560.59	1774.91	46.304	188.4	1.59	4.94	203.9	1
Sep 04	54.40	2520.90	713.20	-273.60	1114.58	5583.61	0.58	0.73	18682.41	1635.56	45.860485	189.4	1.71	5.03	208.7	1
Oct 04	-547.30	2575.30	2520.90	713.20	1130.20	5672.27	0.76	0.94	19250.39	1720.55	43.929104	188.9	1.91	5.31	209.7	1
Nov 04	6157.30	2028.00	2575.30	2520.90	1173.82	6234.29	0.61	0.71	19821.18	1573.51	45.110681	190.2	2.23	5.57	209.1	1
Dec 04	1954.40	8185.30	2028.00	2575.30	1211.92	6602.69	0.57	0.77	19442.83	1506.77	43.760714	188.8	2.22	5.68	226.9	1
Jan 05	-10456.30	10139.70	8185.30	2028.00	1181.27	6555.94	0.64	1.54	18554.21	1654.45	43.735192	188.6	2.51	5.70	225.2	1
Feb 05	9526.00	-316.60	10139.70	8185.30	1203.60	6713.86	0.67	0.82	18490.66	1739.22	43.6175	188.8	2.76	6.10	216.1	1
Mar 05	-1282.80	9209.40	-316.60	10139.70	1180.59	6492.82	0.63	1.02	18954.91	1991.39	43.638871	189.4	2.79	6.11	241.5	1
Apr 05	-9402.10	7926.60	9209.40	-316.60	1156.85	6154.44	0.93	1.24	18775.16	2060.21	43.696167	191.6	2.9	5.98	204.9	1
May 05	89.70	-1475.50	7926.60	9209.40	1191.50	6715.11	0.66	0.63	18347.86	1957.11	43.452903	192.1	2.99	5.93	213	1
Jun 05	6644.00	-1385.80	-1475.50	7926.60	1191.33	7193.85	0.51	0.78	18770.58	2222.01	43.557322	193.2	3.13	5.94	213.6	1
Jul 05	2502.00	5258.20	-1385.80	-1475.50	1234.18	7635.42	0.56	0.94	18480.70	2300.95	43.490185	194.6	3.42	6.02	208.1	1
Aug 05	-3139.00	7760.20	5258.20	-1385.80	1220.33	7805.43	0.57	0.95	19105.09	2470.54	41.960666	195.3	3.52	5.96	212.9	1
Sep 05	-162.80	4621.20	7760.20	5258.20	1228.81	8634.48	0.6	1.1	20028.03	2483.04	43.876667	197.2	3.55	6.06	217.4	1
Oct 05	-9085.80	4458.40	4621.20	7760.20	1207.01	7892.32	0.93	1.43	21062.00	2405.62	44.729667	197.8	3.98	6.10	223.9	1
Nov 05	6501.60	-4627.40	4458.40	4621.20	1249.48	8788.81	0.49	1.03	21796.08	2346.21	45.629655	198.2	3.95	6.30	214.8	1
Dec 05	6486.40	1874.20	-4627.40	4458.40	1248.29	9397.93	0.47	1.09	23290.06	2425.82	45.694401	197.2	4.08	6.88	232.5	1
Jan 06	-5604.60	8360.60	1874.20	-4627.40	1280.08	9919.89	0.7	1.04	24413.14	2588.88	44.351481	196.3	4.47	7.62	237.9	1
Feb 06	4680.20	2756.00	8360.60	1874.20	1280.66	10370.24	0.6	0.91	24603.51	2552.58	44.254711	196.4	4.62	7.65	227.3	1
Mar 06	-1005.80	7436.20	2756.00	8360.60	1294.87	11279.96	0.49	0.88	24776.99	2564.01	44.370555	196.8	4.63	8.48	251.9	1
Apr 06	-5660.00	6430.40	7436.20	2756.00	1310.61	11851.93	0.57	1.67	27448.49	2879.46	44.801205	199.0	4.77	6.97	225.2	1

May 06	-7417.80	770.40	6430.40	7436.20	1270.09	10398.61	0.79	2.6	30668.98	2947.50	45.253648	201.3	4.86	6.82	237.9	1
Jun 06	7522.50	-6647.40	770.40	6430.40	1270.20	10609.25	1	3.34	27455.73	2997.29	45.893571	203.1	5.01	7.09	234.4	1
Jul 06	422.30	875.10	-6647.40	770.40	1276.66	10743.88	0.95	1.97	29439.75	3207.80	46.384958	204.0	5.1	7.20	235.5	1
Aug 06	4150.20	1297.40	875.10	-6647.40	1303.82	11699.05	0.44	0.67	29440.30	3200.96	46.491078	205.3	5.05	7.21	234.8	1
Sep 06	685.80	5447.60	1297.40	875.10	1335.85	12454.42	0.51	1.05	27588.91	2756.65	46.119517	207.8	4.89	7.21	243.5	1
Oct 06	2536.20	6133.40	5447.60	1297.40	1377.94	12961.90	0.44	0.96	26634.49	2568.97	45.438276	208.7	5.08	7.63	234	1
Nov 06	1516.90	8669.60	6133.40	5447.60	1400.63	13696.31	0.52	0.59	28162.44	2548.78	44.811532	209.1	5.03	7.70	248.8	1
Dec 06	-12952.50	10186.50	8669.60	6133.40	1418.30	13786.91	0.43	1.49	28110.41	2618.71	44.6325	208.4	5.02	9.56	263.7	1
Jan 07	1084.10	-2766.00	10186.50	8669.60	1438.24	14090.92	0.48	1.17	27985.57	2306.10	44.30621	208.8	5.12	9.19	265.5	1
Feb 07	9877.00	-1681.90	-2766.00	10186.50	1406.82	12938.09	0.9	1.53	29356.70	2458.96	44.123729	208.9	5.16	10.22	252.2	1
Mar 07	-7834.50	8195.10	-1681.90	-2766.00	1420.86	13072.10	0.87	1.95	28832.08	2599.71	44.014345	209.8	5.04	11.65	289.1	1
Apr 07	7360.90	360.60	8195.10	-1681.90	1482.37	13872.37	0.51	1.21	28636.08	2690.92	42.276563	211.5	4.91	11.12	250.7	1
May 07	-2401.70	7721.50	360.60	8195.10	1530.62	14544.46	0.56	0.81	27220.91	2632.72	40.870669	212.3	4.73	9.72	263.1	1
Jun 07	-4218.10	5319.80	7721.50	360.60	1503.35	14650.51	0.83	0.82	26726.01	2680.51	40.753571	212.3	4.82	9.31	255.3	1
Jul 07	21507.70	1101.70	5319.80	7721.50	1455.27	15550.99	1.06	1.06	26892.24	2807.32	40.420952	213.6	4.96	7.54	255	1
Aug 07	-29771.50	22609.40	1101.70	5319.80	1473.99	15318.60	1.56	1.99	27160.49	2743.35	40.843125	213.8	4.01	8.47	260.3	1
Sep 07	25950.50	-7162.10	22609.40	1101.70	1526.75	17291.10	1	1.08	28748.42	2954.91	40.388438	215.1	3.82	8.45	260.5	1
Oct 07	4302.00	18788.40	-7162.10	22609.40	1549.38	19837.99	0.85	2.36	29816.80	3048.05	39.548261	215.2	3.94	7.90	262.6	1
Nov 07	-29409.60	23090.40	18788.40	-7162.10	1481.14	19363.19	1.65	1.74	31798.42	3420.63	39.439205	215.9	3.15	8.50	261	1
Dec 07	15210.30	-6319.20	23090.40	18788.40	1468.36	20286.99	1.11	1.48	31678.33	3381.98	39.465375	216.4	3.36	8.56	284.7	1
Jan 08	-19973.00	8891.10	-6319.20	23090.40	1378.55	17648.71	1.52	2.94	35025.78	3432.12	39.366685	218.1	1.96	8.54	281.9	1
Feb 08	15312.00	-11081.90	8891.10	-6319.20	1330.63	17578.72	1.29	2.37	36642.46	3574.07	39.720893	219.9	1.85	9.61	276.2	1
Mar 08	-5240.20	4230.10	-11081.90	8891.10	1322.70	15644.44	1.83	3.18	39082.77	3905.72	40.340833	225.5	1.38	9.82	304.9	1
Apr 08	383.20	-1010.10	4230.10	-11081.90	1385.59	17287.31	1.15	1.4	36416.00	4141.96	40.02689	228.5	1.43	8.77	266.3	1
May 08	-4547.50	-626.90	-1010.10	4230.10	1400.38	16415.57	0.9	1.3	37435.38	5010.83	42.047174	231.1	1.89	8.87	274.6	1
Jun 08	-5920.10	-5174.40	-626.90	-1010.10	1280.00	13461.60	1.24	1.91	38087.88	5463.40	42.842487	237.4	1.9	9.94	269.2	1
Jul 08	12876.60	-11094.50	-5174.40	-626.90	1267.38	14355.75	1.46	3.31	40256.56	5621.01	43.001054	240.0	1.68	10.39	271.3	1
Aug 08	-1736.00	1782.10	-11094.50	-5174.40	1282.83	14564.53	1.31	1.73	36026.85	4861.12	43.108455	241.2	1.72	11.22	264.7	1
Sep 08	-5120.00	46.10	1782.10	-11094.50	1166.36	12860.43	3.29	2.51	37815.02	4372.78	45.544457	241.5	0.92	11.86	276.2	1
Oct 08	-12131.50	-5073.90	46.10	1782.10	968.75	9788.06	5.09	5.14	39235.79	3337.83	50.055371	239.0	0.46	11.73	262.9	1
Nov 08	18822.10	-17205.40	-5073.90	46.10	896.24	9092.72	4.48	3.85	37284.82	2517.79	49.842751	234.2	0.01	10.43	267.6	1
Dec 08	759.90	1616.70	-17205.40	-5073.90	903.25	9647.31	3.09	2.55	39696.27	1994.32	49.906565	229.7	0.11	8.89	284	1
Jan 09	-5819.60	2376.60	1616.70	-17205.40	825.88	9424.24	2.47	3.04	41938.42	2196.34	49.043306	228.9	0.24	7.83	284.8	1
Feb 09	318.60	-3443.00	2376.60	1616.70	735.09	8891.61	2.27	1.87	46416.55	2123.45	49.179551	227.6	0.26	7.64	276.8	1
Mar 09	-2765.60	-3124.40	-3443.00	2376.60	797.87	9708.50	3.08	2.61	47387.48	2336.89	51.113321	228.2	0.21	7.64	305.9	1
Apr 09	14888.50	-5890.00	-3124.40	-3443.00	872.81	11403.25	1.89	2.13	44573.36	2512.57	50.03327	231.5	0.14	5.64	269.3	1
May 09	8407.30	8998.50	-5890.00	-3124.40	919.14	14625.25	1.81	4.47	45070.86	2785.85	48.605316	234.3	0.14	5.29	280.3	1
Jun 09	-12507.50	17405.80	8998.50	-5890.00	919.32	14493.84	1.29	1.75	45178.09	3306.41	47.671474	235.0	0.19	4.72	291.6	1
Jul 09	8283.40	4898.30	17405.80	8998.50	987.48	15670.31	1.3	2.19	45317.28	3151.55	48.398962	238.7	0.18	4.52	290.8	1
Aug 09	-8658.40	13181.70	4898.30	17405.80	1020.62	15666.64	1.03	1.78	45872.80	3446.11	48.271903	240.8	0.15	4.58	292.8	1

Sep 09	16049.40	4523.30	13181.70	4898.30	1057.08	17126.84	0.96	0.9	48273.82	3289.49	48.3977	242.6	0.14	4.67	302	1
Oct 09	-4600.10	20572.70	4523.30	13181.70	1036.19	15896.28	1.36	1.09	48737.49	3423.72	46.705242	242.5	0.05	4.61	289.7	1
Nov 09	-9791.20	15972.60	20572.70	4523.30	1095.63	16926.22	0.98	1.57	52484.94	3615.15	46.569183	247.2	0.06	4.44	299.8	1
Dec 09	2529.30	6181.40	15972.60	20572.70	1115.10	17464.81	0.66	1.02	52912.18	3520.10	46.532468	248.3	0.06	4.60	334.3	1
Jan 10	-298.10	8710.70	6181.40	15972.60	1073.87	16357.96	1.03	0.97	51344.51	3519.83	45.981774	250.5	0.08	4.59	347.2	1
Feb 10	-4049.60	8412.60	8710.70	6181.40	1104.49	16429.55	1.14	1.19	50745.87	3407.26	46.3145	250.5	0.13	4.97	331.1	1
Mar 10	25074.50	4363.00	8412.60	8710.70	1169.43	17527.77	0.47	0.69	50654.61	3520.18	45.46429	257.5	0.16	5.69	373.8	1
Apr 10	-17044.40	29437.50	4363.00	8412.60	1186.69	17558.71	0.94	0.85	51115.41	3692.52	44.4562	253.4	0.16	5.01	323.9	1
May 10	-19379.20	12393.10	29437.50	4363.00	1089.41	16944.63	2.02	1.51	55173.35	3506.94	45.669935	260.4	0.16	5.33	323.9	1
Jun 10	18235.20	-6986.10	12393.10	29437.50	1030.71	17700.90	1.61	1.15	57410.36	3444.85	46.4813	259.8	0.18	6.50	325.9	1
Jul 10	13474.90	11249.10	-6986.10	12393.10	1101.60	17868.29	1.25	0.62	55916.83	3405.26	46.719452	261.0	0.15	6.53	346.3	1