INVESTIGATING THE IMPACT OF FDI ON INDIAN STOCK MARKET: A STUDY ON SENSEX

Sanjib Kumar Pakira *
Uttam Kumar Dutta **

[*The flow of Foreign Direct Investments (FDI) in India has emerged as an attractive aspires for foreign investors. FDI is one of the noteworthy players in the Indian stock market. It has become an outstanding appraise of economic growth resulting in fierce competition and accelerated pace of innovation in both developed and developing countries. An attempt has been made in the present paper to investigate the relationship between FDI and Sensex using statistical measures like correlation coefficient and multiple regression analysis. Sensex is considered as the representative of stock market. The study is conducted using yearly data on BSE Sensex and FDI inflows over a period of 13 years starting from 2000-01 to 2012-13. The study concludes that Flow of FDIs determines the trend of Indian stock market. It provides the evidence of significant positive correlation between FDI and Sensex and effects on Indian Stock Market.*

***Keywords**: FDI, Sensex, Correlation, Multiple Regression*]

I. Introduction

The global capital inflows have been increased tremendously during last two decades. FDI has now turned into the instruments of international economic integration and inspiration. Fast growing countries like USA, Singapore, China, and Korea etc have registered incredible growth in commencing FDI and capture most of the FDI inflows. India as a developing country still account for significant growth of FDI (Sultana et al, 2012). A productive business environment fostered Indian economy after 1991, when the government of India opened the doors for foreign capital in the way of direct investment. FDI not only gives access to foreign capital but also provides domestic countries with cutting edge technology, desired skill sets, tools of innovation and other complementary skills (Sultana et al, 2012). Apart from helping in creating additional economic activity and generating employment, foreign investment also facilitates flow of sophisticated technology into the country and helps the industry to march into advanced technology (Sultana et al, 2012). However, the present paper is an attempt to find out whether there exist any relationship between FDI and Indian stock market.

* Assistant Professor, Department of Commerce, Maharaja Manindra Chandra College, Kolkata, Email : pakirasanjib@yahoo.in
** Professor, Department of Commerce, West Bengal State University, West Bengal, India. Email : uttam.dutta@yahoo.co.in

II. Review of Literature

The extent of literature on impact of FDI is presented below:

Jayachandran and Seilan investigate the relationship between trade, Foreign Direct Investment (FDI) and economic growth of India over the period 1970-2010. The results of Granger causality test show that there is a causal relationship between the examined variables. Chopra examines the effect of policy reforms on the FDI in India. The analysis has been carried out with the help of annual data from 1980-2009. The research includes policy related variables such as the degree of openness of the economy, debt-service ratio, foreign exchange rate and GDP as the explanatory variables of FDI inflows in India. Empirical result shows that GDP is an important factor which motivates FDI in the country. Arellano and Bond identify the determinants of FDI using both cross – sectional analysis and panel data technique with data for 46 developing countries. Aitken, Harrison and Alfaro all find that countries with better financial systems and financial market regulations can take advantage of FDI more proficiently and accomplish a higher growth rate. These studies argue that countries should reform their domestic financial system before working on attracting FDI and countries need not only a sound banking system, but also a functioning financial market to allow entrepreneurs to obtain credit to start a new business or expand an existing one. Balasubramanyam et al. examine the relative importance of FDI and found that market size is more important for developed countries, while per capita GDP for developing countries.

Tomsaz Mickiewicz, et al. in their study, examine the role of FDI in job creation and job preservation as well as their role in changing the structure of employment. They present expressive stage model of FDI development into Transition economy. They analyzed the employment aspects of the model. The study concluded that the role of FDI in employment creation / preservation has been most successful in Hungary than in Estonia.

Most of empirical studies carried out in the past used multi regression model to study the impact of flow of FDI. The conclusive sum of this retrospective review of the relevant literatures produce till date on the offered subject reveals wide room for the validity and originates of this work and reflects some decisive evidences that affirm its viability, as may be marked here it. Nor has any previous research measured the impact of FDI on Sensex as well as the relationship between them. No study has incorporated in this fashion before the present work.

III. Objectives of the Study

The main objective of the study is to understand the relationship between FDI and Sensex.

More specifically, the present paper seeks to dwell upon mainly the following issues:

1. To study the impact of FDI on Sensex.
2. To examine the relationship between FDI and Sensex.
3. To understand the effect of percentage in FDI Investment on Sensex value.
4. To make a comparative analysis between percentage change in FDI

Investment and percentage change in Sensex value.

IV. Materials and Methods

A. Data Collection

This study is based on mainly secondary data. The required data related to FDI have been collected from Handbook of statistics of Indian securities market published by Reserve Bank of India. The BSE Sensex is down loaded from the websites of bseindia. The present study covers a period of 13 years data starting from 2000-01 to 2012-13.

B. Analytical Tools & Technique

In order to analyze the collected data the statistical tools such as correlation and multiple regression OLS model is used. Correlation coefficient is a statistical measure that determines the degree to which two variable's movements are associated. In the present study the linear relationship between variables such as FDI and Sensex is applied. The multiple regression analysis is a statistical technique used to evaluate the effects of two or more independent variables on a single dependent variable. In the current paper attempt is made to investigate the impact of FDI on Sensex. So FDI is considered as the independent variable and Sensex is considered as the dependent variable. Further, to study the relationship between FDI and Sensex, the following model equation has been framed and fitted.

BSE SENSEX = $a + b_1$ (FDI)

V. Data analysis and Interpretation

The following table 1 presents the amount of flow of FDI in India in terms of US$ million and BSE Sensex during the year from 2000-01 to 2012-13. An increasing trend in the flow of FDIs has been shown during the considered period except during the years i.e. 2002-03, 03-04, 10-11 and 12-13.

Table 1: Flow of FDI and BSE Sensex

Year	FDI (US$ million)	BSE Sensex
2000-01	4,031	4269.68
2001-02	6,130	3331.94
2002-03	5,095	3206.28
2003-04	4,322	4493.53
2004-05	6,052	5740.98
2005-06	8,962	8280.08
2006-07	22,826	12277.32
2007-08	34,844	16568.88
2008-09	41,902	12365.55
2009-10	37,745	15585.21
2010-11	36,047	18605.17
2011-12	46556	17422.9
2012-13	34298	17765.4

Source: Handbook of RBI (2013)

A. Correlation between FDI & Sensex

Table 2 presents the output of correlation by considering the 13 years data as given in table 1.Correlation is applied to study the statistical relationship between the variables *FDI and BSE sensex. Based on the results it can be concluded that there is a very strong positive correlation between FDI & sensex and the correlation is found to be significant at 1 percent level of significance.*

Table 2: Correlations Statistics

		SENSEX	FDI
Pearson Correlation	SENSEX	1.000	.927
	FDI	.927	1.000
Sig. (1-tailed)	SENSEX		.000
	FDI	.000	
N	SENSEX	13	13
	FDI	13	13

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

B. Multiple Regression Statistics

Table 3 shows the strength of the relationship between the model and the dependent variable. FDI is considered as Independent Variable and BSE Sensex is considered as Dependent Variable. R, the multiple correlation coefficients, is the linear correlation between the observed and model-predicted values of the dependent variable. Its large value indicates a strong relationship. R Square, the coefficient of determination, is the squared value of the multiple correlation coefficients. The value of R is 0.927; it shows that the model explains 92.7 % of the variation. In other words the dependent variables FDI is able to explain around 92.7 % the variation of the dependent variable (BSE Sensex). Durbin-Watson static informs us whether the assumption of independent errors is tenable. The closer to 2 the value is the better and for the data it was 2.060.

Table 3: Multiple Regression Statistics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	Sig. F Change	Durbin-Watson
1	.927[a]	.859	.846	2378.48472	.859	67.111	.000	2.060

a. Predictors: (Constant), FDI(US$ million)
b. Dependent Variable: BSE Sensex

C. ANOVA

The ANOVA table 4, tests the acceptability of the model from a statistical perspective. The Regression row displays information about the variation accounted for by the model. The Residual row displays information about the variation that has not been accounted by the model. The regression much is less than residual sums of squares, which indicates that around 92.7% of the variation in Sensex is explained by the model. However, F statistic is found significant, since the p value (0.000) less than 0.05.

Table 4: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3.797E8	1	3.797E8	67.111	.000[a]
Residual	6.223E7	11	5657189.581		
Total	4.419E8	12			

a. Predictors: (Constant), FDI,   b. Dependent Variable: SENSEX

D. Testing for Collinearity

Table 5 presents the coefficients and Collinearity statistics when multiple regression is applied. The two Collinearity statistics are tolerance and VIF. A value of VIF higher than 10, and tolerance less than 0.2 indicates a potential problem. For our current model the VIF values are all well below ten and the tolerance statistic is as well above 0.2 for all the independent variables. Hence there is no problem of Collinearity among the variables used in the model and multi regression is appropriate.

Table 5: Coefficients and Collinearity Statistics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Toler-ance	VIF
1	(Constant)	3292.376	1125.465		2.925	.014	815.245	5769.508		
	FDI	.336	.041	.927	8.192	.000	.246	.427	1.000	1.000

a. Dependent Variable: SENSEX

E. Percentage change in FDI Investment
Table 6 represents the FDI Investment and percentage change in FDI Investment for 13 years starting from 2000-01 to 2012-13.

The highest FDI Investment in terms of percentage change was 154.70 % in the year 2006-07 than the year 2005-06.

Table 6: Percentage Change in FDI Investment

Year	FDI Investment (US$ million)	% change
2000-01	4031	-
2001-02	6130	52.07%
2002-03	5095	-16.88%
2003-04	4322	-15.17%
2004-05	6052	40.03%
2005-06	8962	48.08%
2006-07	22826	154.70%
2007-08	34844	52.65%
2008-09	41902	20.26%
2009-10	37745	-9.92%
2010-11	36047	-4.50%
2011-12	46556	29.15%
2012-13	34298	-26.33%

In the year 2000-01 the FDI Investment was 4031 million in terms of dollar whereas in the year 2001-02, it was 6130 million dollar which was 52.07 percent higher than the previous year. In the year 2002-03, there was a fall in the FDI investment from 6130 million dollar to 5095 million dollar. This showed a decrease of 16.88 percent in investment. In the year 2003-04, the same result was observed in FDI Investment as there was also a fall of 15.17 percent. In the year 2004-05, the FDI Investment was increased from 4322 million dollar to 6052 million dollar and the percentage was changed from a negative 15.17 percent to a positive 40.03 percent. In the year 2005-06, a positive investment was noticed where the percentage in investment increases from 40.03 percent to 48.08 percent. But a drastic change (154.70%) in FDI investment was noticed in the year 2006-07, where the investment increases to 22826 million dollar from 8962 million dollar in the year 2005-06. In the year 2007- 08 and 2008-09, there was also positive investment but the percentage decreases from 52.65 to 20.26 as investment increases from 34844 million dollar to 41902 million dollar only. FDI investment posted a year-on-year decline of 9.92 % in 2009-10 and 4.50 % in 2010-11. Investments by FDI posted a fall of 37745 million dollar in 2009-10 as compared with investments of 41902 million dollar in the period of 2008-09 and

again 37745 million dollar in 2009-10 as compared with investments of 36047 million dollar in the period of 2010-11. Investments made by FDI during 2011-12 rose a little i.e. 46556 million dollar from 36047 million dollar of that of the preceding year i.e. 2010-11. In the year 2011-12, FDI investment increased from 36047 million dollar to 46556 million dollar. But during 2012-13, FDI inflows again posted a fall of 26.33%. During the period of 13 years there has been increase

in seven years while decline in the rest years. It may be concluded that there are significant variations in the yearly inflow of FDI.

F.: Percentage change in Sensex Values

Table 7 represents the Sensex Values and percentage change in Sensex Values for 13 years starting from 2000-01 to 2012-13. The highest Sensex value in terms of percentage change was 48.28 % in the year 2006-07 than the year 2005-06.

Table 7: Percentage Change in Sensex Values

Year	Sensex	% Change
2000-01	4269.68	-
2001-02	3331.94	-21.96%
2002-03	3206.28	-3.77%
2003-04	4493.53	40.15%
2004-05	5740.98	27.76%
2005-06	8280.08	44.23%
2006-07	12277.32	48.28%
2007-08	16568.88	34.96%
2008-09	12365.55	-25.37%
2009-10	15585.21	26.04%
2010-11	18605.17	19.38%
2011-12	17422.9	-6.35%
2012-13	17765.4	1.97%

In the year 2001-02, the closing value of BSE Sensex was 3331.94 points which was 937.74 points less than closing value of 2000-01. This shows that there is a decrease of 21.96 percent in BSE Sensex. On the other hand, FDI Investment was 2099 million dollar more in the year 2001-02 than the previous year 2000-01. In the

year 2002-03, the closing value of BSE Sensex was 3206.28 points which was 125.66 points less than closing value of 2001-02. This shows that there is a decrease of 3.77 percent in BSE Sensex. On the other hand, FDI Investment was 1035 million dollar less in the year 2002-03 than the previous year 2001-02. In the

year 2003-04, the closing value of BSE Sensex was 4493.53 points which was 1287.25 points more than closing value of 2002-03. This shows that there is an increase of 40.15 percent in BSE Sensex. On the other hand, FDI Investment was 773 million dollar less in the year 2003-04 than the previous year 2002-03. In the year 2004-05, the closing value of BSE Sensex was 5740.98 points which was 1247.45 points more than closing value of 2003-04. This shows that there is an increase of 27.76 percent in BSE Sensex. On the other hand, FDI Investment was 1730 million dollar more in the year 2004-05 than the previous year 2003-04. In the year 2005-06, the closing value of BSE Sensex was 8280.08 points which was 2539.1 points more than closing value of 2004-05. This shows that there is an increase of 44.23 percent in BSE Sensex. On the other hand, FDI Investment was 2910 million dollar more in the year 2005-06 than the previous year 2004-05. In the year 2006-07, the closing value of BSE Sensex was 12277.32 points which was 3997.24 points more than closing value of 2005-06. This shows that there is an increase of 48.28 percent in BSE Sensex. On the other hand, FDI Investment was 13864 million dollar more in the year 2006-07 than the previous year 2005-06. In the year 2007-08, the closing value of BSE Sensex was 16568.88 points which was 4291.56 points more than closing value of 2006-07. This shows that there is an increase of 34.96 percent in BSE Sensex. On the other hand, FDI Investment was 12018 million dollar more in the year 2007-08 than the previous year 2006-07. In the year 2008-09, the closing value of BSE Sensex

was 12365.55 points which was 4203.33 points less than closing value of 2007-08. This shows that there is a decrease of 25.37 percent in BSE Sensex. On the other hand, FDI Investment was 7058 million dollar more in the year 2008-09 than the previous year 2007-08. In the year 2009-10, the closing value of BSE Sensex was 15585.21 points which was 3219.66 points more than closing value of 2008-09. This shows that there is an increase of 26.04 percent in BSE Sensex. On the other hand, FDI Investment was 4157 million dollar less in the year 2009-10 than the previous year 2008-09. In the year 2010-11, the closing value of BSE Sensex was 18605.17 points which was 3019.96 points more than closing value of 2009-10. This shows that there is an increase of 19.38 percent in BSE Sensex. On the other hand, FDI Investment was 1698 million dollar less in the year 2010-11 than the previous year 2009-10. In the year 2011-12, the closing value of BSE Sensex was 17422.9 points which was 1182.27 points less than closing value of 2010-11. This shows that there is a decrease of 6.35 percent in BSE Sensex. On the other hand, FDI Investment was 10509 million dollar more in the year 2011-12 than the previous year 2010-11. In the year 2012-13, the closing value of BSE Sensex was 17765.4 points which was 342.5 points more than closing value of 2011-12. This shows that there is a decrease of 1.97 percent in BSE Sensex. On the other hand, FDI Investment was 12258 million dollar less in the year 2012-13 than the previous year 2011-12. During the period of 13 years there has been increase in Sensex points in eight years while decline in the rest years. It

may be concluded that there are significant variations in Sensex values.

G. Comparative Analysis of percentage change in FDI Investment and percentage change in Sensex Value

Table 8 represents the Comparative Analysis of percentage change in FDI Investment and percentage change in Sensex Value for 13 years starting from 2000-01 to 2012-13.

Table 8: Percentage Change in FDI Investment and Sensex Values

Year	% Change in FDI Investment	% Change in Sensex Value
2000-01	-	-
2001-02	52.07%	-21.96%
2002-03	-16.88%	-3.77%
2003-04	-15.17%	40.15%
2004-05	40.03%	27.76%
2005-06	48.08%	44.23%
2006-07	154.70%	48.28%
2007-08	52.65%	34.96%
2008-09	20.26%	-25.37%
2009-10	-9.92%	26.04%
2010-11	-4.50%	19.38%
2011-12	29.15%	-6.35%
2012-13	-26.33%	1.97%

In the year 2001-02, the FDI investment has increased to 52.07 percent though BSE Sensex has declined to 21.96 percent than the previous year 2000-01. In the year 2002-03, both the FDI investment and BSE Sensex have decreased to 16.88 percent and 3.77 percent respectively than the previous year 2001-02. In the year 2003-04, the FDI investment has decreased to 15.17 percent though BSE Sensex has increased to 40.15 percent than the previous year 2002-03. During the year 2004-05 to 2007-08 FDI investment has increased positively than the respective previous year and Sensex value has also increased during this period. But in the year 2008-09, the FDI investment has increased to 20.26 percent though BSE Sensex has declined to 25.37 percent than the previous year 2007-08. During the year 2009-10 to 2010-11, the FDI investment has decreased to 9.92 and 4.50 percent though BSE Sensex has increased to 26.04 and 19.38 percent than the previous year 2008-09 and 2009-10 respectively. In the year 2011-12, the FDI investment has increased to 29.15 percent though BSE Sensex has declined to 6.35

percent than the previous year 2010-11. Again in the year 2012-13, the FDI investment has decreased to 26.33 percent though BSE Sensex has increased to 1.97 percent than the previous year 2011-12. During this period of 13 years, percentage increase in FDI Investment have caused the decrease in the percentage of Sensex in the year 2001-02, 2008-09 and 2011-12 and percentage increase in Sensex have caused the decrease in the percentage of FDI Investment in the year 2003-04, 2009-10, 2010-11and 2012-13. In the year 2002-03 fall in the percentage in FDI Investment have caused the fall in the percentage of Sensex. During the period 2004-05 to 2007-08 percentage increase in FDI Investment have increased the percentage of Sensex. It may be concluded that percentage change in FDI Investment have positive and negative impact on Sensex or vice versa.

H. Testing the Hypothesis: FDI

The null hypothesis and alternative hypothesis with respect to BSE Sensex and FDI can be stated as follows:

H_0: Flow of FDIs in India and BSE Sensex trend are independent.

Ha: Flow of FDIs in India and BSE Sensex trend are dependent.

The p-value related to FDI shown in table 5, is .000 less than 0.05 so null hypothesis H_0 is not accepted. Hence it is concluded that Flow of FDIs in to India and BSE Sensex trend are dependent.

VI. Findings of the Study

- Flow of FDIs into India and BSE Sensex trend are dependent.

- The FDIs flow has shown increasing trend during the considered period of study except during the years i.e. 2002-03, 03-04, 10-11 and 12-13.

- There is a strong positive correlation between FDI & sensex, and the correlation is significant at 1 percent level of significance.

- Percentage change in FDI Investment has positive impact on Sensex or vice versa.

- Percentage change in Sensex has positive impact on FDI Investment or vice versa.

VII. Summary & Conclusion

The flow of FDI gave opportunities to Indian industry for technological up-gradation, gaining access to global managerial skills and practices, optimizing utilization of human and natural resources and global competitive advantage with greater efficiency. From the current study it is evident that there is a strong positive correlation between FDI & sensex .It may be concluded that percentage change in FDI Investment have positive and negative impact on Sensex or vice versa.

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