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A study of currency fluctuations along with FDI & FII flows impact on foreign reserves - India

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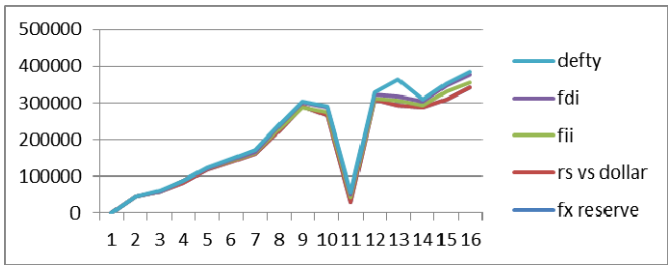
Abstract
External fund flows into in any country plays always plays a key role in foreign exchange reserves, which is essential for the developing economies like India. We cannot deny that the exchange rates are of vital importance and are usually looked upon before making any investment decision abroad by foreign investors. This paper has focused on the external fund flows and its allied economic factors for the 2001 to 2015. Bi-variate Correlation is applied on the FDI, FII and Rs vs. Dollar rate and observed that Variables have strong positive correlation among them. Regression analysis is implemented on Rs vs. Dollar, FDI and FII it was observed that exchange rate fluctuation has impact on FII and FDI. Granger causality test was applied on FII, FDI and fx reserve and it was found that FII has impact on FX Reserve but FDI don't have the impact on fx reserve. This study is useful to the Indian investor's fraternity such as HNI's, QIB, Indian Mutual Funds and retail investors.

Keywords: FDI, FII, Rupee Vs Dollar, Forex.
JEL Codes: H5, G2, G22.

1. Introduction

NSE was established in 1994 even though after 20 years of completion foreign investments are more than the Indian investments. Indian investors prefer other asset class to equity investment hence regarding the stock market investment still they are in the nascent stage. Stock market is dominated foreign investors and are benefiting from by being a part of wealth distribution and wealth creation. Indian investors because of their low risk appetite, sentiments and perceptions are not able to be a part of this asset class. Before investing in the security they just consider few factors which is not enough to get decent returns. To understand this problem of the Indian investor I started collecting the data for the period of 2001-15 for the variables such as exchange rate, FDI, FII and foreign reserves



The graph shows the movements of the variables across 15 years. FDI and FII inflows, Forex Reserve shows an increase in the initial years i.e., from 2001 to 2009 even Rupee is shown depreciating. A major fall is shown in 2011 in all the variables. In the last two years there is a recovery higher than previous levels. In the year 2013 to 15 even though the rupee value is depreciating DEFTY, FDI, FII and FOREX have amplified. In 2014 the total external capital inflow was 35959.99 crores and return on the market were 6.54% whereas in 2015 till July the total external inflows were 34142.01 crores and market gave a return of 34.68%. In the year 2014-14 Rupee value depreciated by 2.3498 rupees but FII amplified from 5190.66 crores to 21351 crores. Forex reserves have also increased. Even there is increased in Defty index also. In 2015 in 6 months Rupee value depreciated by 1.9096 Rupees there is increase in the FOREX reserves, FDI and DEFTY. Majority of Indian investors only focus on Technical and Fundamental analysis before making any investment decision. My study has proven the foreign investments have influence on the Returns on Indian Equity markets and foreign investments are influenced by the fluctuation in exchange rates. The Indian investors have to concentrate on the external inflow i.e., FDI, FII and exchange rate movements too beside fundamental analysis and technical analysis.

2. Review of Literature

Dr. JasbirSingh, Ms. Sumita Chadha, Dr. AnupamaSharma (October 2012): The study aimed at knowing the requirement of amount of foreign investment by India for its economic development. It also analyzes the trend and role of FDI/FPI in improving the quality and availability of goods in India. Sources of information includes reports/publication of Govt. and RBI relating to foreign investment. It was found that foreign investment flows are supplementing the scarce domestic investment in developing countries particularly in India. The research is single dimensional FII can make or break the stock market and the study has on the whole avoided this fact. And exchange rate plays a very important role when FII & FDI are concerned. It is not the requirement of Indian Economy but the interest of foreign economy on which the FDI/FII depends upon.

Khandelwal, Vartika (March 2014): This paper has investigated the casual relationship between FII and Stock market return and exchange rates. Granger Causality test is

used. In the study it was found that there was FII coming to India w ere return chasers. And FII inflows are effect of exchange rate movements. They don't cause movement in exchange rates. My study includes FDI, foreign reserves apart from Exchange rates and FII.

K Raviteja (Dec 2013): The paper had examined the flow of global and Indian FDI/FPI before and after the recession of 2009 particularly the impact on India. The variables used are FDI, FPI, and recession. In this research it was found that rupee depreciation has influenced the FDI and FPI flows. The research focuses only on the impact of 2009 recession on FDI /FPI. But my study emphasizes on impact of currency fluctuation for the period of 2001-15 on FDI and FII along with foreign reserve, Composite bond index and the 2001-15 wrap all the phases of economic cycle.

Miss Chonnikarn Aranayara (March 2014): The paper aims to study if the exchange rates have impact on FDI at industry level and FPI at firm specific level. It is empirical study and conduct time series model apply regression on the overall FDI and FPI at industry and sector level. Bases on the monthly data 2005-09 the exchange rate risk and the foreign portfolio investment has negative relationship in Thailand. In the period 2001-09 FDI respond to Exchange rate risk varies across the different industries. The research is limited to FDI and FPI. My paper is for the period of 2001-15 it also covers forex reserve and exchange rate fluctuation beside FDI and FPI.

Nithyashree (2005): This paper talks about the era of 1990 marked with the advent of liberalization policy and the push it gave to Indian equity market. Analysis shoes that the Indian equity market became lucrative destination fetching higher returns for the investment because of FII flow to India. The current paper talks only about the liberalization policy and the boost in Indian equity market and economy. Because of FII along with domestic savings the equity markets in India is moving ahead. But the current paper talks about the another dimension of FII and FDI as they are the booster for our stock market but they can even play havoc if as they also bring exchange rate risk and also get affected from exchange rate risk. The above study ignores the Exchange rate risk aspect of FDI and FII. The current paper deals with not only the FDI, FII, DEFTY and Forex Reserve.

Dr Hojtallah Goudarzi Dr. C.S. Ramanarayanan (February 8, 2010): The study emphasis on investigation on the co-integration causality between the Indian stock market and FII in India during world financial turmoil of 2008. It was found that BSE 500 stock index and FII series are co-integrated and causality between them is bilateral. The paper focuses only on the impact of FDI and FII on Indian stock market but completely avoided Debt market and uses only three variable FII, FDI and Sensex. My research investigates the impact of exchange rate on FDI, Fii along with other variable such as foreign reserves.

Aditya Gaiha, PujaPadhi Ramanathan (October, 2014): The study explores the relationship between capital flows and the real exchange rates for the period of 2005 July to November 2012. The study has taken three major component of capital flows in to India namely FDI, FPI and ECB. It was found that FDI flows have no significant impact on the change in the real exchange rates in India.

Ravi Bhandari (February 2014): This study analyzed the cause and impact of rupee depreciation against dollar on Indian Economy. The variable considered are FDI /GDP/Inflation /money supply as % of GDP. Correlation method is used to analyze the relationship between the above said factors and exchange rate. It completely ignores the stock and debt market which is the barometer of Indian economy. My study emphasizes on impact of exchange rate on FDI and FII and in turn their impact on Forex reserve.

3. Research Gap

Equity markets are the barometer of the economy and include domestic and external flows. The researchers have proven that our equity market gets affected by external flows and external inflows. The external inflows in turn are influenced by the exchange rate fluctuation. During 2001 to 2015 no research has been found in this area, hence there is a need to do research on impact of exchange rate fluctuation by considering Rs vs. Dollar rate, FDI, FII.

4. Objectives

1. To measure the relationship between Rs vs. dollar rate, FII and FDI.
2. To know the currency fluctuation impact on FDI and FII.
3. To know the impact of FII and FDI on FX reserves.

5. Scope

External fund flow movement will have direct impact on foreign reserves which influences balance of payments and current account deficit. The current study had taken the 15 years data into consideration from the period of 2001 to 2015. To study the impact of exchange rate fluctuations along with FDI and FII on foreign reserves of India.

6. Research Methodology: In the study descriptive analysis tools are applied on the secondary data. The following formulas were used in the analysis.

1. Correlation: Correlation is used to determine the degree to which the movement of two variables is related. There is a possibility of positive and negative correlation between the movements of two variables in order to analyze the collected data different statistical tools such as Bi-variate correlation, linear regression model, granger causality test and regression model are used

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[\, n\sum x^2 - (\sum x)^2 \,][\, n\sum y^2 - (\sum y)^2 \,]}}$$

2. Linear regressions is used to know the impact of rs vs. dollar fluctuation movement on fdi and Fii. So Rs vs. dollar is considered as independent variable for both the models and fdi is the dependent variable in Model 1 and FII is dependent variable in Model 2.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

3 Arch tests: An ARCH (*q*) model can be estimated using ordinary least squares. The methodology to test for the lag length of ARCH.

$$\sigma_t^2 = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \cdots + \alpha_q \epsilon_{t-q}^2 = \alpha_0 + \sum_{i=1}^{q} \alpha_i \epsilon_{t-i}^2$$

4. Garch test: when testing for Heteroskedasticity in econometric models, the best test is the White test. However, when dealing with time series data, this means to test for ARCH and GARCH.

$$\sigma_t^2 = \omega + \alpha_1 \epsilon_{t-1}^2 + \cdots + \alpha_q \epsilon_{t-q}^2 + \beta_1 \sigma_{t-1}^2 + \cdots + \beta_p \sigma_{t-p}^2 = \omega + \sum_{i=1}^{q} \alpha_i \epsilon_{t-i}^2 + \sum_{i=1}^{p} \beta_i \sigma_{t-i}^2$$

5. EGarch: The formulation for $g(Z_t)$ allows the sign and the magnitude of Z_t to have separate effects on the volatility. This is particularly useful in an asset pricing context

$$g(Z_t) = \theta Z_t + \lambda(|Z_t| - E(|Z_t|))$$

6. TARCH

$$\epsilon_{t-1}^{+} = \epsilon_{t-1} \text{ if } \epsilon_{t-1} > 0, \text{ and } \epsilon_{t-1}^{-} = 0 \text{ if } \epsilon_{t-1} \leq 0.$$

7. The Granger causality test is a statistical hypothesis test for determining whether one series is useful in forecasting another.

7. Limitation of the Study

1. The study is limited to 2015 July only and **S** figures for 2001 to 2004 were not available
2. The study moves around only 4 variables it only focuses on Impact of exchange rate fluctuation on FDI and FII but not vice versa.

8. Data Analysis:

1. **To measure the correlation between FDI, FII, Rs VS. Dollar exchange rate.**

Table 1

		Rs Vs Dollar	FDI	FII
Rs Vs Dollar	Pearson Correlation	1	.627*	.627*
	Sig. (2-tailed)		0.012	0.017
	N	15	15	15
Foreign Direct Investments	Pearson Correlation	.627*	1	.534*
	Sig. (2-tailed)	0.012		0.04
	N	15	15	15
Foreign Institutional Investments	Pearson Correlation	.627*	534*	1
	Sig. (2-tailed)	0.017	0.04	
	N	15	15	15

Interpretation: Correlation is applied to study the relationship between FDI, FII, and rs vs. dollar exchange rate. The following table 1 presents the output when correlation is run over 15 year's data. Based on the result it can be concluded that rs vs. dollar and FDI and FII has strong positive correlation.

2. **Impact of exchange rate on Foreign Direct Investment.**

Table 2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error the Estimate
1	.627*	0.393	0.346	533237537
a. Predictors: (Constant), Rs Vs Dollar b. Dependant Variable: Foreign Direct Investments				

Interpretation: The table 2 Model Summary shows the strength of the relationship between the model and the dependent variable. R value represents the correlation between independent variable i.e., Rs vs. dollar and the dependent variable foreign direct investment. R square predicts the 39.3% variation of FDI can be explained by the RS vs. Dollar.

Table 3

Anova Test					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig**
1 Regression	239287137.8	1	239287138	8.415	0.12b
Residual	369644951.9	13	28434227.1		
Total	608932089.7	14			
Dependent Variable: foreign Direct Investment.					

The Anova table 3 tests the acceptability of the model from statistical perspective. Sig column represents the statistical significance of the regression model. P value is less than .05 indicates that overall regression model is statistically significant to predict the outcome.

Table 4

Coefficient					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig**
	B	**Std. Error**	**Beta**		
(Constant)	-23292.34	10748.125	0.627	-2.167	0.049
Rs Vs Dollar	626.421	215.937		2.901	0.012
Dependent Variable: foreign Direct Investment.					

In the above table 4 it is shown that for every unit of change in Rs vs. dollar rate there would be increase in FDI by 626.421 units with standard error of 215.937. P value is less than 0.05 that shows Rs vs. Dollar fluctuation has impact on FDI.

3. **Impact of exchange rate fluctuation on FII.**

Table 5

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error the Estimate
1	.604*	0.364	0.315	5462.69375
a. Predictors: (Constant), Rs Vs Dollar				

As per the table 5 the correlation between the variable is very strong i.e., 0.604.the variation of FII that can be explained by Rs vs. dollar is just is 36.4%.

Table 6

Anova Test					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig**
1 Regression	222233508.6	1	222233509	7.447	0.17b
Residual	387933298.8	13	29841023		
Total	610166807.4	14			
a. Dependent Variable: foreign Institutional Investment.					
b. Predictors: (Constant), Rs Vs Dollar					

Interpretation: The Anova table 6 tests the acceptability of the model from statistical perspective Sig column represents the statistical significance of the regression model. P value is less than 0.05 i.e., 0.017 indicates that overall regression model is statistically significant to predict the outcome.

Table 7

Coefficient					
	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig**
Model	**B**	**Std. Error**	**Beta**		
(Constant)	-23646	11010.799	0.604	--2.131	0.049
Rs Vs Dollar	603.686	221.214		2.729	0.053
					0.017
Dependent Variable: foreign Institutional Investment.					

Interpretation: The above table shows that for every unit of increase in Rs vs dollar rare FII would increase by 603.686 units with standard error of 222.214. Beta standard co efficient is. 604 for Rs vs dollar shows that change in rs vs. dollar by one unit of standard deviation would change FII by 0,604 units. P value of less than .05 implies that null hypothesis is rejected and the dollar fluctuation has impact on FII.

4: Impact of FDI and FII on Foreign exchange reserves.

Data Trend	**None**	**None**	**Linear**	**Linear**	**Quadratic**		
Rank or No. of CES	**No Intercept**	**Intercept**	**Intercept**	**Intercept**	**Intercept**	**AIC**	**SIC**
LLR Values FDI	NO Trend	No Trend	No Trend	Trend	Trend		
0	-252.4467	-252.4467	-252.34	-252.3395	-251.977	42.7411	42.90275
1	-252.6605	-234.0878	-234.069	-233.0394	233.0325	41.7768	42.10003
2	-241.9192	-232.675	-234.675	-230.2592	-230.2592	42.3199	42.80478
LLR Values FDI							
0	-240.5923	-240.5923	-240.546	-240.546	-240.0549	44.4713	44.616
1	-235.0502	-235.0006	234.996	230.483	230.0927	44.1909	44.4803
2	-234.682	-234.682	233.069	-233.4415	-228.4415	44.8513	45.2853

Interpretation: As all the values in the table either row wise or column wise in the descending order hence the FDI has co integration with FX reserve. Even FII has co integration with FX reserve too.

Null Hypothesis	**Obs**	**F-Statistic**	**Prob.**
DFII does not Granger Cause DFXRESERVE	11	0.72119	0.524
DDFDI does not Granger Cause DFXRESERVE	12	2.2601	0.1749

9. Hypothesis

Ho - Reject the null hypothesis - FDI do not have the impact on the FX reserve.

H1 - Alternative hypothesis - FDI has impact on the FX reserve.

As the value is less than 0.5 the null hypothesis is accepted. FDI do not have the impact on the FX reserve.

Ho - Reject the null hypothesis - FII do not have impact on the FX reserve

H1 - Alternative hypothesis - FII have impact on the FX reserve

Hence the significant value is greater than 0.5, so null hypothesis is rejected. FII has impact on FX reserve.

10. Findings

1. Rs Vs. Dollar exchange rate, FDI and FII has strong positive correlation
2. Exchange rate fluctuation has impact on FDI
3. Exchange rate fluctuation has impact on FII
4. FDI do not have impact on foreign reserve whereas FII has impact on Foreign reserve

11. Conclusion

I conclude the analysis of the impact of exchange rate on FDI and FII for the period of 2001 to 2015. In this study the Rs Vs dollar exchange rate, FDI, FII, Forex Reserve are considered for the sand period. In the equity market investment comes from internal flow and external flows. Foreign investments are influencing the Indian investments. Foreign investments are the integral part of the equity investments and present study

found that their decisions get influenced by the exchange rate movements .The Indian investor should not only consider the fundamental values of the company or the technical analysis but they should also concentrate on FDI, FII and Exchange rate movements. Hence there is further scope to do research in this field by considering various macro level factors which influences the FDI and FII flows such as the commodity price movements, political stability, and interest rate fluctuation.

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