

Causal Impact of Economic Reforms on Rupee Depreciation in 2013

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Abstract:

Since the great depression of 2008, the Indian economy has been continuously slowing down. Most of the times IIP index had been falling and the growth had been perpetually shrinking. Steep fall in the rupee against the US dollar, dismal GDP growth outlook, declining corporate profitability, huge CAD, high imports, FII withdrawals, reduced Foreign direct investments and rise in US treasury yields have turned foreign investors bearish on India. The Current Account Deficit has widened inspite of rise in exports due to rise in the prices of crude oil. Without a more stable source of capital inflows, Rupee is expected to remain highly volatile shifting gears from an appreciating currency outlook to depreciating reality in quick time. The situation is intense ever since May 22 over the announcement by US Federal Reserve that it may consider a withdrawal of its liquidity injecting stimulus program in a phased manner. Despite a series of emergency measures (such as raising short term interest rates and squeezing liquidity from banks to discourage financing of speculative activity against rupee, raising import duty on gold and non-essential imports, reducing limits on foreign investment by Indian companies and outward remittances by Indian residents) announced by RBI and the finance minister to control the slide the currency almost touched 70 to a dollar level in no time. Thus an event study is conducted to analyze the impact of steps undertaken by RBI and the government and its reaction on the stock markets and the FII sentiments. Thus study would concentrate on the causes, reasons, and remedies for the economic turmoil. From an investor point of view, the study would also suggest opportunities for making right investing decision in this high volatile environment.

KEY WORDS: Event Study, FIIs, Rupee Depreciation, Exchange Rate, Fiscal deficits.

CAUSAL IMPACT OF ECONOMIC REFORMS ON RUPEE DEPRECIATION IN 2013

1. INTRODUCTION

The Indian rupee was under great stress as overseas investors were paring their exposure to Asia's third-largest economy amid international uncertainty and mounting worries over the domestic economy. The exchange rate between the Indian Rupee and the US Dollar had gone over the roof. In 2009 – 2010 the exchange rate was around the 43 – 45 rupees per US Dollar level. The rupee has consistently depreciated against the dollar with the worst scenario being appreciation of 98 paise came a day after the RBI announced easing of rules for non-bank asset finance companies to raise to overseas debt. Prime Minister Manmohan Singh was of the opinion that the plunging rupee, which had lost 18 percent against the dollar since selling pressure picked up in May, would spur exports and discourage imports. The Indian rupee, has depreciated by a little more than 65 times against the American currency in the past 66 years. It was on par with the American currency at the time of Independence in 1947. The rupee touched its historic record low of below 68 (intraday) against dollar on the sluggish local stocks and continued dollar demand from importers. The currency has witnessed huge volatility in the past two years. This volatility became

severe since May 2013 affecting major macro-economic data, including growth, inflation, trade and investment. Managing volatility in the currency markets has become a big challenge for policymakers. Despite a series of measures taken by the central bank as well as the government to curb the volatility in the markets, the rupee continued to depreciate. The trend is unlikely to reverse any time soon. The rupee depreciation influenced the Indian economy in a negative way. It fuelled inflation and hurt the economic growth. IMF's forecasts show the world economy strengthening. But we still are not seeing the growth needed to drive a sustainable global rebound. While financial markets have recovered, the real economy continues to lag. Rupee depreciation has become one of the most crucial concerns for the Indian economy. The situation is intense ever since May 22 over the announcement by US Federal Reserve that it may consider a withdrawal of its liquidity injecting stimulus program in a phased manner despite a series of emergency measures (such as raising short term interest rates and squeezing liquidity from banks to discourage financing of speculative activity against rupee, raising import duty on gold and non-essential imports, reducing limits on foreign investment by Indian companies and outward remittances by Indian residents) announced by RBI and the finance minister to arrest the depreciation. At the present time the worry lines are multiple — high consumer price inflation, a large fiscal deficit, poor growth, flat industrial production and a balance of payments current account deficit.

1.1 CAUSES OF DEPRECIATION OF INDIAN RUPEE: As Indian currency has sharply depreciated not only against the US dollar, but also against the other currencies of the world, it is imperative to understand the factors contributing to depreciation of Indian rupee in the global market. Various factors can cause currency depreciation, i.e. economic, political, corruption etc., but some factors require greater attention and should be analyzed objectively than the others.

There are four key factors behind the recent depreciation:

- a. Flight of foreign funds from the Indian market;
- b. Slowdown in the capital inflows, which decreases the supply of dollar
- c. Higher global crude oil prices, which has widened the current account deficit and also increase dollar buying by oil companies. India does not enjoy the luxury of taking the benefit with a depreciating currency in respects to high exports mainly because of increasing demand for oil which constitute a major portion of its import basket. Thus India continued to record a current account deficit of around 4.3%, depleting its Forex reserves in the bargain and thus depreciating the rupee.
- d. Recovery of US dollar- The immense strength of the Dollar index, which touched its three year high level of 84.30 was the main reason for the fall in the rupee value. The record setting performance of the US equities and the improvement in the labour market made Americans more optimistic about the outlook for the US economy thereby spurring greater hopes of QE tapering. The fact that the Euro zone was in a recession was just another reason why investors were snapping up dollars. Dollar was considered as equal to Gold in the sense considered as a safe haven.
- e. Recession in the Euro Zone- Owing to the uncertainty prevailing in Europe and the slump in the international markets, investors prefer to stay away from risky investments.
- f. Weak Balance of payments position in India - The problem of CAD continues to trouble the Government of India even after measures due to import of commodities and resources like gold and crude oil. Coal imports have doubled and fertilizer imports have surged by 30%. The Indian economy needs to debug its structural reforms and the gap between imports and exports. The Indian economy needs to debug its structural reforms and the gap between the imports and exports. A slowdown in the global economy has adversely reduced the demand for Indian goods.

The persistent decline in rupee is a cause of concern. Depreciation leads to imports becoming costlier which is a worry for India as it meets most of its oil demand via imports. Apart from oil, prices of other imported commodities like metals, gold etc will also rise pushing overall inflation higher. Even if prices of global oil and commodities decline, the Indian consumers might not benefit as depreciation will negate the

impact. The depreciating rupee will add further pressure on the overall domestic inflation and since India is structurally an import intensive country, as reflected in the high and persistent current account deficits month after month, the domestic costs will rise on account of rupee depreciation. Exchange rate risk also drives away foreign investors which in turn depreciates the local currency. Indian Rupee is currently caught in this vicious cycle; it will have to find a stable level to regain investors' confidence. The depreciating rupee has serious effects on the external debt figures of the nation. The total external debt had increased by Rs. 2186.8 billion to Rs 16384.9 billion by the end of November 2011. Crisil Research expected India to be severely impacted by the rupee's depreciation against the dollar the reason being large foreign currency debt and only partial hedging. If the rupee touches a new low and stabilizes there, foreigners may then put in more money, as they would get more rupees for the same amount of dollars they would have put in earlier." The situation worsens in debt with FIIs pulling out \$259.7 million in each session in June compared with a \$23.6 million average daily inflows the previous month. The yield differential, between Indian 10-year government bonds and US treasury yields of the same maturity, has fallen by 1 percentage point since the beginning of this year. Apart from the above factors, most FIIs also sold part of their shares on expectations the US Fed would wind down its \$85-billion monthly bond-buying programme with an improvement in the economy. Hopes of a gradual withdrawal of cheap liquidity strengthened the US currency and raised bond yields causing FIIs to pull out from both equity and debt markets. They have sold \$11.5 billion worth of stocks and bonds since June this year. As in other countries, the Indian bond market has also seen withdrawals by foreign institutional investors (FIIs) in the past few weeks. With a risk-off environment setting in globally, there have been redemptions from global exchange-traded funds (ETFs). This has led to selling by FIIs in the Indian equity market, compounding the rupee's woes. The RBI has refrained from intervening because the rupee's decline is largely driven by global factors and these are very difficult to contain.

2. LITERATURE REVIEW: Bahmani-Oskooee and Sohrabian (1992) used monthly values of S&P 500 index and US dollar effective exchange rate for the period of 1973-88 and used cointegration and Granger causality test to detect the relationship between the variables. They found bidirectional causality in the short run. They found no long-run relationship between the variables. Abdalla and Murinde (1997) employed co-integration test to examine the relationship between stock prices and exchange rates for four Asian countries named as India, Pakistan, South Korea and Philippines for a period of 1985 to 1994 and detected unidirectional causality from exchange rates to stock prices for India, South Korea and Pakistan and found causality runs from the opposite direction for Philippines. Yu (1997) studied Hong Kong, Tokyo and Singapore markets by using daily data for a period of 1983-94. They traced bidirectional relationship in Tokyo, no causation in the Singapore markets and also found that changes in exchange rates Granger cause changes in stock prices. Christine Jiang and Thomas C. Chiang (2000) tests whether foreign exchange excess returns for the British pound, Canadian dollar, Deutsche mark, and Japanese yen are related to volatility in the currency market and volatility in the stock markets and proves that volatility (measured by standard deviation and variance) from currency markets is significant in explaining the excess returns, suggesting that the excess returns are indeed reward for risk-taking. In addition, shocks in equity markets are found to have a significant impact on currency risk premium as well. In some cases, it was noticed that a non linearity in the risk premium exists and risk premiums for each currency tend to respond to positive and negative shocks differently. Carmen Reinhart and Guillermo Calvo (2000) presents evidence that capital account reversals have become more severe for emerging markets because policy options are limited in the midst of a capital market crisis. A review of policies that could reduce the incidence of crises in the first place, or at least make the sudden stop problem less severe is made and they conclude that, while the evidence suggests that capital controls appear to influence the composition of flows skewing flows away from short maturities, such policies are not likely to be a long-run solution to the recurring problem of sudden capital flow reversals. Yet, because fear of floating, many emerging markets are likely to turn to

increased reliance on controls. Dollarization would appear to have the edge as a more market-oriented option to ameliorate, if not eliminate, the sudden stop problem.

Fang, WenShwo and Miller, Stephen M (2002) tries to test the effects of daily currency depreciation on stock market returns for five newly emerging East Asian stock markets during the Asian Financial crises using bivariate GARCH- M model of the reduced form of stock market returns. The model permits both a direct measurement of depreciation rate risk and a straightforward assessment of the hypothesized relationship. It is proved from the study that the conditional variances of stock market returns and depreciation exhibit time varying characteristics for all countries. It is also proved that domestic currency depreciation and its uncertainty adversely affects stock market returns. Akinlo, A.E (2003) investigates whether currency depreciation has resulted in currency substitution in Nigeria by adopting co integration approach to examine whether Nigeria's Naira depreciation has resulted in currency substitution in the country. Time series quarterly data are employed and a money demand function that incorporates exchange rate, income and interest rate estimated and they conclude that depreciation of Nigeria's Naira has not resulted in a decrease in domestic money holdings. Bhattacharya and Mukherjee (2003) investigated Indian markets using the data on stock prices and macroeconomic aggregates in the foreign sector including exchange rate and concluded that there is no significant relationship between stock prices and exchange rates. Alan C. Stockman (2004), examined and tested whether dollar depreciation had an effect on inflation or not. The evidence does not support that view: once other factors that predict inflation are also included in the analysis, currency depreciation plays essentially no role at all in predicting future inflation.

Stavarek, Daniel (2004) investigates the nature of the causal relationships among stock prices and effective exchange rates in four old EU member countries (Austria, France, Germany, and the UK), four new EU member countries (Czech Republic, Hungary, Poland, and Slovakia), and in the United States. Both the long- and short-term causalities between these variables are explored using monthly data. The paper also endeavors to answer the question of whether the linkages between the analyzed economic variables are of similar intensity and direction in old and new EU member countries, and whether or how relationships have changed. The results show much stronger causality in countries with developed capital and foreign-exchange markets (i.e., old EU member countries and the United States). Evidence also suggests more powerful long- and short-term causal relations during the 1993-2003 period than during 1970-92. Causalities seem to be predominantly unidirectional, with the direction running from stock prices to exchange rates. Finally, we detected strong relations when applying the real effective exchange rate than the nominal effective exchange rate. Jashim Uddin and Md. Lutfur Rahman (2009) investigates the interactions between stock prices and exchange rate in three emerging countries Bangladesh, India and Pakistan from the monthly average nominal exchange rates of US dollar in terms of Bangladesh Taka , Indian Rupee, Pakistan rupee and montly values of all the three exchanges all share prices and shows that exchange rates and stock prices data series are non stationary and integrated of order one and Johansen test prove that there is no co integrating relationship between stock prices and exchange rates and granger causality test proves there is no way causal relationship between the two. Sumanjeet Singh (2009) studies the real implications of the depreciation of the rupee on the Indian economy and shows that in the long run, the Indian economy has more to lose and less to gain with weaker rupee. An attempt has been made to study the causes, effects or consequences of depreciation of currency on various sectoral performance and impact on the economy. Dr. Sumanjeet (2009) elaborates on various aspects of the capital inflows to India and their policy implications. The paper includes overview of foreign capital flows in the developing countries, composition of capital inflows in India, an insight of government regulations to manage foreign capital in India and highlights some of the major issues and challenges for the central banks. The author suggests some options for foreign capital management. Shelly Singhal (2012) reviews the probable reasons for this depreciation of the rupee and the outlook and policy options to prevent the depreciation of the Rupee. They take into consideration factors such as trends in India's Balance of payment positions, forex reserves ,

exchange rates of Indian rupee against major currencies, composition of capital inflows, reasons and impact of depreciation of rupee etc.

3. PROBLEM STATEMENT

From the literature review, we can infer that rupee depreciation was an immediate problem for the central bank and the Indian economy and if rupee is depreciating, its impact should also be reflected in the stock prices mainly the broader indices namely BSE Sensex index and CNX Nifty index. We know that stock prices assimilate the new information very quickly and thus there would not be any opportunity for investors to make abnormal profits. Several steps were taken during the month June and July of 2013 by the central bank of India (RBI) to sustain growth, price stability and rupee depreciation. The steps aimed at bring down the pressure on the rupee and on the Indian economy but with negative results. Thus a need was felt to analyse the impact of days on which major announcements were done by the RBI and its reaction on the rupee depreciation and stock returns. Thus event study methodology was conducted to analyse the impact of major announcement done by RBI on July 15 on the market sentiments.

4. OBJECTIVES OF THE STUDY

1. To examine the impact of RBI announcements on Rupee downfall during the period June-July 2013.
2. To examine the impact of RBI announcements on Stock indices during the period June-July 2013.
3. To examine the impact of RBI announcements on FII flows during the period June-July 2013.

5. HYPOTHESES OF THE STUDY

H_{01} : There exists no significant change in BSE and NSE indices returns before and after the RBI announcement.

H_{02} : There exists no significant change in the FII before and after the RBI announcement.

6. DATA COLLECTION

For the study, the data on exchange rates, BSE Sensex and CNX Nifty prices was collected for the period January 2013 to August 2013 from RBI database, BSEindia.com and nseindia.com. July 15th, 2013 was considered as the event day for the study. In order to analyse the impact of the event on the rupee value and the stock indices, three event study methodology tests were conducted respectively.

7. METHODOLOGY

This study is based on Event Study Methodology (Brown and Warner, 1985). Event study methodology is based on the concept of market efficiency. If the markets are efficient, security prices would be able to reflect all currently available information, and thus price changes will reflect only new information. Thus importance of an event is understood by examining the price changes during the period in which the event occurs. Event Study Methodology describes the technique of empirically assessing the impact of a particular event on a firm's stock price or industry's average stock price represented by indices.

The event study methodology enables to compute cumulative abnormal returns (CAR) of the respective share indices during the days surrounding the announcement. To statistically understand whether there was significant difference in the distribution pattern of abnormal returns before and after the announcement, parametric t-test was conducted. If there existed possibility to gain abnormal returns due to the announcement, then the markets can be said to inefficient. Analysing the impact of any particular event is difficult, since stock prices respond to wide range of macroeconomic news such as forecasts of corporate profitability, Gross Domestic Product, inflation rates, interest rates, global news etc. Isolating the part of a stock price movement that is attributable to a specific event is always a challenge. To isolate the stock price movements from the specific event, general approach followed is to find a proxy for what the stock's return would have been in the absence of the event. The abnormal return due to the event is estimated as the difference between the stock's actual return and this benchmark. The approach followed in this study, is to find the normal returns using the asset pricing model such as the CAPM. The researchers often use the 'market model' or the single- index model, which holds that stock returns are determined by a market factor and a firm-specific factor.

The stock return, r_{it} , during a given period t , would be expressed mathematically as

$$\bar{r}_{it} = \alpha_i + \beta_i \bar{r}_{mt} + \xi_{it}$$

where

\bar{r}_{it} = expected return of stock price returns on day t

\bar{r}_{mt} = Market's rate of return during the period

β_i = systematic risk component or it measures sensitivity to the market return

α_i = Intercept term or average return of the stock in case of zero market return

ξ_{it} = white noise error term on day t with zero mean and constant variance.

The deviation of actual return from the expected return is regarded as the abnormal return. The determination of the abnormal return in a given period is expressed mathematically as shown below;

$$AR_{it} = r_{it} - (\alpha_i + \beta_i \bar{r}_{mt})$$

Where, AR_{it} = abnormal return of stock 'i' on day 't'

r_{it} = actual return on stock 'i' on day 't'

The abnormal return is the stock's return over and above what one would predict based on broad market movements in that period, given the stock's sensitivity to the market.

The parametric 't' test for the equality of means for the abnormal returns before and after the announcement date is conducted to test the hypothesis of no difference in the means of abnormal returns.

T-TEST for testing difference between sample means

Here under the null hypothesis of no difference in the returns before and after the event day, the t-test was conducted at 0.05 level of significance.

The standard error of the difference between the two means since population standard deviation is unknown was calculated as follows:

$$\hat{\sigma}_{\bar{x}_{after} - \bar{x}_{before}} = \sqrt{\frac{\hat{\sigma}_{after}^2}{n_{after}}} + \sqrt{\frac{\hat{\sigma}_{before}^2}{n_{before}}}$$

To estimate the common variance or an unbiased estimator of population variance, the weighted average of sample variances were considered with weights being equal to degrees of freedom used. Thus pooled estimate of population variance was estimated as shown below:

$$s_p^2 = \frac{(n_{after} - 1)s_{after}^2 + (n_{before} - 1)s_{before}^2}{n_{before} + n_{after} - 2}$$

Thus degree of freedom would be equal to number of sample before and after the event minus two. Because we are doing upper tailed test at 0.05 level of significance, the critical value of t is 1.671.

Thus standardized 't' statistic is calculated as shown below:

$$t = \frac{(\bar{x}_{after} - \bar{x}_{before}) - (\mu_{after} - \mu_{before})H_0}{\hat{\sigma}_{\bar{x}_{after} - \bar{x}_{before}}}$$

If the standardized difference between the two samples means lies within the acceptance region, we would accept the null hypothesis of no difference between the means of returns before and after the event day. The p-values of the t-test were often used to accept or reject the null hypothesis. In the methodology,

July 15th, 2013, when RBI announced key major steps was considered as the “event day”. 30 days surrounding the event day (15 days before and 15 days after the event) has been denoted as “event window”. 15 days prior to the last day of the event window (-16 to -30 days from the event day) has been considered the “estimation window/benchmark period”. BSE 500 and CNX 500 index were taken as proxies for the overall market.

8. FINDINGS OF THE STUDY

8.1 CUMULATIVE ABNORMAL RETURNS AROUND THE RBI ANNOUNCEMENTS

We observe that till the announcement day for around 30 days, the abnormal returns grew at around 0.05% per day in case of BSE Sensex and around 0.03% per day in case of CNX Nifty index. For the five days preceding the announcements, the abnormal returns for CNX NIFTY was 0.06%, 0.24%, -0.08%, 0.16% and 0.05% respectively. It was also observed that, the cumulative abnormal returns for 30 days, prior to the announcement day was 0.52%. In case of BSE SENSEX index, the abnormal returns for five preceding the announcement was 0.31%, 0.37%, -0.2%, 0.32% and 0.06% respectively. The cumulative abnormal returns for 30 days prior to the announcement in BSE Sensex was around 0.75%.

The t-test for equality of the average returns before and after the announcements as shown in table 3 and 4 in the appendix shows that there exists no significant return in the mean returns to the RBI announcement in both BSE Sensex index and NSE Nifty mean returns respectively. The t-test value is -1.17 which is within the critical value of 2.144, thus accepting the null hypotheses of no impact of announcements on BSE Sensex index. The t-test value for CNX Nifty was -0.93 which is within the critical value of 2.144, thus accepting the null hypothesis. Thus we can infer that the markets have already expected the announcement and has adjusted the shares accordingly.

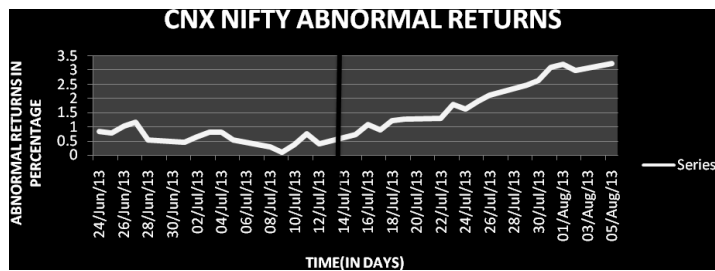


Figure 1: CNX NIFTY abnormal returns for the event window period. Source: Authors



Figure 2: BSE SENSEX abnormal returns for the event window period. Source: Authors

As shown in Figure 1 and Figure 2, the market expectation seems to be gradually imbedded in the share prices before the actual announcement. Thus in both the indices there seems to be absolutely no possibility of making use of the announcement of the event. Thus traders and investors cannot form a trading strategy

around the event and earn abnormal returns. Table 1 and Table 2 shows the event study methodology followed and the cumulative abnormal returns. Rupee depreciation in the recent days seems to have a negative impact on the stock returns. The rupee expressed in one unit of dollars seems to be highly negatively correlated as shown in Table 5 in appendix.

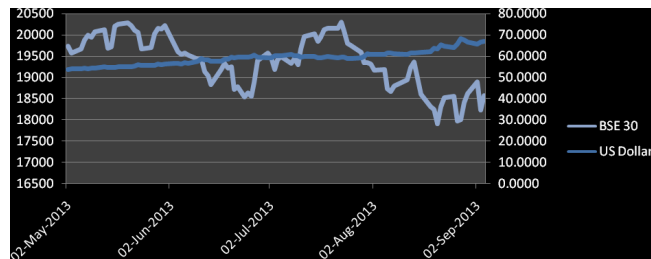


Figure 3: Performance of Rupee value in Dollar terms and BSE Sensex index for the period May-September 2013 Source: bseindia.com

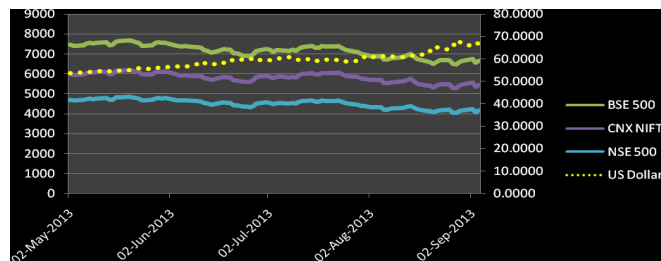


Figure 4: Performance of Rupee value in Dollar terms and Broader indices for the period May-September 2013, Source: bseindia.com

9. CONCLUSION: In the event of a crisis, positive steps taken always surprise the markets. But the announcements if anticipated would not create the same response as expected by the decision makers. Thus though an announcement should cause some response theoretically, it might have no response in reality depending upon whether the news was already expected by the investors. From the study we observe that no such changes were observed in the mean returns of the indices though the figure shows slightly above average change in the mean returns. Hence the study supports the semi-strong form of efficiency with respect to BSE Sensex and CNX Nifty indices. Thus, if the markets are semi-strong efficient, then understanding the fundamentals of the systems and then investing into the market will fetch benefits. Thus fundamental analysis would play a key and major role in the decision making of the investors. The prices of the shares are found to incorporate the information content of the RBI announcements from the study a few days before the actual announcements. Thus the days preceding the announcements are not so beneficial to the investors.

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11. APPENDIX

13-May-13	19691.67	7458.16	-2.140161	-1.88155					
14-May-13	19722.29	7476.38	0.1554972	0.244296					
15-May-13	20212.96	7643.24	2.4878957	2.231829					
16-May-13	20247.33	7673	0.1700394	0.389364					
17-May-13	20286.12	7695.35	0.1915808	0.291281					
20-May-13	20223.98	7662.25	-0.306318	-0.43013					
21-May-13	20111.61	7609.99	-0.555628	-0.68205					
22-May-13	20062.24	7575.63	-0.24548	-0.45151					
23-May-13	19674.33	7422.53	-1.933533	-2.02095					
24-May-13	19704.33	7448.78	0.152483	0.353653					
27-May-13	20030.77	7556.31	1.6566917	1.443592					
28-May-13	20160.82	7591.26	0.6492511	0.462527					
29-May-13	20147.64	7571.19	-0.065374	-0.26438					
30-May-13	20215.4	7584.36	0.3363173	0.173949					
31-May-13	19760.3	7441.89	-2.251254	-1.87847					
03-Jun-13	19610.48	7408.14	-0.758187	-0.45351					
04-Jun-13	19545.78	7398.23	-0.329926	-0.13377					
05-Jun-13	19568.22	7403.22	0.1148074	0.067449					
06-Jun-13	19519.49	7397.86	-0.249026	-0.0724					
07-Jun-13	19429.23	7351.09	-0.46241	-0.63221					
10-Jun-13	19441.07	7323.22	0.0609391	-0.37913					
11-Jun-13	19143	7207.09	-1.533198	-1.58578					
12-Jun-13	19041.13	7164.91	-0.532153	-0.58526					
13-Jun-13	18827.16	7073.15	-1.123725	-1.28069					
14-Jun-13	19177.93	7193.12	1.8631063	1.696133					
17-Jun-13	19325.87	7242.83	0.7714076	0.691077					
18-Jun-13	19223.28	7219.21	-0.530843	-0.32612					
19-Jun-13	19245.7	7238.94	0.1166294	0.273299					
20-Jun-13	18719.29	7047.04	-2.735208	-2.65094					
21-Jun-13	18774.24	7036.48	0.2935475	-0.14985	EXPECTED RETURNS	ABNORMAL RETURNS	CUMULATIVE ABNORMAL RETURNS		
24-Jun-13	18540.89	6914.47	-1.242926	-1.73396	-1.787146847	0.544220369	0.544220369		
25-Jun-13	18629.15	6924.33	0.4760289	0.1426	0.190821072	0.285207857	0.829428226		
26-Jun-13	18552.12	6897.1	-0.413492	-0.39325	-0.37398552	-0.039506239	0.789921987		
27-Jun-13	18875.95	6993.04	1.7455148	1.391019	1.506702514	0.238812285	1.028734271		
28-Jun-13	19395.81	7164.06	2.7540865	2.445574	2.618243111	0.135843439	1.16457771		
01-Jul-13	19577.39	7267.11	0.9361816	1.43843	1.556675224	-0.620493646	0.544084063		
02-Jul-13	19463.82	7231.21	-0.580108	-0.49401	-0.480185614	-0.099922358	0.444161706		EVENT WINDOW PERIOD
03-Jul-13	19177.76	7114.39	-1.469701	-1.6155	-1.662278916	0.192577696	0.636739401		
04-Jul-13	19410.84	7182.3	1.2153661	0.954544	1.046641298	0.168724834	0.805464235		
05-Jul-13	19495.82	7209.1	0.4377966	0.37314	0.433818904	0.003977708	0.809441944		
08-Jul-13	19324.77	7164.93	-0.877368	-0.6127	-0.60529068	-0.272076879	0.537365065		
09-Jul-13	19439.48	7219.93	0.5935905	0.767628	0.849624435	-0.256033929	0.281331136		
10-Jul-13	19294.12	7178.74	-0.747757	-0.5705	-0.560816942	-0.186939685	0.094391451		
11-Jul-13	19676.06	7292.93	1.9795668	1.590669	1.717140792	0.26242604	0.356817491		
12-Jul-13	19958.47	7361.74	1.4352975	0.943517	1.035017676	0.400279837	0.757097328		
15-Jul-13	20034.48	7410.65	0.3808408	0.664381	0.740798326	-0.35995751	0.397139818	EVENT DAY	
16-Jul-13	19851.23	7321.25	-0.914673	-1.20637	-1.231045433	0.316372329	0.713512148		
17-Jul-13	19948.73	7326.64	0.4911534	0.073621	0.118115463	0.373037982	1.08655013		
18-Jul-13	20128.41	7400.95	0.900709	1.014244	1.109566991	-0.208858023	0.877692107		
19-Jul-13	20149.85	7382.82	0.1065161	-0.24497	-0.217690207	0.32420632	1.201898427		
22-Jul-13	20159.12	7378.71	0.0460053	-0.05567	-0.018162202	0.064167507	1.266065934		
23-Jul-13	20302.13	7422.61	0.709406	0.594955	0.667620684	0.041785282	1.307851216		
24-Jul-13	20090.68	7312.48	-1.041516	-1.48371	-1.523370092	0.481853758	1.789704975		EVENT WINDOW PERIOD
25-Jul-13	19804.76	7222.92	-1.423147	-1.22476	-1.250422412	-0.172725038	1.616979937		
26-Jul-13	19748.19	7181.31	-0.285638	-0.57608	-0.566697056	0.281058654	1.898038591		
29-Jul-13	19593.28	7109.88	-0.784426	-0.99467	-1.007898739	0.223472419	2.12151101		
30-Jul-13	19348.34	6999.47	-1.250122	-1.55291	-1.59630903	0.346186539	2.467697549		
31-Jul-13	19345.7	6985.56	-0.013645	-0.19873	-0.168952334	0.155307753	2.623005302		
01-Aug-13	19317.19	6940.93	-0.147371	-0.63889	-0.632897531	0.485526281	3.108531583		
02-Aug-13	19164.02	6880.49	-0.792921	-0.87078	-0.877315466	0.084394757	3.19292634		
05-Aug-13	19182.26	6898.27	0.0951784	0.258412	0.312891607	-0.217713247	2.975213093		

Table 1: Event study methodology and cumulative abnormal returns of BSE SENSEX index

Source: Authors

13-May-13	5980.45	4689.75	-2.07622	-1.88294				
14-May-13	5995.4	4702.5	0.249981	0.27187				
15-May-13	6146.75	4810.95	2.524435	2.30622				
16-May-13	6169.9	4830.25	0.376622	0.401168				
17-May-13	6187.3	4847.1	0.282014	0.348843				
20-May-13	6156.9	4821.95	-0.49133	-0.51887				
21-May-13	6114.1	4788.2	-0.69516	-0.69992				
22-May-13	6094.5	4766.85	-0.32057	-0.44589				
23-May-13	5967.05	4668.2	-2.09123	-2.0695				
24-May-13	5983.55	4685.6	0.276519	0.372735				
27-May-13	6083.15	4756.4	1.664564	1.511012				
28-May-13	6111.25	4777.05	0.461932	0.434152				
29-May-13	6104.3	4766.65	-0.11372	-0.21771				
30-May-13	6124.05	4774	0.323542	0.154196				
31-May-13	5985.95	4681.45	-2.25504	-1.93863				
03-Jun-13	5939.3	4659.3	-0.77932	-0.47314				
04-Jun-13	5919.45	4652.55	-0.33421	-0.14487				
05-Jun-13	5923.85	4656.5	0.074331	0.0849				
06-Jun-13	5921.4	4653.4	-0.04136	-0.06657				
07-Jun-13	5881	4621.1	-0.68227	-0.69412				
10-Jun-13	5878	4604.4	-0.05101	-0.36139				
11-Jun-13	5788.8	4529.85	-1.51752	-1.6191				
12-Jun-13	5760.2	4502.2	-0.49406	-0.6104				
13-Jun-13	5699.1	4447.4	-1.06073	-1.21718				
14-Jun-13	5808.4	4525.95	1.917847	1.7662				
17-Jun-13	5850.05	4557.5	0.717065	0.697091				
18-Jun-13	5813.6	4540.7	-0.62307	-0.36862				
19-Jun-13	5822.25	4552.7	0.148789	0.264276				
20-Jun-13	5655.9	4429.65	-2.85714	-2.70279				
					EXPECTED RETURNS	ABNORMAL RETURNS	CUMULATIVE ABNORMAL RETURNS	
21-Jun-13	5667.65	4420.15	0.207748	-0.21446				
24-Jun-13	5590.25	4345.6	-1.36565	-1.68659	-1.755471176	0.389825803	0.389825803	
25-Jun-13	5609.1	4350.1	0.337194	0.103553	0.136389262	0.20080496	0.590630763	
26-Jun-13	5588.7	4335.5	-0.36369	-0.33562	-0.32774153	-0.03595318	0.554677583	
27-Jun-13	5682.35	4393.9	1.675703	1.347019	1.450506613	0.225196145	0.779873728	
28-Jun-13	5842.2	4510.9	2.813097	2.662782	2.841029722	-0.027933028	0.7519407	
01-Jul-13	5898.85	4572.05	0.969669	1.355605	1.459580997	-0.489912036	0.262028663	
02-Jul-13	5857.55	4542.8	-0.70014	-0.63976	-0.649154116	-0.050982351	0.211046312	
03-Jul-13	5770.9	4473.35	-1.47929	-1.52879	-1.588703635	0.10941622	0.320462532	
04-Jul-13	5836.95	4517.7	1.144536	0.991427	1.074710711	0.069824803	0.390287335	
05-Jul-13	5867.9	4535.8	0.530243	0.400646	0.450362917	0.079879761	0.470167096	
08-Jul-13	5811.55	4501.25	-0.96031	-0.76172	-0.778044841	-0.18226464	0.287902456	
09-Jul-13	5859	4539.95	0.816478	0.859761	0.935563858	-0.119086326	0.16881613	
10-Jul-13	5816.7	4511.4	-0.72197	-0.62886	-0.637639836	-0.08432637	0.08448976	
11-Jul-13	5935.1	4586.45	2.035518	1.663563	1.785036748	0.250481673	0.334971433	
12-Jul-13	6009	4630.95	1.245135	0.970249	1.052329747	0.192805129	0.527776562	EVENT WINDOW PERIOD
15-Jul-13	6030.8	4655.7	0.362789	0.534448	0.5917665	-0.228977351	0.298799211	EVENT DAY
16-Jul-13	5955.25	4596.5	-1.25274	-1.27156	-1.316854868	0.064118912	0.362918124	
17-Jul-13	5973.3	4597.7	0.303094	0.026107	0.054542704	0.248551205	0.611469328	
18-Jul-13	6038.05	4647.55	1.08399	1.084238	1.172794823	-0.088804398	0.52266493	
19-Jul-13	6029.2	4632.75	-0.14657	-0.31845	-0.309588442	0.163017943	0.685682873	
22-Jul-13	6031.8	4631.1	0.043123	-0.03562	-0.010687095	0.05381056	0.739493433	
23-Jul-13	6077.8	4660.75	0.762625	0.640237	0.703566338	0.059058417	0.79855185	
24-Jul-13	5990.5	4588.25	-1.43636	-1.55554	-1.616974391	0.180599387	0.979151238	
25-Jul-13	5907.5	4531.8	-1.38553	-1.23032	-1.273268487	-0.112258598	0.86689264	
26-Jul-13	5886.2	4507.25	-0.36056	-0.54173	-0.545554819	0.184996207	1.051888847	EVENT WINDOW PERIOD
29-Jul-13	5831.65	4459.9	-0.92674	-1.05053	-1.083266441	0.156522531	1.208411378	
30-Jul-13	5755.05	4390.35	-1.31352	-1.55945	-1.621104828	0.307582926	1.515994304	
31-Jul-13	5742	4379.65	-0.22676	-0.24372	-0.230611333	0.003853963	1.519848268	
01-Aug-13	5727.85	4354	-0.24643	-0.58566	-0.591987069	0.345557254	1.865405522	
02-Aug-13	5677.9	4314.95	-0.87205	-0.89688	-0.920882862	0.048827902	1.914233424	
05-Aug-13	5685.4	4323.35	0.132091	0.194672	0.232685478	-0.100594388	1.813639036	

Table 2: Event study methodology and cumulative abnormal returns of CNX NIFTY index

Source: Authors

Parametric t-Test: Paired Two Sample for Means for BSE Sensex abnormal returns around the event day

	<i>Before the announcement</i>	<i>After the announcement</i>
Mean	0.050473155	0.171871552
Variance	0.091466833	0.055422858
Observations	15	15
Pearson Correlation	-0.106246728	
Hypothesized Mean Difference	0	
df	14	
t Stat	-1.168087773	
P(T<=t) one-tail	0.131139581	
t Critical one-tail	1.761310115	
P(T<=t) two-tail	0.262279162	
t Critical two-tail	2.144786681	

Table 3: PARAMETRIC T-TEST RESULTS around the event day for BSE SENSEX index
Source: Authors

Parametric t-Test: Paired Two Sample for Means for CNX NIFTY abnormal returns around the event day

	<i>Before the announcement</i>	<i>After the announcement</i>
Mean	0.035185104	0.100989322
Variance	0.046198005	0.020301942
Observations	15	15
Pearson Correlation	-0.134859596	
Hypothesized Mean Difference	0	
df	14	
t Stat	-0.932103615	
P(T<=t) one-tail	0.183539869	
t Critical one-tail	1.761310115	
P(T<=t) two-tail	0.367079738	
t Critical two-tail	2.144786681	

Table 4: PARAMETRIC T-TEST RESULTS around the event day for BSE SENSEX index
Source: Authors

	<i>US Dollar</i>	<i>BSE 30</i>	<i>BSE 500</i>	<i>CNX NIFTY</i>	<i>NSE 500</i>
US Dollar	1				
BSE 30	-0.76559084	1			
BSE 500	-0.898152358	0.936331257	1		
CNX NIFTY	-0.857242934	0.979085748	0.986140679	1	
NSE 500	-0.901601519	0.931523014	0.999758859	0.984551941	1

Table 5: CROSS-CORRELATION MATRIX OF RUPEE-DOLLAR VALUE AND BROADER INDICES
