

EFFECT OF GST RATE ANNOUNCEMENT ON SECTORIAL INDICES OF NATIONAL STOCK EXCHANGE

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ABSTRACT

The present article aims to study the reaction of Indian Capital Market with respect to the announcement of GST rates and also tries to test semi-strong efficiency of the stock market. The performance of stock market and its behaviour serves as an indicator of the reactions of the economy of the nation. The Goods and Services Tax is a major tax reform in India which is most likely to boost the economic growth of the country. This expectation of the investors is assumed to be transformed to stock price returns that are either negative or positive. Therefore the present study observes the reaction of stock market to the announcement of much awaited GST rates on May 8th 2017. The study is conducted using the daily closing prices of various NSE sectorial and thematic indices. OLS, GARCH and TGARCH and event study is used for the study. The findings of the study are useful to the portfolio managers, investors, and regulatory bodies.

Keywords: Abnormal returns, Event study, Dummy variable, GARCH, GST, TGARCH.

Introduction:

The Capital Market behaviour and the reaction of stock prices to various events and information has been a subject of study for over a number of years. The Indian Stock market is closely studied, with regard to the various changes in the economy, and the performance of this sensitive market is observed, as it serves as the indicator of the economy (Jyoti, 2014). Researchers have conducted numerous studies on Efficient Market Hypothesis to find out the efficiency of stock markets (Kutchu, 2012; Patel, Dave & Shah, 2016).

The Goods and Services Tax (GST) was a much awaited tax reform in India. It was necessary to eliminate the ill effects of the earlier tax regimes. With the commencement of GST era, we can expect a tax system free from cascading effects and multiple tax levy (Roy, 2017). The implementation of GST will put an end to the present tax regime of VAT and subsume other indirect taxes such as service taxes and excise duties (Arora, 2016).

The implementation of GST has been a subject of debate since it was proposed by Mr. P Chidambaram the then Union Finance Minister, in his budget speech for the year 2006-07 (Roy, 2017). A lot of discussions were undergone regarding its implications on the economy both positively and negatively. These

implications are presumed to be seen first on the reactions of stock market return. The directions of the movements of the stock prices would help us understand if the investors perceive the GST rates and eventually the implementation of GST as “good” or “bad”. Various studies have been undertaken on stock market reactions to news effect such as monetary policies, union budget, stock spilt, mergers and acquisitions and have tested the short term efficiency of the Indian stock market. Major studies have studied the movements and volatility of stock market indices during the event window (Kutchu, 2012; Floros, 2010) and have tested the semi-strong efficiency of stock market. A semi strong market is one in which all the publicly available information is incorporated into the stock prices without giving the investors an opportunity to make any abnormal returns (Fama, 1991). The present article aims to test the semi-strong efficiency of the Indian stock market and study the reactions of financial investors towards the announcement of the rates of GST on 19th May 2017 by examining the movements and volatility of sectorial and thematic indices of NSE instead of just one stock market index.

Review of Literature:

The Goods and Services Tax (GST) is one of the remarkable changes in the Indirect tax system in India, which will pose a major effect on the Indian economic system. Implementation of GST is necessary to prevent tax cascading and multiple tax levy and thereby putting an end to the flaws that existed under the Value Added Tax (VAT) system (Arora, 2016). Though the introduction of GST would be beneficial to most of the stakeholders in the society, it also creates a negative effect on various sectors in the market (Roy, 2017). The Stock Market of a nation has a vital role in determining the progress of that particular nation (Patel, Dave, & Shah, 2016). The behaviour of a country's capital market and its reaction to the news information and its overall performance is constantly a subject of study, as it serves as an indicator of the economy, where, the constant rise in the share prices indicate an advancement in the economy, whereas a constant decrease in the share prices indicate a downfall (Jyoti, 2014). Numerous studies were conducted in the past to study the effect of publicly available information on the stock market (Habib, Nazir, Saeed, & Hashmi, 2015; Thomas & Shah, 2002). Studies were conducted that tested whether the capital market is efficient semi strongly, with regard to Union Budget (Kutchu, 2012), stock split announcement (Patel, Dave, & Shah, 2016) and credit rating announcement (Habib, Nazir, Saeed, & Hashmi, 2015). In the Indian scenario a recent study tried to analyse the reaction of Indian stock market to demonetization and its effect on various industries (Dharmapala & Khanna, 2017). Most of the above mentioned studies perform an event study to compute the magnitude of abnormal returns and cumulative abnormal returns made and thus tries to find the magnitude of effect of the event on stock market. Event study helps to analyse the stock market behaviour to find out chances of making abnormal returns by the investors, thereby finding out the stock market efficiency (MacKinlay, 1997). Certain researchers also use regression models to analyse the stock market reaction. Some of the studies also use GARCH and TGARCH models to find out the stock volatility as these models are efficient in estimating financial series data that are prone to heteroscedasticity and to provide more robust results (Asteriou, Samitas, & Kenourgios, 2013; Floros, 2010).

From the above articles it is evident that various event studies were performed to analyse whether the stock market is efficient. The Indian Stock market is considered to be sensitive to news information and events. Various studies that were conducted previously has checked the semi strong efficiency of the stock market by analysing the impact of a particular event or news information on the stock market index. Very few studies could be found on stock market sectoral indices. This paper has considered the investors reaction on the returns of

sectoral and thematic index with respect to the announcement of GST rates to check if there exists any abnormal returns during the event.

Data:

The data collected comprises of daily share closing prices of 11 Sectoral Indices and 3 Thematic Indices of National Stock Exchange (NSE). The data is obtained from the website of NSE. The data is collected for a period ranging from 1st January 2011 to 24th July 2017. The study considers data from January 2011 as the latest sectoral index, pharma was added on Oct 2010.

Methodology:

In this study, a single regression model is employed which calculates log-returns for all the 11 sectoral indices and 3 thematic indices. The model that is put into use here is as given below:

$$R_i = \alpha_i + \beta_i R_m + Y_t + \mu_t$$

where, R_i stands for the return made in a particular sector, R_m stands for the market return made and Y represents dummy variable which is related to the announcement of GST rate and α , β and Y represents coefficients of estimates and μ_t is the error term which follows the assumption of regular normality. The Dummy Variable included takes 0 as a value for the dates before the announcement of GST rate, and it assumes the value of unity for the date of announcement and the dates after. The inclusion of dummy variable allows all kinds of changes that occurred after the date of announcement to be considered in the model (Asteriou, Samitas, & Kenourgios, 2013).

The above model is estimated using OLS. We also estimate the above model using a GARCH model as it is known that volatility clustering occurs in a financial time series for which OLS model may not provide appropriate results. The model is also estimated using TGARCH method, for an enhanced estimation and to provide more robustness for the results that are obtained. The TGARCH model also takes into consideration the effect of positive and negative information on the variance series.

In order to study the magnitude of the effect of announcement of rates of GST on the stock prices of the various sectors considered, an event study analysis is conducted. The event date is 19th May 2017 ($t=0$), which was the date of announcement of the rates and this announcement date was not known in advance and came as a shock to the investors. The date of implementation of GST, which was on 1st July 2017 is not taken as the event date because of the fact that the date of implementation was well known in advance and was considered to be ineffective in analysing the investor reaction on that particular date. In the present article, the event study is conducted with a shorter

event window to calculate the abnormal returns made by the various sectors considered and to find out the stock market efficiency. Here, the estimation window is from 1st January 2011 to 11th May 2017. A 10 day event window is followed, with the pre and post event window being $t = -5$ to $t = -1$ and $t = 1$ to $t = 5$ respectively. Computation of Average Abnormal Returns and Cumulative Average Abnormal Returns is done for both the pre and post event windows for all the sectors considered for the event study. The GARCH market model is adopted to compute Abnormal Returns and the residuals are taken into consideration. The equation to calculate the Abnormal Return is as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

However, it is seen that, the abnormal returns calculated gives just an indication to the effect caused by the event on the various sectoral indices which refers to the particular individual time points. Therefore, in order to find out the ongoing and actual effect of the event on the sectoral indices, cumulative abnormal returns are calculated for the pre and post event window period for each sector (Asteriou, Samitas, & Kenourgios, 2013).

Empirical Results:

OLS Market Model:

An OLS Market Model is used to estimate the equation model. The results are presented in Table 1. It can be observed that in all the cases the value of the Adjusted R Square is considerably low. This indicates that the dummy variable, expected in reflecting the impact of the event, is not helpful in determining abnormal returns made during the period. Out of the 14 sectors considered in the study, only three of them showed that the dummy variable is significant statistically at 5 percent significance level. These are the FMCG, Pharmaceutical Sector and PSU Bank. Out of these, only the FMCG Sector shows a positive and significant coefficient. The PSU Bank and the Pharmaceutical Sector, however shows a negative result, which implies that the announcement of GST had a negative effect on these sectors. Out of remaining 11 sectors, 5 sectors, namely, Automobile, Bank, IT, Private Bank, MNC have a positive effect due to the announcement of GST and 6 of them show a negative effect. However, these effects are statistically insignificant for the dummy variable even at 10 percent significance level.

GARCH Market Model:

We estimate the equation using the GARCH(1,1) model because of the fact that the returns made by the stock market are highly volatile and the usage of OLS method is not optimal enough. In order to estimate the equation, the dummy variable is included in both the mean equation and variance equation. Results of the analysis are presented in Table 2. From, the table of results, we can observe that the effect of dummy

variable is mostly insignificant due to the low adjusted R square values. Out of the 14 sectors considered, only 3 of the sectors, namely, Pharmaceutical Sector, Realty and PSU Bank sectors show a significant result for the dummy variable at 5 percent significant level. However, all these sectors are negatively affected by the announcement of GST rates. In the variance equation, only 2 sectors gives a significant result for the dummy variable 5 percent level, and these are the IT and Realty sector. However the results indicate that both these sectors are negatively affected by the event showing a reduced volatility in these sectors.

TGARCH Market Model:

We estimate the equation using TGARCH(1,1,1) model with both the mean equation and variance equation being incorporated with a dummy variable. Table 3 gives the results of analysis. We can observe from the table that the TGARCH model provides a better estimate. It can be seen that, of the 14 sectors considered only 3 sectors, namely, Pharmaceutical, PSU Bank and Realty sector shows a significant result for the dummy variable at 5 percent significant level and all the 3 sectors were negatively affected by the event. From the variance equation, it can be seen that almost all the ARCH coefficient, GARCH coefficient and TARCH coefficients shows significance at 5 percent and 10 percent significance levels. The coefficient for TARCH is positive for 5 sectors (Bank, Financial Services, Pharmaceutical, Private Bank and Realty) and negative for just 1 sector, ie; Energy Sector. This suggests the increase or decrease on the variance of the returns of the respective sectors considered. On a further examination of the variance equation, it can be observed that the dummy variable shows significance only for 3 sectors and all the three are affected negatively showing a reduced volatility for these sectors. These are the Automobile, IT and Realty sector. Thus, the results show estimates that are quite significant and robust, but they do not display results which are conclusive in just one particular direction.

Event Study Analysis:

The results obtained from the OLS, GARCH and TGARCH models helps to understand whether there is any effect of the GST rates announcement on the stock market and also gives the direction of the effect. Thus an event study analysis with a 10 day window is conducted to determine the magnitude of the effect. The results of the event study is presented in Table 5. It is found out from the table that 3 sectors showed abnormal returns that are significant statistically, namely, Pharmaceutical, PSU Bank and Realty sectors. These results are in line with those obtained from GARCH and TGARCH models, where it was observed that these 3 sectors were negatively affected, however the magnitude of the effect was not known from those models. It is seen from Table 5 that the Pharmaceutical sector in the pre-event window made

an average abnormal return of -8.333, but in the post event window it has dropped to -240.542, which implies there was a change of 2786.62% and it is significant at 5 percent level of significance. The average abnormal returns of the realty sector also showed a significant change from -0.522 to -2.862, which is a change of 448.28% during the pre-event and post event window. The PSU Banking Sector also showed a 5950.35% change in the average abnormal returns during the pre-event and post event window from -1.007 to -60.927 which is close to significant change at 10 percent level of significance (p-value = 0.1036). This can also be seen in the graph (figure 1) showing the CAR values of all sectors. Further it is seen that 7 of the 14 sectors has made positive abnormal returns, with the magnitude of the effect being highest for FMCG sector. Negative abnormal returns were made in the rest of the 4 sectors, IT sectors being hit the most. However these results were not statistically significant.

The event studies also help us examine the semi-strong efficiency of the market. Existence of abnormal returns during the 10 day event window would show the inefficiency of the market to absorb the news. As described in the methodology section the event window considered is 10 days to examine if the investors had any opportunity to make abnormal returns. The cumulative abnormal returns of all the sectors are compiled in table 4 from which it can be seen that the CAR values are completely positive for the IT sector, whereas it is fully negative for the Media sector. Rest of the sectors have both positive as well as negative CAR values. These CAR values are tested for statistical significance using t-test. Table 5 gives the details of the analysis. Here AAR stands for Average Abnormal Returns, CARb and CARa is Cumulative Abnormal Returns before and after the event respectively. From the tables it is analysed that 3 of the 14 sectors show abnormal returns that are significant. Hence the stock market is not completely efficient. However, it can be said that the market is partially efficient because significant abnormal returns were not made in majority of the sectors. Significant abnormal returns were made in only 21.43 percent of the market.

Conclusion:

The reaction of stock market is considered to be an indicator of the changes in a nation's economy and it thereby helps in the study of the progress of a nation. The present article aims to study reaction of Indian Capital Market with respect to the announcement of GST rates and also tries to test the semi-strong efficiency of the market. OLS market model, GARCH and TGARCH market model was used to estimate the equation model which included a dummy variable. The OLS market model was not effective in calculating the excess returns made as it does not account for

heteroscedasticity and is not suitable for financial series that are volatile (Asteriou, Samitas, & Kenourgios, 2013). Under the model, only 3 sectors, Pharmaceutical, PSU Bank and FMCG Sector showed significant results. Hence much better and efficient models of GARCH and TGARCH were used to analyse the effect of announcement of GST rates on the various sectors. The mean equation showed significant effect only on Pharmaceutical, PSU Bank and Realty Sector. However more significant results were shown by the coefficients in the variance equation, which implied that there was a huge effect on the volatility of the sectoral indices, with 96, 54% of volatility was shown by the pharmaceutical sector and 98.35% and 81.75% of volatility was displayed by the PSU Bank and Realty sector respectively. The event study gave more insights into the study. The difference in Cumulative Abnormal Returns before and after gives the magnitude of the effect. The analysis revealed that significant abnormal returns were made in 3 sectors, namely Pharmaceutical, PSU Bank and Realty, and all the three sectors were negatively affected as it was anticipated before. Out of these, the negative returns shown by the Pharmaceutical Sectors can be explained by the fact that GST rate for the finished medicines is under the 12% slab rate compared to the 9% tax rate that existed earlier. Thus a reduced return is shown by this sector. PSU banks were negatively affected due the complexity in the compliance procedures and costlier services. Under GST, the services are charged at 18% compared to the 15% service charge earlier. Thus the negative returns made in the PSU Bank can be explained due to the 3 per cent increase in the tax rate. The realty sector showed significant negative returns. This is mainly due to the hike in the tax rates. The service tax paid by the buyers at 4 to 4.5 per cent earlier under the earlier regime is replaced with 18% tax rate under GST. Also the cost of materials likes cement and paints have increased as they fall under the 28% slab rate. Also, the existence of significant abnormal returns in the three sectors namely, Pharmaceutical, PSU Bank and Realty which constitutes around 21% of the Indian stock market makes it partially efficient. Portfolio managers, financial investors stand to benefit from the findings of the study as they are in constant research to understand how the stock market reacts to the news effect. These findings would help them mitigate their risk to certain extent and minimize potential losses. They also stand to benefit from the abnormal returns earned during the event window. The regulatory bodies can use the findings to control the market more efficiently.

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TABLES AND FIGURES

Table 1: Results of OLS estimation of dummy variable

	α	β	γ	ADJ R ²
Auto	0.0003(1.67)*	0.9973(0.02)**	0.0011(0.002)	0.6656
Bank	6.43E-05(0.36)	1.2873(74.64)**	0.0010(0.35)	0.7785
Finserv	8.38E-05(0.58)	1.2485(87.92)**	-0.0008(-0.36)	0.8298
Fmcg	0.0004(1.9)	0.6423(30.22)**	0.0088(2.49)**	0.3673
IT	3.08E-05(0.11)	0.6823(25.24)**	0.001(0.21)	0.2862
Media	0.0002(0.67)	0.8126(30.17)**	-0.0067(-1.49)	0.3646
Metal	-0.0006(-2.13)**	1.2545(42.35)**	-0.0002(-0.03)	0.5522
Pharma	0.0003(1.28)	0.5625(25.96)**	-0.0210(-5.82)**	0.3067
PsuBank	-0.0005(-1.4)	1.3813(40.21)**	-0.0126(-2.21)**	0.5051
PvtBank	0.0003(1.46)	1.2725(72.73)**	0.0026(0.91)	0.7695
Realty	-0.0007(-1.66)*	1.5484(40.54)**	-0.0093(-1.46)	0.5088
Energy	-0.0001(-0.75)	0.9758(53.22)**	-0.0031(-1.00)	0.6411
MNC	0.0003(2.03)*	0.7213(48.57)**	0.0005(0.19)	0.598
Infra	0.0004(-1.93)*	1.1342(64.33)**	-0.0026(-0.89)	0.723

** significant at 5% and * significant at 10%

Table 2: Results of GARCH (1,1) estimation of dummy variable

	MEAN EQUATION			VARIANCE EQUATION				ADJ R ²
	α	β	γ	C	ARCH	GARCH	DUMMY	
Auto	0.0003 (1.87)*	0.9871 (63.07)**	0.0019 (0.58)	0.0000385 (5.18)**	0.1586 (4.79)**	0.107694 (0.71)	-0.000023 (-1.42)	0.6655
Bank	0.0002 (0.99)	1.2717 (86.53)**	0.0009 (0.39)	0.0000108 (5.01)**	0.0531 (7.11)**	0.9238 (96.38)**	-0.000000409 (-0.004)	0.7784
Finserv	0.0002 (1.22)	1.2333 (100.86)**	-0.0009 (-0.55)	1.20E-06 (4.56)**	0.0586 (6.83)**	0.9087 (73.48)**	-2.17E-06 (-0.29)	0.8297
Fmcg	0.0005 (2.13)**	0.6538 (36.11)**	0.0082 (1.00)	6.55E-05 (7.07)**	0.1489 (7.4)**	-0.0289 (-0.24)	0.0001 (0.61)	0.3679
IT	0.0002 (-0.36)	0.6829 (12.76)**	0.0009 (0.09)	9.88E-05 (4.06)**	0.1411 (3.51)**	0.5727 (5.71)**	-0.0001 (-59.3)**	0.2859
Media	0.0002 (0.73)	0.8015 (33.18)**	-0.0064 (-0.88)	2.79E-05 (1.89)*	0.0514 (2.42)**	0.7171 (5.24)**	-3.75E-06 (-0.07)	0.3645
Metal	-0.0009 (-3.00)**	1.2503 (42.74)**	-0.0005 (-0.08)	3.37E-06 (2.68)**	0.0454 (5.21)**	0.9294 (61.63)**	1.85E-05 (0.41)	0.552
Pharma	0.0003 (1.68)*	0.5496 (27.46)**	-0.0191 (-3.92)**	2.10E-05 (4.15)**	0.1169 (5.79)**	0.6162 (7.63)**	3.10E-05 (0.53)	0.3064
PsuBank	-0.0006 (-1.72)*	1.3662 (49.53)**	-0.0126 (-2.11)**	2.89E-05 (5.80)**	0.1391 (7.41)**	0.7135 (19.32)**	5.48E-05 (0.48)	0.505
PvtBank	0.0004 (2.35)**	1.2391 (81.65)**	0.0028 (1.26)	1.07E-06 (4.83)**	0.0497 (7.19)**	0.9274 (100.70)**	-2.88E-06 (-0.42)	0.7689
Realty	-0.0007 (-1.7)*	1.5423 (41.46)**	-0.0076 (-2.97)**	6.47E-05 (3.79)**	0.0691 (3.50)**	0.6655 (7.95)**	-7.51E-05 (-461.69)**	0.5088
Energy	-0.0002 (-0.94)	0.9620 (60.21)**	-0.0034 (-0.53)	0.00000543 (3.28)**	0.0503 (4.80)**	0.8514 (22.90)**	0.00000554 (0.22)	0.641
MNC	0.0003 (2.15)**	0.7128 (64.16)**	0.0013 (0.65)	2.67E-05 (8.00)**	0.2105 (11.46)**	0.0575 (0.64)	-1.28E-05 (-0.54)	0.5979
Infra	-0.0003 (-1.89)*	1.1255 (66.43)**	-0.0028 (-0.46)	2.05E-05 (4.28)**	0.1052 (10.37)**	0.4989 (5.03)**	6.27E-06 (0.14)	0.723

** significant at 5% and * significant at 10%

Table 3: Results of TGARCH estimation of dummy variable

	MEAN EQUATION			VARIANCE EQUATION					ADJ R ²
	α	β	γ	C	Arch	T-Arch	G-Arch	Dummy	
Auto	0.0003 (1.91)*	1.0043 (69.30)**	0.0023 (1.31)	1.70E-05 (3.76)**	0.0855 (3.26)**	0.0391 (1.18)	0.5313 (5.09)**	-1.95E-05 (-5.67)**	0.6655
Bank	8.89E-05 (0.54)	1.2649 (85.72)**	0.0009 (0.4)	8.31E-07 (4.69)**	0.0268 (3.68)**	0.0362 (3.91)**	0.9376 (117.77)**	2.50E-07 (0.03)	0.7783
Finserv	0.0001 (0.87)	1.2294 (98.80)**	-0.0008 (-0.56)	7.59E-07 (4.11)**	0.0323 (3.64)**	0.0338 (3.06)**	0.9261 (90.44)**	-1.89E-06 (-0.28)	0.8297
Fmcg	0.0005 (2.13)**	0.6538 (36.07)**	0.0082 (1.00)	6.55E-05 (7.07)**	0.1494 (4.77)**	-0.0010 (-0.03)	-0.0291 (-0.24)	0.0001 (0.61)	0.3672
IT	0.0002 (0.73)	0.6693 (30.26)**	0.0026 (1.02)	8.62E-05 (15.97)**	0.3015 (13.54)**	0.0243 (0.63)	0.0439 (0.90)	-6.26E-05 (-2.5)**	0.2859
Media	0.0001 (0.47)	0.7988 (32.32)**	-0.0063 (-0.80)	1.73E-05 (2.05)**	0.0261 (1.42)	0.0366 (1.42)	0.8133 (10.12)**	-3.23E-06 (-0.07)	0.3645
Metal	-0.0009 (-3.01)**	1.2502 (42.7)**	-0.0005 (-0.07)	3.29E-06 (2.61)**	0.0444 (4.80)**	0.0023 (0.18)	0.9299 (62.15)**	1.83E-05 (0.41)	0.552
Pharma	0.0003 (1.54)	0.5541 (28.54)**	-0.0203 (-3.65)**	3.77E-05 (6.24)**	0.0988 (3.80)**	0.1007 (2.8)**	0.3695 (3.96)**	4.48E-05 (0.56)	0.3066

	MEAN EQUATION			VARIANCE EQUATION						ADJ R ²
	α	β	γ	C	Arch	T-Arch	G-Arch	Dummy		
PsuBank	-0.0006 (-1.76)*	1.3658 (49.47)**	-0.0127 (-2.11)**	2.83E-05 (5.79)**	0.1306 (6.4)**	0.0182 (0.64)	0.7168 (19.71)**	5.69E-05 (0.5)	0.505	
PvtBank	0.0003 (1.67)*	1.23 (80.32)**	0.0028 (1.26)	7.71E-07 (4.35)**	0.0142 (2.11)**	0.0512 (5.63)**	0.9442 (127.06)**	-2.68E-06 (-0.39)	0.7687	
Realty	-0.0007 (-1.85)*	1.5978 (43.18)**	-0.0078 (-4.99)**	0.0001 (4.38)**	0.0505 (2.48)**	0.0588 (1.85)*	0.5068 (4.78)**	-0.0001 (-5.12)**	0.5083	
Energy	-0.0001 (-0.71)	0.9622 (61.37)**	-0.0035 (-0.55)	5.41E-06 (3.17)**	0.0596 (4.85)**	-0.0285 (-1.96)*	0.8558 (21.79)**	5.70E-06 (0.24)	0.6409	
MNC	0.0003 (2.20)**	0.7138 (63.87)**	0.0013 (0.63)	2.71E-05 (8.05)**	0.2270 (10.60)**	-0.0438 (-1.02)	0.0505 (0.56)	-1.24E-05 (-0.52)	0.5979	
Infra	-0.0003 (-1.83)*	1.125 (66.24)**	-0.0028 (-0.45)	2.02E-05 (3.82)**	0.1109 (10.32)**	-0.0189 (-0.61)	0.5075 (4.47)**	6.33E-06 (0.14)	0.7229	

** significant at 5% and * significant at 10%

Table 4: Cumulative returns of all sectors for 10 day event window

Event Window	Auto	Bank	Finserv	Fmcg	IT	Media	Metal	Pharma	PsuBank	PvtBank	Realty	Energy	MNC	Infra
-5	38.41	-84.36	-20.62	-34.08	125.01	-63.75	7.59	-48.38	-9.94	-77.87	2.76	9.02	5.36	-0.47
-4	38.36	-74.89	0.68	33.37	62.81	-53.71	59.43	53	-6.22	-71.42	3.03	-24.81	72.91	-12.32
-3	77.88	-177.24	-44.3	162.01	133.62	-82.22	21.37	3.65	49.08	-163.93	2.82	-41.78	102.58	-21.24
-2	131.78	-215.1	-65.62	24.45	97.81	-89.9	85.31	-32.66	20.34	-166.42	1.95	-82.66	68.78	-14.67
-1	1.25	-161.68	-35.54	-228.9	274.92	-118.17	42.56	-41.67	-5.04	-148.22	-2.61	-152.09	-84.3	-36.53
1	-84.58	-152.53	-64.16	848.47	38.95	-4.56	-18.31	-206.76	-160.78	-39.67	-4.17	-104.67	-60.39	2.05
2	8.96	-67.38	-41.13	700.34	81.22	-49.32	-7.99	-491	-195.4	31.89	-8.96	-181.97	20.68	-25.17
3	39.08	-39.29	-26.59	717.6	97.51	-98.19	-61.28	-681.38	-260.83	81.12	-11.74	-162.67	-8.73	-77.11
4	74.2	153.52	-3.25	516.8	213.05	-124.96	-63.77	-1015.3	-243.36	191.36	-12.43	-256.46	5.22	-67.33
5	100.43	55.97	-37.46	809.5	143.81	-93.61	4.27	-1202.7	-304.63	178.53	-14.31	-124.07	71.14	-55.5

Table 5: Results of Event analysis of 10 day event window

	-5 to -1 days			+1 to +5 days			Difference
	AAR	t-stat	CARb	AAR	t-stat	CARa	CARa-CARb
Auto	0.2491	0.01	1.2456	20.0864	0.69	100.4319	99.1863
Bank	-32.3368	-1.12	-161.684	11.1934	0.18	55.967	217.6508
Finserv	-7.1072	-0.5	-35.5359	-7.4924	-0.42	-37.4619	-1.926
Fmcg	-45.7714	-0.67	-228.857	161.901	0.84	809.5049	1038.3617
IT	54.9837	1.2	274.9183	28.7622	0.97	143.8111	-131.1072
Media	-23.6341	-1.92	-118.17	-18.7226	-1.27	-93.6129	24.5574
Metal	8.5124	0.39	42.562	0.8549	0.04	4.2745	-38.2875
Pharma	-8.3332	-0.29	-41.6659	-240.542	-8.23**	-1202.7089	-1161.043
PsuBank	-1.0079	-0.07	-5.0395	-60.927	-2.1*	-304.635	-299.5954
PvtBank	-29.6441	-1.29	-148.221	35.706	1.3	178.5301	326.7509
Realty	-0.5225	-0.44	-2.6124	-2.8623	-3.84**	-14.3115	-11.6991
Energy	-30.4171	-2.34*	-152.086	-24.8148	-0.55	-124.074	28.0116
MNC	-16.8602	-0.45	-84.3008	14.227	0.53	71.1351	155.436
Infra	-7.3062	-1.5	-36.5312	-11.1008	-0.9	-55.5038	-18.9725

** significant at 5% and * significant at 10%

Figure 1: Graph showing cumulative abnormal returns of all the sectors


