TESTING SEMI-STRONG EFFICIENCY OF INDIAN STOCK MARKET - A STUDY ON EFFECT OF UNION BUDGET 2012 ON SIX SELECT SECTORAL STOCKS

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ABSTRACT

In a semi-strong efficient market, the security prices reflect all publicly available information. Semi-strong efficiency says that an Investor cannot earn abnormal return with the knowledge of publicly available information. Immediately after the Budget speech by the Finance Minister, several reports crop up on the Internet, newspapers as well as on satellite TV channels including News and Business news channels. The reports appearing in these media construe the possible impact of the Budget on various industrial sectors. Does this publicly available information affect the security prices in the manner envisaged by the budget analysts'? What is the speed of adjustment of security prices to Budget announcements? Using regression-based event study methodology, we test the semi-strong efficiency of the Indian stock market. The results of our study show that there is a chance to make abnormal returns for the investor and that the impact of budget seems to be company- specific.

Keywords: event study, semi-strong efficiency, regression, budget, stock market, event clustering.

INTRODUCTION:

The Government's economic policy might provide support or restrain an industry's development. For example, it can impose restrictive import quotas and/or tariffs, increase/decrease customs duty, favorable/unfavorable tax legislations, etc., which may substantially lessen or improve the profits of a particular industry[1].

The Union Budget is the most-watched event in economic policy making in India as it is a mechanism through which the Government of India announces important new policy initiatives as well as plans for economic policy for the near future[2]. For that reason, the Union Budget is the most awaited annual event by Indian industry and every industrial sector expects the Government of India to come up with a policy which brings about considerable benefits to their respective industry. After the Budget speech, many reports start to surface in the Print media, Television media, Internet etc., regarding the possible impact of the Budget on various industrial sectors. And these reports anticipate whether the Budget is going to have a positive or negative or neutral impact on the respective sectors. Does this publicly available information affect the security prices in the manner predicted by the Budget analysts? What is the speed of adjustment of security prices to Budget announcements? These are the questions which are investigated in this study.

According to Fama (1991), the semi-strong efficient market hypothesis states that the stock price reflects all public information fully and without bias, making it impossible to earn economic profits based on this information alone. So the Capital market efficiency may be defined as the ability of securities to reflect and incorporate all relevant information in their prices. Thus the efficiency of security prices depends on the speed of price adjustment to any available information. The faster is the speed of adjustment, the more efficient the prices. In a semi-strong efficient market, the security prices reflect all publicly available information. In other words, such publicly available information is already impounded in the current security prices[3].

LITERATURE REVIEW:

Previous studies in India studied the impact of publicly available information including Union Budget, earnings announcements, bonus issues, and dividends announcements.

Thomas and Shah (2002) studied the Indian stock market index from April 1979 to June 2001 covering 26 Budget dates in this period. They found that in some years, post–budget returns are positive; in other years post–budget returns are negative; on average, there is no clear pattern about movement in the Index after budget date. They also report no evidence of over–reaction or under–reaction prior to Budget date, or immediately after it. Thus they concluded that the information processing by stock market participants is rational, and that the Indian stock market is semi-strong efficient.

Gupta and Kundu (2006) examined the impact of Union Budgets on Sensex group of stocks from 1991 to 2005 covering 17 Budgets. They found that Investors can earn super profits during the short-term and medium term periods around the budget (up to 15 days) and also face the risk of abnormal losses if the investors' expectations are not met from the budget.

Obaidullah (1990) studied the stock market reaction to half-yearly announcements and found that the Indian stock market is semi-strong efficient.

Gupta (2008) performed an event study on 50 companies comprising CNX Nifty, which announced their quarterly earnings for the quarter ended March 31, 2004. He used the board meeting date as the event date and used a 61 event window i.e. 30 days before and 30 days after the event date. He divided his sample into good news and bad news announcements. In the good news sub sample, he found that the stock prices turn positive 3 days before the announcement (t-3) and remain positive till 13 days after the event day (t+13) pointing out that Indian stock market is not semi-strong efficient.

Mishra (2005) examined 46 bonus issues from June 1998 to August 2004 and his results indicated that there are significant positive abnormal returns 5 days prior to the event but post event within two days the market corrects the speculation built up with prices fully reflecting the public announcement available. His study shows that Indian stock market is semi-strong efficient.

OBJECTIVE OF THE STUDY:

Many of Budget analysis reports publicly available indicated that the impact of the budget is going to be positive on sectors on Fertilizers and Textiles sector, negative on Paper and Hotels sector and will have a neutral

[1] Fisher and Jordan (1996), Security Analysis and Portfolio Management, Prentice Hall India, Page 166
[2] Thomas, Susan and Shah, Ajay "The stock market response to the Union Budget" Economic and Political Weekly, XXXVII (5):455–458, February 2–8 2002
[3] Pandey I M, Financial Management, Eight Edition, Vikas Publishing, Page 974-976

effect on Pharmaceuticals and Software sector[4]. This study attempts to answer these questions:

1. Does this publicly available information really influence the stock market? Is the impact of the Budget on select sectors same as anticipated by the Budget analysts?
2. How do the stock prices react to this information? Whether abnormal returns (returns which do not commensurate with risk) can be realized by closely following the budget analysis reports which are publicly available.

In other words, we are testing the hypothesis whether the Indian Stock market is semi-strong efficient or not. Against this backdrop, this study investigates the effect of Union Budget 2012-13 on six select industry stocks around the budget date to find out whether the Indian stock market is semi-strong efficient or not. The hypothesis being tested is:

H_0: There is no difference between the stock returns during the event period (i.e. around the budget) and the stock returns in pre-budget period (pre-event period). The Indian stock market is semi-strong efficient.

H_1: There is a difference between the stock returns during the event period and the stock returns in the pre-budget period. The Indian stock market is not semi-strong efficient.

DATA AND METHODOLOGY:

EVENT STUDY:

Fama, Fisher, Jensen and Roll (1969) have used event studies to study the semi-strong form of market efficiency. Using financial market data, an event study measures the impact of a specific event on the value of a firm. The usefulness of such a study comes from the fact that, given rationality in the marketplace, the effects of an event will be reflected immediately in security prices. Thus a measure of the event's economic impact can be constructed using security prices observed over a relatively short time period[5]. Brown and Warner (1980, 1985) used monthly returns as well as daily returns to conduct event studies and they concluded that daily data have greater power to signal an event effect when the event date is known[6].

METHODOLOGY OF THE STUDY:

In our study, the event date is the March 16th 2012 (T=0) i.e. the day of Budget speech by the Finance Minister. We examine the security prices 7 days prior to the event and 7 days after the event. Therefore our event window is from day -7 to day 7 i.e. a 15-day event window is employed, consisting of 7 pre-event days, the event day and 7 post event days. We deliberately take a short event window to determine the impact of Union Budget on the stocks under study and to isolate other possible effects on stock returns. The comparison or pre-event window/period is 147 days prior to the event window i.e. Day -154 to Day -8. Most of the research in event studies aggregate abnormal returns over time and across securities as the event windows of the included securities do not overlap in calendar time and hence the covariance across securities will be zero. Since in our study the event window is same across all the stocks, this is an example of event clustering[7] i.e. event windows overlapping for all the stocks under study.

Mackinlay (1997) proposes an alternative method to handle event clustering, which is to analyze the abnormal returns without aggregation. One can consider testing the null hypothesis of the event having no impact using unaggregated security by security data. This approach is applied most commonly when there is total clustering, that is, there is an event on the same day for a number of firms. The basic approach is an application of a multivariate regression model (MVRM model) with dummy variables for the event date (Binder, 1985). Mackinlay (1997) suggests that an advantage of using this method is that we can have an alternative hypothesis where some firms have positive abnormal returns

and others-negative. We use the MVRM model used by Binder (1985) et al and the regression equation is as follows:

$$R_{1t} = \alpha_1 + \beta_1 R_{mt} + \sum_{i=1}^{n} \gamma_{1i} D_i + \varepsilon_{1t}$$

$$R_{2t} = \alpha_2 + \beta_2 R_{mt} + \sum_{i=1}^{n} \gamma_{2i} D_i + \varepsilon_{2t}$$

$$R_{Nt} = \alpha_N + \beta_N R_{mt} + \sum_{i=1}^{n} \gamma_{Ni} D_i + \varepsilon_{Nt}$$

[4] CRISIL Research Budget Analysis, moneycontrol.com et al

[5] Mackinlay, Craig A(1997) "Event studies in Economics and Finance" Journal of Economics Literature, Vol. 35, No.1,pp 13

[6] Binder(1998), "The Event study methodology since 1969", Review of Quantitative Finance & Accounting, Vol.11, pp. 120-121

[7] See Henderson Glen V (1990) "Problems and Solutions in Event Studies" Journal of Risk and Insurance, Vol.57, No.2, pp 294 - 296

Where R_{jt} = return on security j in period t; j = 1 to N (N – No. of stocks)
α_j = intercept representing mean returns in pre-event period for company j
β_j = beta coefficient
R_{mt} = market return in period t (S&P CNX Nifty index is taken as a proxy for the market)
D_i = dummy variable which take value of for event period and zero otherwise
γ_{ji} = slope coefficient representing by how much the mean returns differ from Pre-event returns (intercept)
ε_{jt} = error term fro company j on event day i

'α' represents the mean returns for the stocks in the pre-event period i.e. comparison period (day -154 to day -8) and the coefficient γ indicates by how much the mean stock returns differ from the mean returns in the pre-event period. If the value of γ is negative, it implies that the returns in the event period are lower than the pre-event period returns by about the value of γ coefficient and if the value of γ is positive then the returns in the event period are higher than the pre-event returns by about the value of γ coefficient. If γ is statistically significant then we reject the null hypothesis that the returns in pre-event period and returns in the event period are same and conclude that Indian stock market is not semi-strong efficient. If γ coefficient is not statistically significant we accept the null hypothesis that the returns in pre-event period and returns in the event period are same and conclude that Indian stock market is semi-strong efficient.The dummy variable 'D_i' takes on the value of zero for the comparison period (-154, -8) and takes on the value of one for each day in the event window (-7, 7).

SAMPLE STOCKS FOR THE STUDY:

Daily closing prices from 1st August 2011 to April 30th 2012 were collected for S&P CNX Nifty index and for stocks from six select sectors from the NSE website (www.nseindia.com). The stocks were selected for the sample from the six sectors based on three criteria:

1. They are listed on NSE (National Stock Exchange)
2. They had no missing data during our entire sample period of 1st August 2011 to April 30th 2012 and
3. They should be major players in their respective sector.

Based on the above criteria, we singled out the choice of companies in the six sectors as follows:

Table 1: Sectors chosen for the study

Sector	No. of companies included in the sample
Fertilizers	9
Textiles	20
Hotels	10
Paper	7
Software	15
Pharmaceuticals	15
Total	**76**

QUANTITATIVE RESULTS AND INTERPRETATION:

Table 2: Results of Regression Equation for Fertilizer Sector Stocks

COMPANY	γ	β	α	R^2
CHAMBAL	-0.00611	0.86608	-0.00017	0.163071
COROMANDEL	0.000507	0.540926	-0.00055	0.145721
DEEPAK	-0.00626	0.414955	-0.00024	0.091264
FACT	-0.00584	0.915091	-0.00085	0.144232
GNFC	-0.00363	0.506969	-0.00075	0.182569
GSFC	0.002246	0.523631	0.000302	0.138408
MANGALORE	-0.00491	0.732322	0.002161	0.113189
NFL**	-0.01641	0.817011	0.000594	0.130159
RCF[8]	-0.0066	0.902553	-0.00053	0.153301

** Significant at 10%

[8] Rashtriya Chemicals and Fertilizers Ltd

The results in table 2 indicate that 7 stocks out of the 9 Fertilizer stocks experienced negative returns during the event period and only NFL (National Fertilizers) had statistically significant negative returns at 10% i.e. returns in event period are significantly lesser than its returns in the pre-event period, thereby indicating that there was a chance to make some abnormal returns with NFL stock[9]. The other two stocks viz., GSFC and Coromandel (stock price increased marginally) experienced positive returns in the event period and their returns are not statistically significant. Post Budget analysis reports predicted a positive impact of Budget on the Fertilizer sector but our results show no evidence of an overall impact of Budget on the Fertilizer sector. None of the Fertilizers' stock returns (except NFL), are statistically significant in the event period indicating that their returns in event period and their returns in the pre-event period are about the same and that all of them witnessed an instantaneous price rise/drop and their prices stabilized at that increased/decreased price level indicating evidence of semi-strong efficiency.

Table 3: Results of Regression Equation for Textile Sector Stocks

COMPANY	γ	β	α	R^2
ADITYA BIRLA NUVO**	0.006099	0.710832	-0.00043	0.25742
JBF	0.000539	0.692979	-0.00186	0.198176
ZODIAC	0.005202	0.147004	-0.00418	0.005129
VTL[10]	-0.00071	0.401479	-0.00021	0.076829
SUTLEJ	-0.0005	0.408563	-0.00095	0.05129
SRF	-0.00294	0.387819	-0.00103	0.112396
SKUMARS	-0.00182	1.620957	-0.00301	0.365831
SIYARAM SILK	0.000308	0.618801	-0.00187	0.120888
RAYMOND**	0.007715	0.948977	0.000112	0.306975
PAGE INDUSTRIES	-0.00119	0.556043	0.001144	0.091124
LOVABLE LINGERIE	-0.00056	1.32279	-0.00045	0.185311
INDO-RAMA*	-0.01257	0.854258	-0.00224	0.183272
GARDEN SILK	-0.00179	0.912917	-0.00276	0.251468
CENTURY ENKA	0.00091	0.704015	-0.0027	0.141719
BRFL[11]*	-0.00695	0.158764	-0.00039	0.039458
S LAKSHMI	-0.0055	0.818855	0.00453	0.179139
MANDHANA	-0.00116	0.353336	0.001627	0.076799
ARVIND	-0.00251	1.208253	0.00017	0.248962
ALOK INDUSTRIES	-0.00344	1.275215	-0.00074	0.419804
RUBY	-0.00431	0.064463	-0.00077	0.003277

* Significant at 5% ** Significant at 10%

The results in table 3 show that 14 out of 20 textile stocks experienced negative returns in the event period and only BRFL and Indo-Rama Synthetics experienced statistically significant negative returns at 5% level in the event period, indicating that there was chance to make abnormal returns with respect to these two stocks. The results also show that 6 out of 20 stocks experienced positive returns in the event period and only Aditya Birla Nuvo and Raymond witnessed statistically significant positive returns at 10% in the event period i.e. returns in the event period are higher than their mean returns in the pre-event period, indicating that there was chance to make abnormal returns with these two stocks as well[12]. So, only four Textile stocks had statistically significant returns and the remaining textiles stocks witnessed an instantaneous price increase/decrease and their prices become stable at that increased/decreased price level indicating evidence of semi-strong efficiency. Post Budget analysis reports predicted a positive impact of Budget on the Textile sector but on the contrary our results show no concrete evidence of an overall impact of Budget on the Textiles sector.

Table 4: Results of Regression Equation For Hotel Stocks

COMPANY	γ	β	α	R^2
BHAGWAT	-0.01134	0.717435	-0.0002	0.062988

[9] Investors holding the NCF stock would immediately sell and buy it back later at much lesser price
[10] Vardhaman Textiles Ltd
[11] Bombay Rayon Fashions Limited
[12] Investors would immediately buy Aditya Birla Nuvo stock and sell it back later at a much higher price

ASIANWEST	-0.00402	-0.0422	-0.00144	0.002659
EIHASSOCIATED	-0.00184	0.585449	-0.0008	0.053956
TAJGVK	-0.00289	0.947738	-0.0012	0.268798
ASIANNORTH	-0.00466	0.185583	-0.00057	0.018892
EIHHOTELS	-0.00509	0.441463	-0.00011	0.137483
HOTEL LEELA	-0.00459	1.083861	-0.00113	0.22594
INDIAN HOTELS	-0.00453	0.762633	-0.00067	0.246746
MHRIL	0.001276	0.524237	-0.00162	0.12738
ORIENT HOTELS	-0.00083	0.240552	-0.00109	0.034045

The results in table 4 clearly indicate that all the Hotel stocks were already experiencing negative returns in the pre-event period as indicated by their negative values of their respective α coefficient. In the event period, the entire Hotel stocks experienced further decline, with the exception of MHRIL (Mahindra Hotels and Resorts). Post Budget analysis reports predicted a negative impact of Budget on the Hotels sector and all the Hotel stocks did experience negative returns during the event period, the only exception being MHRIL, whose stock price increased marginally. So, the Budget did have the anticipated negative impact on the Hotel sector stocks. Since, none of the returns are statistically significant indicating that the mean returns for the Hotel stocks in the event period and in the pre-event period are about the same, which means that all the Hotels stocks witnessed an instantaneous price drop and their prices stabilized at that decreased price level indicating evidence of semi-strong efficiency.

Table 5: Results of Regression Equation For Paper Stocks

COMPANY	γ	β	α	R^2
A P PAPER	0.002546	0.747279	-0.00417	0.091634
BALLARPUR	-0.00123	0.843905	-0.00207	0.224952
J K PAPER	0.002496	0.417028	-0.00122	0.169548
RAINBOW PAPER	0.000551	0.385146	0.000546	0.185858
SESHASAYEE PAPER	0.004163	0.492687	-0.00127	0.052993
TNPL	-0.00212	0.496794	-0.00099	0.16082
WEST COAST PAPER	-0.00506	0.39839	-0.00287	0.08109

The results in table 5 shows that 4 out of 7 stocks witnessed an increase in their stock prices, with AP Paper seeing a marginal increase in its stock price but none of their positive returns during the event period are statistically significant indicating that their returns in event period and in the pre-event period are about the same. The other 3 stocks experienced negative returns in the event period but none of them are statistically significant. The Budget analysis reports predicted a negative impact of Budget on Paper sector. On the contrary, our results show no conclusive evidence of an overall impact of the Budget on the Paper sector. Since, none of the returns of Paper stocks are statistically significant, it means that their returns in event period and in the pre-event period are about the same and that all the Paper stocks witnessed an instantaneous price drop and their prices stabilized at that decreased price level indicating evidence of semi-strong efficiency.

Table 6: Results of Regression Equation For Pharmaceutical Stocks

COMPANY	γ	β	α	R^2
ALEMBIC	-0.00195	0.667372	-0.00096	0.109245
AUROBINDO	1.02E-06	1.150703	-0.00201	0.246598
CADILA	0.0053	0.254157	-0.00158	0.053862
CIPLA	-0.00292	0.375785	0.000247	0.120056
DIVIS LABS	0.003245	0.414911	-0.00071	0.215671
DR REDDY'S	2.28E-05	0.415427	0.000431	0.191145
GLENMARK	0.001288	0.290629	-0.0007	0.047528
LUPIN	0.001843	0.278729	0.000644	0.057791
MERCK	-0.00071	0.341834	-0.00061	0.176194
NATCO*	0.012223	0.53088	0.000354	0.112955
ORCHID	0.001636	1.431599	-0.00056	0.302335

PIRAMAL	0.00145	0.436673	0.001153	0.15187
RANBAXY	0.001279	0.533099	-0.00185	0.155632
SUN	0.00174	0.470982	0.000581	0.164776
TORRENT*	0.007054	0.224259	-0.00085	0.08329
WOCKHARDT	0.004735	0.676897	0.000901	0.092571

* Significant at 5%

The results in table 6 show that for 13 out of 16 stocks, the stock prices increased during the event period. Only NATCO and Torrent stock returns are positive and statistically significant at 5% level indicating that there was a chance to earn abnormal returns with respect to these two pharmaceutical stocks. For the other 3 stocks, their stock returns declined during the event period and none of their negative returns are statistically significant indicating that their returns in event period and in the pre-event period are about the same. The Budget analysis reports anticipated that the Budget would have a neutral effect on Pharmaceutical sector. But our results show no conclusive evidence of an overall impact. Only 2 stocks had statistically significant returns and for the rest 14 stocks, none of their returns in the event period are statistically significant, meaning that the mean returns for these stocks in the event period and in the pre-event period are about the same indicating evidence of semi-strong efficiency.

Table 7: Results of Regression Equation For Software Stocks

COMPANY	γ	β	α	R^2
ECLERX	-0.00084	0.446854	-0.00036	0.197592
EDUCOMP	0.001938	1.725983	-0.00284	0.405803
HCL	-0.00115	1.043098	0.000238	0.377866
HEXAWARE	0.000548	1.229508	0.001482	0.307308
INFOTECH	0.000856	0.600686	0.000969	0.125034
INFOSYS	0.001723	0.930961	0.000265	0.435568
TECH MAHINDRA*	0.011536	0.918496	-0.00144	0.305667
MINDTREE	0.005462	0.435849	0.00054	0.111754
MPHASIS	0.005064	0.860412	-0.00057	0.211915
NIIT TECH	0.000852	0.730555	0.000528	0.167825
OFSS[13]	1.17E-05	0.589138	0.001237	0.143994
PATNI	0.001348	0.364815	0.002585	0.045565
ROLTA	-0.00378	1.355027	-0.00055	0.367048
TATA ELXSI	-0.00215	0.965931	-0.00059	0.328672
TCS	-0.00209	0.883948	0.000682	0.376868
WIPRO	-0.00098	0.770778	0.000882	0.331735

* Significant at 5%

The results in table 7 show that 10 out of 16 stocks saw increase in their stock returns during the event period and only Tech Mahindra had positive and statistically significant returns at 5% level in the event period, indicating that there was a chance to make abnormal returns with respect to Tech Mahindra stock. The remaining 6 stocks saw a drop in their prices in the event period and none of their negative returns are statistically significant. The Budget analysis reports anticipated that the Budget would have a neutral effect on Software sector. But our results show no evidence of an overall impact of the Budget. The returns for 15 out 16 software stocks in the event period are not statistically significant meaning that the mean returns for these stocks in the event period and in the pre-event period are about the same indicating evidence of semi-strong efficiency.

CONCLUSION:

Most of the market analysts felt that the Budget 2012 was going to be favorable to Fertilizers and Textile sector but the impact was quite the opposite as the results show that stocks prices in that sectors took a plunge. The analysts' expectation was a negative impact of Budget on Hotels sector and surprisingly the stock prices in the Hotels sector did experience decline in their prices. With respect to Paper sector, the anticipated impact of the

[13] Oracle Financials Services Software

Budget was negative but it was a mixed response, with some stocks witnessing rise in prices and others a fall in their prices. And finally, with respect to Pharmaceutical and Software sectors, the expected impact of the Budget was that there will be no effect i.e. neutral but a number of stocks in these sectors witnessed rise in their prices and a few of them saw a fall in their prices. In light of these results, there seems to be inconclusive evidence about overall impact of budget either on the stock market or a particular sector but the results seem to point in the direction that the effect of the Budget may be company-specific.

Further, our results shows that only 8 out of a sample of 76 stocks had statistically significant returns meaning that only for those 8 stocks, there is a difference between the returns in the pre-event period and returns in the event period. So, there seems to be chance to make abnormal returns for the investors. If the investor purchased a stock during the Budget period such as Tech Mahindra or NATCO or Aditya Birla Nuvo or Raymond, it would have resulted in a short-term gain. But at the same time purchasing a stock like Indo-Rama Synthetics or BRFL counting on Budget analysis reports, it would have resulted in a loss in the short-term. Our results suggest that the Investor should be very cautious while interpreting such reports. But for the rest 68 stocks, their returns in pre-event period and returns in the event period are about the same; therefore we do have evidence to conclude that the Indian stock market is semi-strong efficient.

The above findings of our study throw up some interesting possibilities for further research. Is the effect of Budget more on companies with particular type of shareholding pattern or are there any other company-specific factors? Is the effect of Budget more or less on particular sector(s) i.e., any industry-specific factors? Is capitalization a factor i.e. are large cap stocks more susceptible to the Budgets? The research in this area can be made more comprehensive and conclusive by conducting more such studies.

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