# Is the Indian Stock Market Efficiently Inefficient ? An Empirical Investigation

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## Abstract

**The present study examined the efficiency of the Indian stock market following event study methodology considering the Union Budget as an event. The daily data of selected 36 companies of different sectors over the period from 2000 - 2016 were considered for the analysis. We estimated standard capital asset pricing model for each company for : (a) the entire period, (b) each of the financial years, (c) 30 trading-days before announcement of the budgets, and (d) 30 trading-days after the announcement of the budgets. We found that βs of different companies varied over different time periods. The estimation of average excess return and cumulative average excess return of 30 trading days before and after the budgets over 16 years showed that the Indian stock market was informationally efficient in a semi-strong form. The short-term under-reaction/over-reaction represented by average excess return around the event period provided opportunities to earn abnormal profits and validated Shiller's argument. The cumulative average excess return converging to zero over the 30 trading days before and after the budgets also lent support to Fama's efficient market hypothesis. The study found that the budget is an important event for the Indian stock market, at least in the short time period. It is not necessarily required to trade/ invest in high β stocks ; rather, some trading/ investment strategies may be formulated to earn excess returns, particularly around the event. The arguments on market efficiency of both the schools of thought (Fama and Shiller) seemed to be visible and suggested that the Indian stock market may be "efficiently inefficient".**

***Keywords :*** **capital asset pricing model, budget effect, event study, efficient market hypothesis, stock market**

**JEL Classification : G11, G12, G14, G22, G23**

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The great divide of the Nobel Prize 2013 in economics between Fama, the pioneer of efficient market hypothesis (EMH) and Shiller and Hansen, the strong critics of EMH generated renewed interest to revisit the concept and empirical validity of market efficiency developed in the early 1970s. The area of research remained in the limelight and got further boost with the recognition of Thaler's contribution in behavioural economics for Nobel Prize 2017. The EMH says that 'the price is right' and 'there is no free lunch' and hence, one cannot beat the market. At any given point of time, stock prices reflect all available information in the market (Fama, 1970). On the other hand, behavioural economists (e.g. DeBondt & Thaler, 1985 ; Shiller, 2000) asserted that stock price movements are not necessarily a function of market efficiency.

Behavioral finance neither assumes that all available information is reflected in market prices, nor that

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investors are rational and/or utility maximizing (Shiller, 2000). According to Shiller, individuals act in their own self-interest and make mistakes. Investors do not always make optimal decisions, which may explain price swings. This argument goes against the foundation of EMH, which claims that market forces will always act to bring prices back to rational levels – this implies the impact of irrational behavior on financial markets is generally negligible, therefore, irrelevant.

According to Fama, the behavioural biases and irrational beliefs are not so pervasive so as to overwhelm the ability of arbitrage capital and available instruments dedicated to taking advantage of these mispricing. Grossman and Stiglitz (1980) showed that the theory of efficient markets entails a paradox since investors must have an incentive to collect information, and securities markets must entail an equilibrium level of disequilibrium. Their point is strengthened by the fact that investors pay large fees for active management. Shiller (2000) believed that security market prices deviate from fundamentals because people make mistakes and are subject to common biases that do not cancel out in aggregate.

The differences between EMH proponents and behaviourists arose on whether the instances of price overshooting are due to irrationality or inadequate asset pricing models. Pedersen (2015) premised that trading strategies present natural test of asset pricing theories and vice versa. According to him, prices are pushed away from their fundamental values because of a variety of demand pressures and institutional frictions. Although prices are kept in check due to intense competition among money managers, taking market to become inefficient to an efficient extent – just efficient enough that money managers can be compensated for their costs and risks through superior performance, and just efficient enough that the money rewarded to money management after all costs does not encourage entry of new managers or additional capital. So, market efficiency may be less than the beliefs of Fama and proponents of EMH, and more than the strong belief of Shiller and most practitioners. Thus, the market can be 'efficiently inefficient' (Pedersen, 2015).

How do we test whether markets are, in fact, efficient? You cannot say anything about market efficiency by itself. To be able to make any statement about market efficiency, you need to make some assertion of how the market should reflect information. So, you need an equilibrium model of how security prices are set (Asness & Liew, 2014). The EMH remains the dominant line of thought in asset pricing. This is reinforced by Fama in his Nobel Prize receiving speech. Fama (2014) said that, "I interpret this to include work on efficient capital markets and work on developing and testing asset pricing models - the two pillars, or perhaps more descriptive, the Siamese twins of asset pricing" (p. 1467). It is perhaps enviable to consider the testing of asset pricing models generating expected returns while testing market efficiency.

Over the years, market (in)efficiencies have been guiding the investment strategies to trade off the risks and returns in financial markets, albeit, partly. Fama, known as the father of the efficient market hypothesis, described CAPM as the first precise definition of risk and how it drives returns. The investment strategies principally need large academic attention due to major theoretical advancement in financial theory. Event driven investment is an opportunistic strategy of investing around corporate specific events and possibly market - wide events (Pedersen, 2015). Around the event, in a short time, $\beta$ may change, however, it should converge to long term $\beta$ over medium term, 30 to 45 days to assess market efficiency.

It is understandable why hardly there is any event study at the international level which considers budget as an event to examine market efficiency. In India, there are studies available to test the market efficiency, particularly on weak form tests. However, very few studies have been conducted to test the semi-strong form of market efficiency based on event study methodology at a company - specific level. With this background, the present study seeks to examine the effect of the budget and the efficiency of the Indian stock market following event study methodology.

## Review of Literature

Historically, the empirical work on market efficiency earlier began with its classification given by Fama (1970). The empirical literature may broadly be summarized as follows. Initial studies were concerned with weak form mostly based on the random walk model followed by semi-strong form in which the concern is the speed of price adjustment to publicly available information ; for example, announcements of stock splits, annual reports, new security issues, etc. Testing the strong form of market efficiency is very difficult due to the monopolistic access of any investor or groups to any information relevant for the formation of prices. The empirical results on market efficiency are mixed in nature. While most of the studies invalidated the semi-strong and strong forms of market efficiency, opinions are divided on the presence of weak form of market efficiency. The detailed review of literature may be found in some of the research papers (e.g. Ashraf & Baig, 2015 ; Binder, 1998 ; Fama, 1970 ; Titan, 2015).

There are many studies on market efficiency based on event study methodology available at the international level, more prominently under the heading of January Effect (JE) and Other January Effect (OJE). Rozeff and Kinney (1976) were the first to provide empirical evidence of JE for the U.S. economy. The research at the disaggregated level of firms revealed that JE was primarily concentrated in smaller firms, and the effects were shown to negatively correlate to stock size, that is, small size stocks were affected more than the other stocks (Keim, 1983). The existence of JE in the riskier small cap stocks were due to the expectation of making a higher return in the new year (Ritter, 1988). The literature suggested that the high returns in January may be explained by the window dressing hypothesis and tax - loss selling hypothesis. In the Indian context, however, these are subject of empirical verifications may be with reference to budget, not the calendar year.

To understand the effect of the events, different frequencies of data were used. Again, some studies analyzed the reaction on a short time period (in the first few days after distinct types of announcements) in the idea that the prices of financial assets quickly react to new information, so that the efficiency of capital markets is confirmed. It is assumed that prices gradually adjust to new information released, and hence, a longer time period is considered to test the market efficiency in the medium to long term. Fama, Fisher, Jensen, and Roll (1969) excluded the data of 15 months before and after the split for all securities under consideration, following statistical criteria in their empirical study. According to Titan (2015) :

> Fama, Fisher, Jensen and Roll (1969) analyzed 940 split events between 1927 and 1959, concluding that the largest positive abnormal returns are recorded in the first 3-4 months after the announcement, sustaining in this way the gradual adjustment of prices on capital markets. (p. 444)

Moller and Zilca (2008) found that the decline in the magnitude of the JE was confirmed by daily data analysis ; whereas, monthly analysis did not provide any conclusive evidence. Keim (1983) expected that as much as 50% of the JE was concentrated in the first few trading days of the year. These provided a strong rationale for studying the daily pattern of returns.

The event study methodology has, in fact, become the standard method of measuring security price reaction to some announcement or event. In practice, event study has been used to test the null hypothesis that the market efficiently incorporates information (Binder, 1998). The event study methodology can be used to recognize market efficiency in the semi-strong form. If a market is efficient in a semi-strong form, trading rules based on publicly available information are in suspect (Elton, Gruber, Brown, & Goetzmann, 2014). The studies invalidated EMH by finding that stocks obtain abnormal negative return or higher abnormal return (e.g. Klock & Bacon, 2014 ; Moller & Zilca, 2008).

Different methods were employed to study the effects of events that generated excess/abnormal returns in the market. The scientific way to generate excess returns comes from some equilibrium model of capital markets. The models of equilibrium in the capital markets are being revisited both theoretically and empirically. The capital asset pricing model (CAPM) is one such model, which is being verified empirically in alternative forms following different methodologies for various economies. Largely, studies use standard CAPM developed independently by Sharpe, Linter, and Mossin in the 1960s.

However, the availability of literature on event study methodology is very scanty in the Indian context. Generally, event studies in India have considered dividend declaration, rights issue, insider's trading, and corporate events announcement as events in line with the literature is available at the international level (e.g. Joshipura, 2009 ; Majumder, 2013 ; Mehndiratta & Gupta, 2010 ; Mishra, 2007 ; Prabakaran & Ganesan, 2016 ; Rahmanizadeh & Mahesh, 2015 ; Safitri & Asandimitra, 2016 ; Sharma, 2011). To sum up, though some studies found excessive returns/abnormal returns during the post events period, most of the studies concluded that there is inefficiency in the Indian stock market.

Though Thomas and Shah (2002) recognized the importance of budget for stock market analysis, they, however, restricted their analysis to the stock market index which failed to capture the dynamics of fluctuations of individual stock prices. Following them, there are few studies, which considered the role of the budget in the stock market in India (e.g. Gakhar, Kushwaha, & Ashok, 2015 ; Pandya, 2014 ; Rajamohan & Muthukamu, 2015 ; Saraswat & Banga, 2012 ; Singhvi, 2014). Gakhar et al. (2015) provided a brief review of previous studies. The present study is methodologically different from the previous studies and is wider in coverage as it considers individual companies for analysis over a longer period of time.

## Data and Methodology

The present study attempts to investigate the market efficiency based on the event, the budget. We have analyzed the average returns of the stocks in CNX Nifty 100 around the announcement of the budget dates during the study period from 2000 to 2016. We consider individual firms in our study for the analysis. Generally, investment and portfolio building are about a firm action and what happens to the price movement. An index would average out reactions of 30 or 50 stocks and probably generate underestimated β. To an extent, the present study is also limited to the stock market, individual stocks, and stock indices, not to a broad-based market portfolio as envisaged by CAPM [1].

The study is based on daily data over the sample period from January 3, 2000 to July 15, 2016. The adjusted closing prices of all the companies listed in CNX-100 of India were collected. However, finally, 36 companies were considered on the ground of availability of data for the entire study period [2]. The data were collected from Bloomberg Database and missing data were filled up from NSE/BSE websites. Only the Central government's annual budgets are considered and budget dates were collected from the website of Ministry of Finance, Government of India.

The empirical analysis of budget effects (BE) on individual stocks draws an analogy from the event study methodology developed by Fama et al. (1969).

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[1] In literature, the abnormal returns are measured as residuals from some benchmark model of normal returns, e.g. the market model. Klock and Bacon (2014) estimated the stock price's risk adjusted rate of return by estimating the CAPM model. A number of studies simply use the return on a market index as proxy for the expected return. Any of the equilibrium models could be used to define expected returns (Elton et al., 2014). We have estimated the market model and derived the excess return of the stocks. However, other versions like three- factor models (Fama & French, 1993) and five-factor model (Fama & French, 2015) are available.

[2] The data for LT and LUPIN were not available respectively for the period from May 24, 2004 - June 22, 2004 and from July 16, 2001- September 07, 2001.

The basic CAPM model is specified as:

$$E(r_j) = r_f + \beta_j [E(r_m) - r_f] \quad (1)$$

where, $E(r_j)$ and $E(r_m)$ are respectively the expected rate of return on security $j$ and market ; $r_f$ is risk free rate of return and $\beta_j$ is risk coefficient.

To understand the risk associated with the stocks, we need to calculate/estimate β. The βs can be estimated as covariance between stock returns and market returns or estimating market model. We have estimated the market model of the form :

$$r_{j,t+1} = \alpha_j + \beta_j r_{m,t+1} + u_{j,t+1} \quad (2)$$

where, $r_{j,t+1}$ is rate of return on security $j$ for day $t$, $r_{m,t+1}$ is rate of return on market index $m$ for day $t$, $u_{j,t+1}$ is the random disturbance term. The estimated parameters α and β are assumed to remain constant over the study period, and the estimated $u_{j,t+1}$ is assumed to be independent of $r_{m,t+1}$.

The expected return for each company $j$ is calculated as :

$$E(r_j) = \hat{\alpha_j} + \hat{\beta_j} r_m \quad (3)$$

The excess return (ER) can be calculated as the difference between actual return and expected return. The average excess return (AER) can be calculated as :

$$AER = (\sum_{i=1}^{n} ER_i)/n \quad (4)$$

where, $n$ is the number of firms in the study.

The cumulative average excess return (CAER) can be calculated by adding successive AER as:

$$CAER = \sum^{n=1} AER_i \quad (5)$$

The stability of β is examined simply by looking at the movement of yearly βs against subsequent yearly β and that of long term, which we assumed in our study, is the entire study period of 16 years. We have also considered βs of the pre-30 and post-30 trading days of the announcement of budgets to examine the stability with the occurrence of an event. The AER and CAER are estimated before and after the event to assess efficiency of the Indian stock market[3].

## Empirical Analysis and Discussion of Results

The study uses daily data to investigate the BE as literature suggests that it may give better picture of the evolution of the pattern. We have estimated the market models of all the 36 companies over the sample period of January 3, 2000 to July 15, 2016 of all the financial years from 2000-01 to 2015-16, and of 30 days before and after announcement of the main annual budgets during the entire period (the list of companies are given the Table 1)[4]. This turns out to be 16 budgets over the study period and 1764 estimated models[5].

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[3] Klock and Bacon (2014) estimated the stock prices' risk adjusted rate of return by estimating CAPM model and examined the stock price returns 30 days before and after the last trading day for three consecutive years and analyzed how this information affected trading to see if investors could earn an abnormal rate of return in January of the new year.

[4] We have ignored the interim budgets as no serious changes in the policy instruments were announced. It is also to be noted that we have only 10 observations for LT in the estimation of pre-budget β for the year 2004, which may not be sufficient for time series regression.

[5] It is to be noted that the time series requirements of stationarity test, autocorrelation problems, etc. are taken care of in the estimation of the model.

**Table 1. Industry - Wise List/Profiles of the Selected Companies**

| S. No. | Symbol | Company Name | Industry | S. No. | Symbol | Company Name | Industry |
|---|---|---|---|---|---|---|---|
| 1 | ACC | ACC Ltd. | Cement & Cement Products | 19 | BPCL | Bharat Petroleum Corporation Ltd. | Energy |
| 2 | AMBUJACEM | Ambuja Cements Ltd. | Cement & Cement Products | 20 | GAIL | GAIL (India) Ltd. | Energy |
| 3 | GRASIM | Grasim Industries Ltd. | Cement & Cement Products | 21 | ONGC | Oil & Natural Gas Corporation Ltd. | Energy |
| 4 | ASIANPAINT | Asian Paints Ltd. | Consumer Goods | 22 | RELIANCE | Reliance Industries Ltd. | Energy |
| 5 | HINDUNILVR | Hindustan Unilever Ltd. | Consumer Goods | 23 | TATAPOWER | Tata Power Co. Ltd. | Energy |
| 6 | ITC | I T C Ltd. | Consumer Goods | 24 | CIPLA | Cipla Ltd. | Pharma |
| 7 | AXISBANK | Axis Bank Ltd. | Financial Services | 25 | DRREDDY | Dr. Reddy's Laboratories Ltd. | Pharma |
| 8 | BANKBARODA | Bank of Baroda | Financial Services | 26 | LUPIN | Lupin Ltd. | Pharma |
| 9 | HDFC | Housing Development Finance Corporation Ltd. | Financial Services | 27 | SUNPHARMA | Sun Pharmaceutical Industries Ltd. | Pharma |
| 10 | HDFCBANK | HDFC Bank Ltd. | Financial Services | 28 | HCLTECH | HCL Technologies Ltd. | IT |
| 11 | ICICIBANK | ICICI Bank Ltd. | Financial Services | 29 | INFY | Infosys Ltd. | IT |
| 12 | INDUSINDBK | IndusInd Bank Ltd. | Financial Services | 30 | WIPRO | Wipro Ltd. | IT |
| 13 | KOTAKBANK | Kotak Mahindra Bank Ltd. | Financial Services | 31 | BHEL | Bharat Heavy Electricals Ltd. | Industrial Manufacturing |
| 14 | SBIN | State Bank of India | Financial Services | 32 | HINDALCO | Hindalco Industries Ltd. | Metals |
| 15 | BOSCHLTD | Bosch Ltd. | Automobile | 33 | TATASTEEL | Tata Steel Ltd. | Metals |
| 16 | HEROMOTOCO | Hero MotoCorp Ltd. | Automobile | 34 | LT | Larsen & Toubro Ltd. | Construction |
| 17 | M&M | Mahindra & Mahindra Ltd. | Automobile | 35 | VEDL | Vedanta Ltd. | Mining |
| 18 | TATAMOTORS | Tata Motors Ltd. | Automobile | 36 | ZEEL | Zee Entertainment Enterprises Ltd. | Media & Entertainment |

Source: Authors' compilation, taking the list from NSE website.

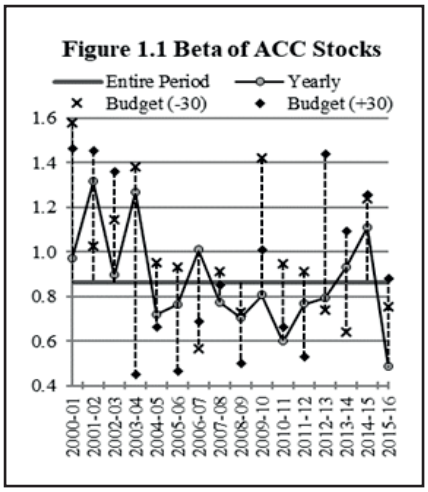
The $\beta$ coefficients are estimated from the market models, and the result shows that mostly, the $\beta$ coefficients are statistically significant ; whereas, $\alpha$ coefficients are statistically insignificant in some cases. However, presence of insignificant $\alpha$ coefficients in the models produced better results, and hence, we finally kept it in all the estimated equations [6]. The results show that only in 28 out of 1764 models, the $\beta$ coefficient carries a negative sign. However, the negative $\beta$s are mostly statistically insignificant.

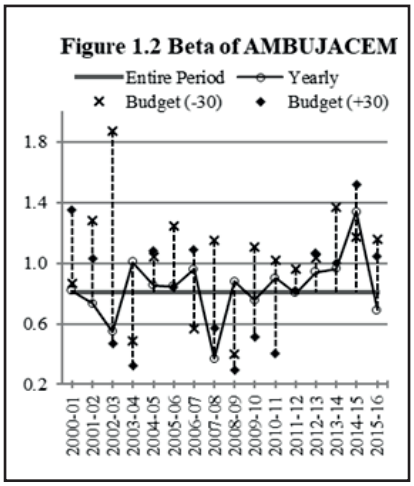
The mathematical results provide the long-term beta as well as that around the event, the budget. The beta does react to the expected flow of information and then to the actual unfolding of information in the budget. This provides a firm a statistical base to understand in what ways and to what extent is the market inefficient, and the different reaction of the returns around the budget is the basis as to how an investor or a trader can exploit this.

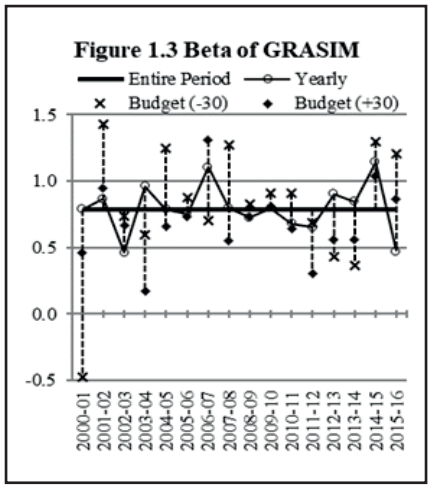
The estimated $\beta$s of individual stocks over different periods of time are presented in the Figure 1 (Figures 1.1 through 1.36) for clear view and analysis. From the figures, it is clearly evident that pre- and post- budget $\beta$ differs significantly within and across the years between themselves as well as yearly and during the entire study period (long term) $\beta$. The yearly $\beta$ moves generally along the long term $\beta$, but there is considerable variation over time and

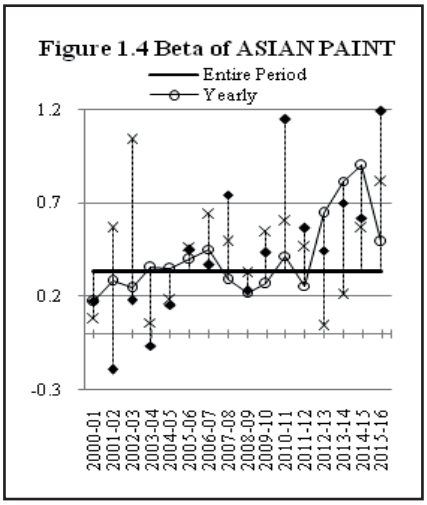
[6] The results are not presented in the paper to minimize space. However, it can be made available on request.

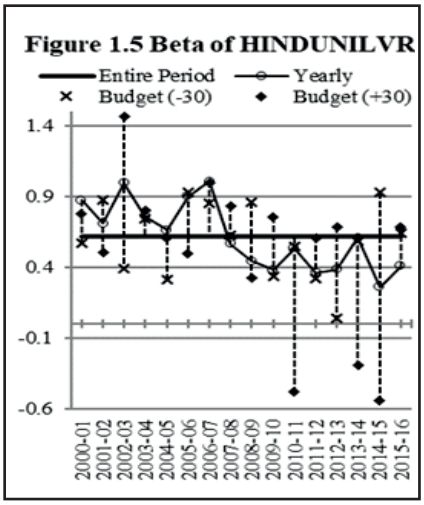
**Figure 1. Estimated βs of Selected 36 Stocks in Different Periods**

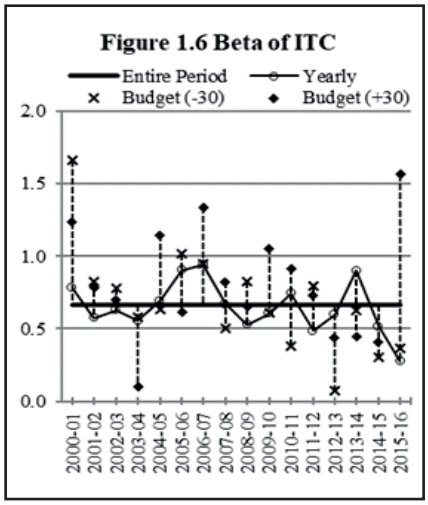


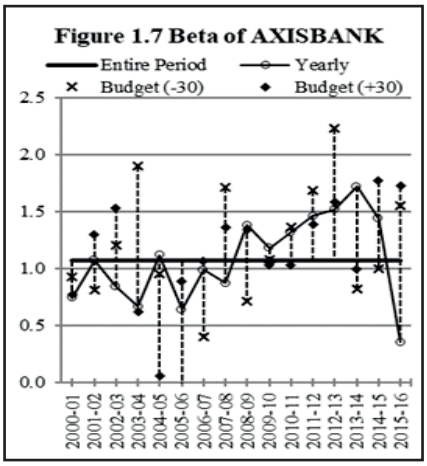



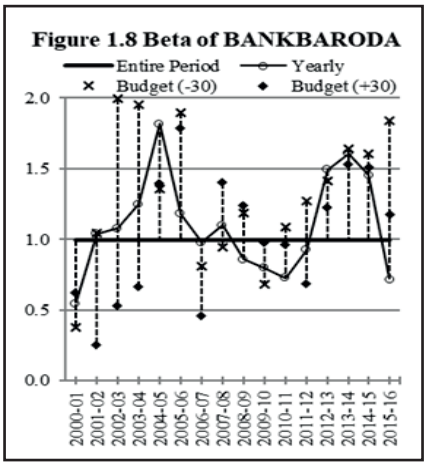



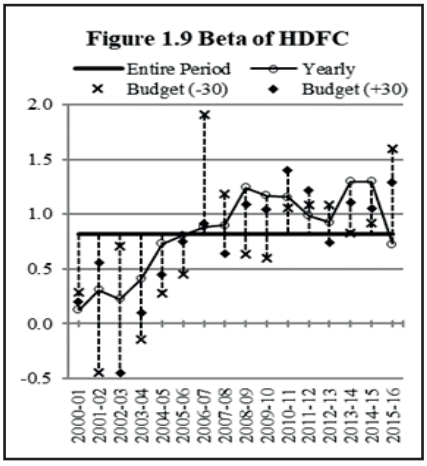



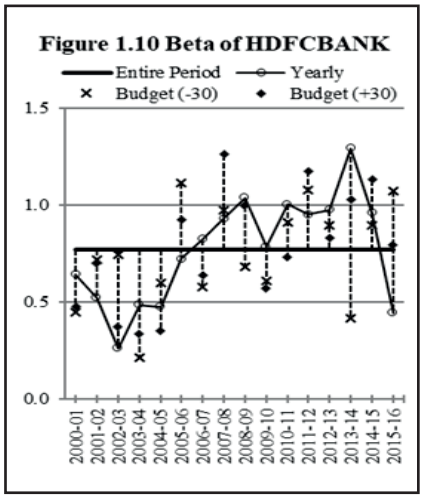


Figure 1.10 Beta of HDFCBANK
Entire Period
Yearly
Budget (-30)
Budget (+30)

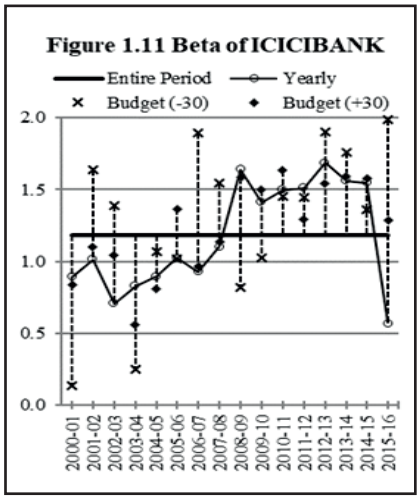


Figure 1.11 Beta of ICICIBANK
Entire Period
Yearly
Budget (-30)
Budget (+30)

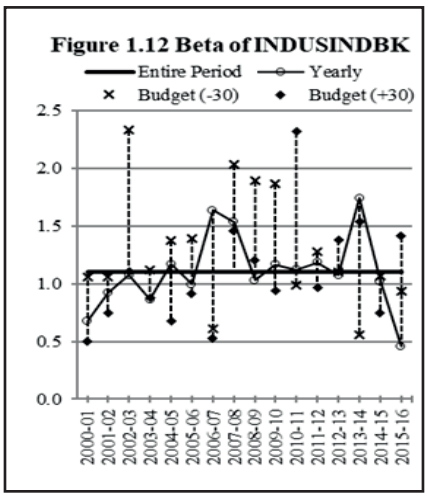


Figure 1.12 Beta of INDUSINDBK
Entire Period
Yearly
Budget (-30)
Budget (+30)

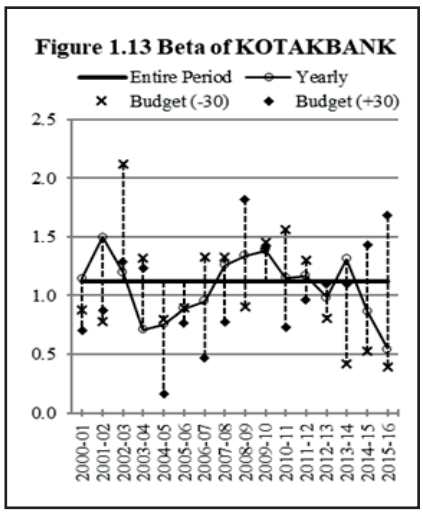


Figure 1.13 Beta of KOTAKBANK
Entire Period
Yearly
Budget (-30)
Budget (+30)

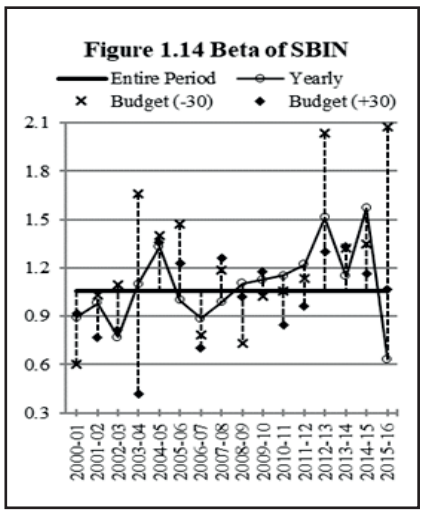


Figure 1.14 Beta of SBIN
Entire Period
Yearly
Budget (-30)
Budget (+30)

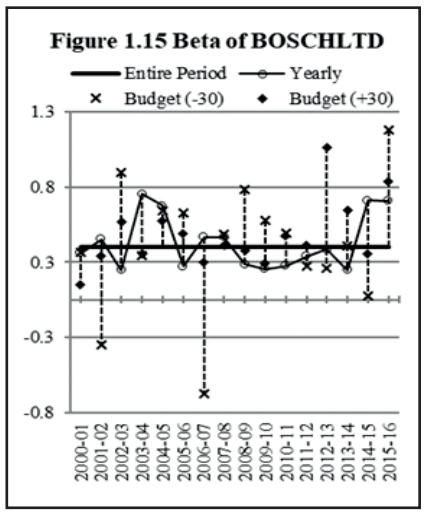


Figure 1.15 Beta of BOSCHLTD
Entire Period
Yearly
Budget (-30)
Budget (+30)

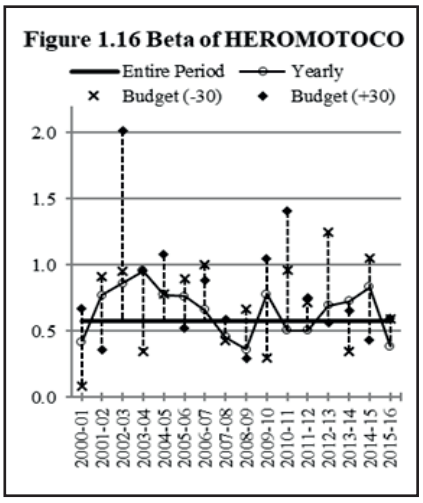


Figure 1.16 Beta of HEROMOTOCO
Entire Period
Yearly
Budget (-30)
Budget (+30)

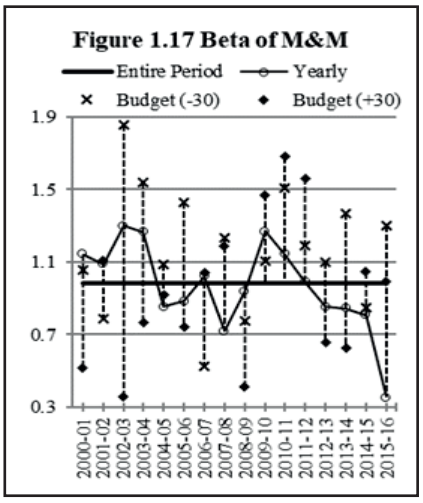


Figure 1.17 Beta of M&M
Entire Period
Yearly
Budget (-30)
Budget (+30)

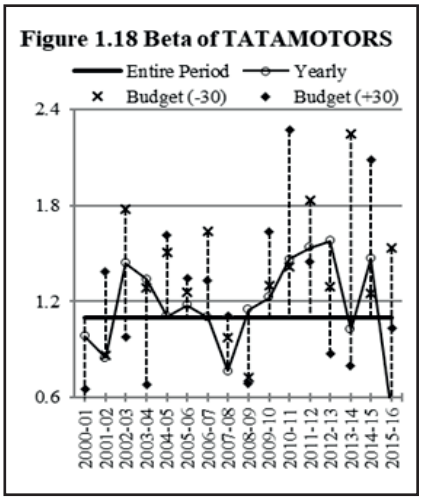


Figure 1.18 Beta of TATAMOTORS
Entire Period
Yearly
Budget (-30)
Budget (+30)

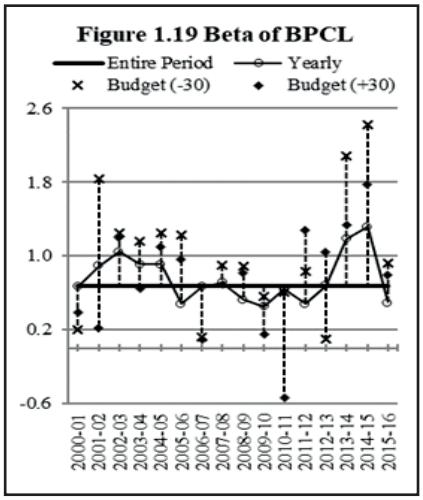


Figure 1.19 Beta of BPCL
Entire Period
Yearly
Budget (-30)
Budget (+30)

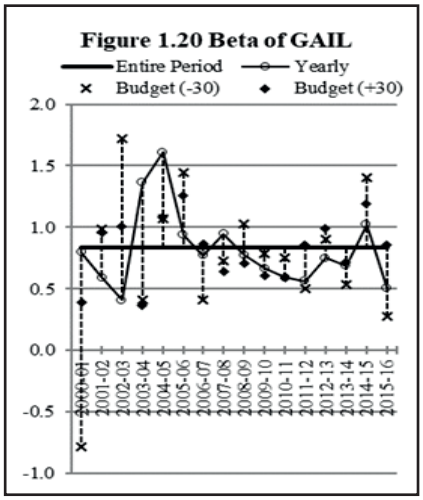


Figure 1.20 Beta of GAIL
Entire Period
Yearly
Budget (-30)
Budget (+30)

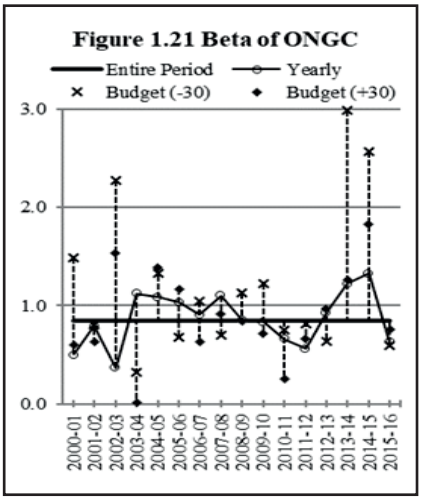


Figure 1.21 Beta of ONGC
Entire Period
Yearly
Budget (-30)
Budget (+30)

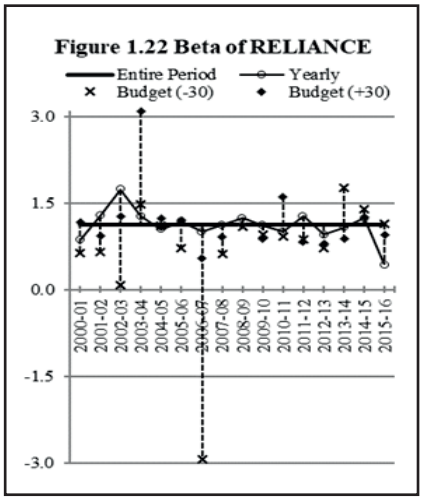


Figure 1.22 Beta of RELIANCE
Entire Period
Yearly
Budget (-30)
Budget (+30)

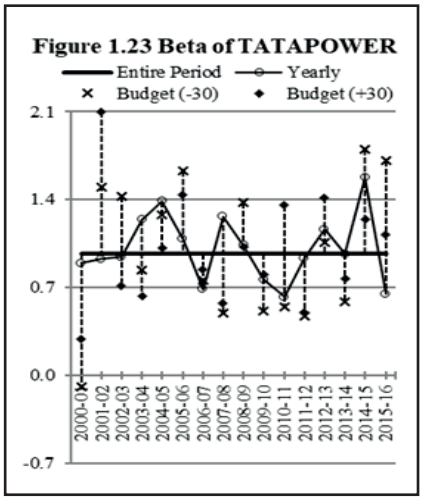


Figure 1.23 Beta of TATAPOWER
Entire Period
Yearly
Budget (-30)
Budget (+30)

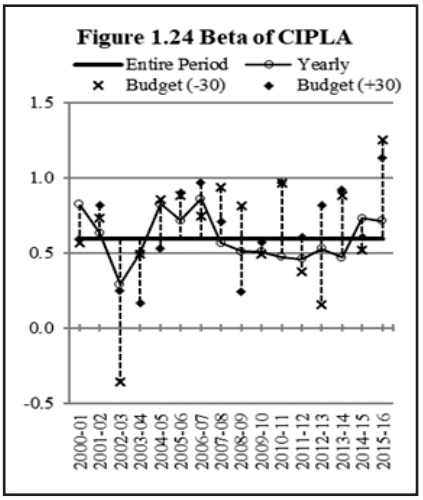


Figure 1.24 Beta of CIPLA
Entire Period
Yearly
Budget (-30)
Budget (+30)

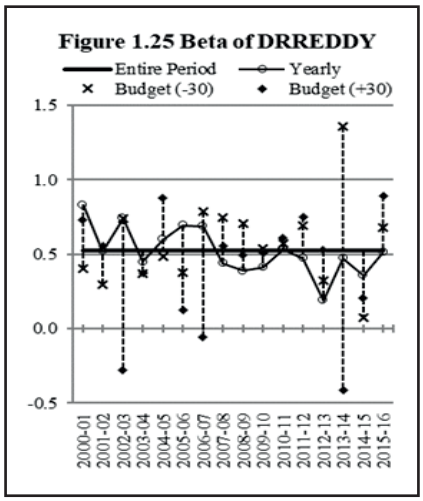


Figure 1.25 Beta of DRREDDY
Entire Period
Yearly
Budget (-30)
Budget (+30)

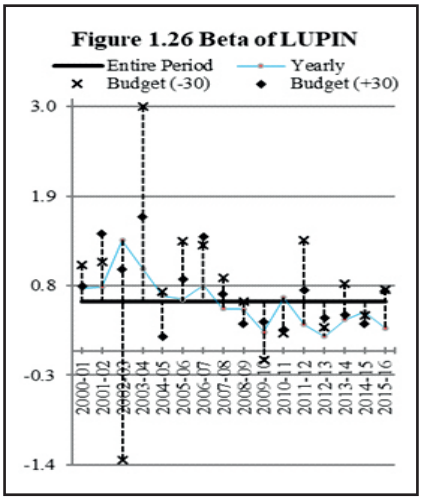


Figure 1.26 Beta of LUPIN
Entire Period
Yearly
Budget (-30)
Budget (+30)

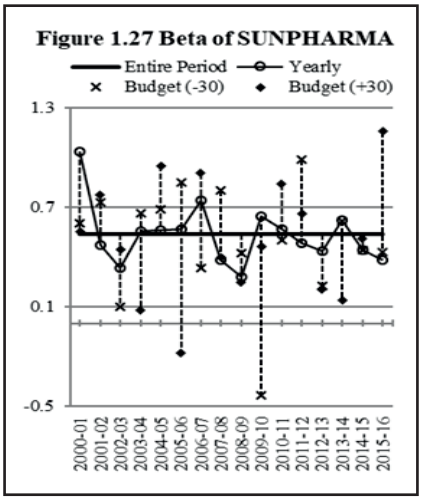
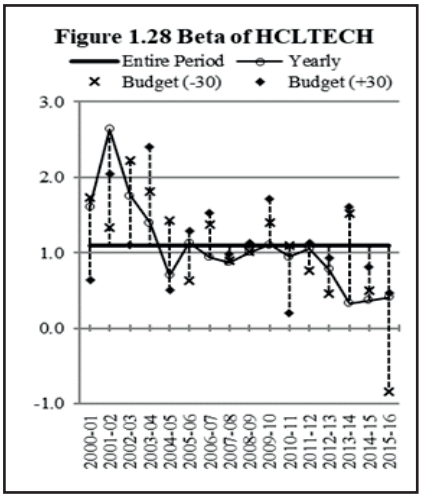
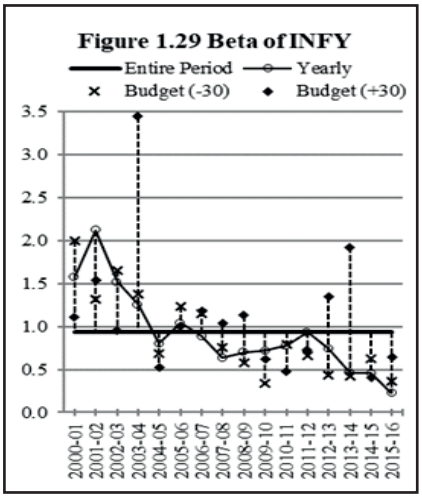
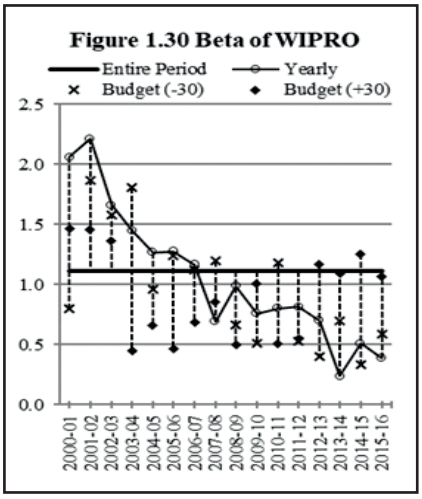
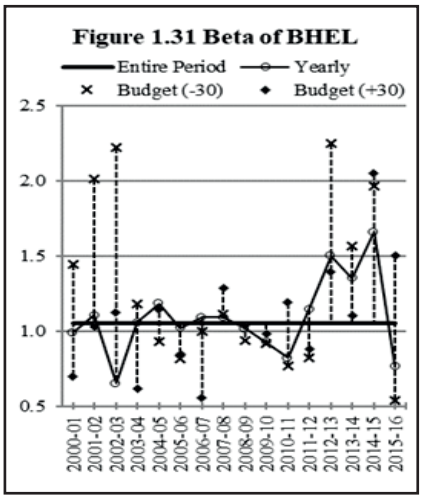


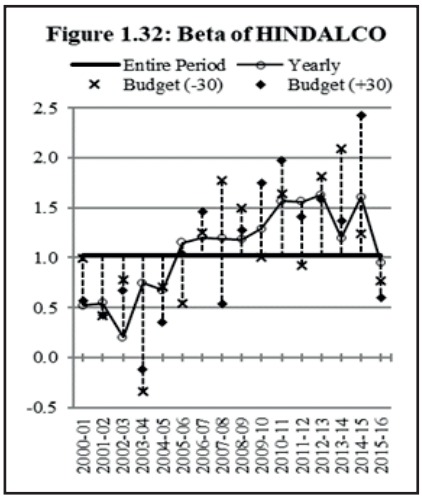
Figure 1.27 Beta of SUNPHARMA
Entire Period
Yearly
Budget (-30)
Budget (+30)

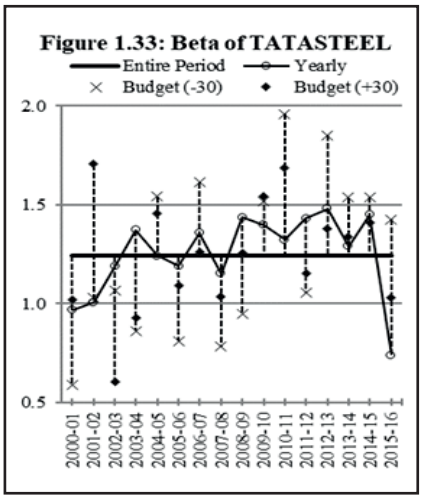


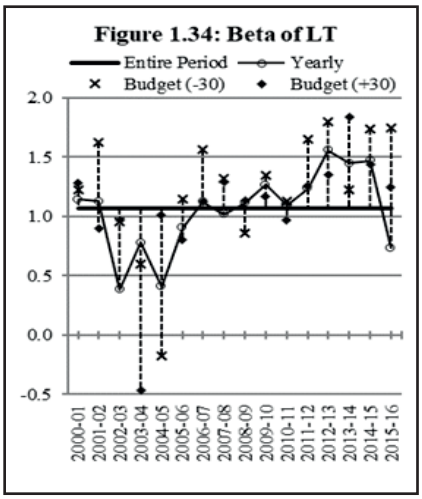



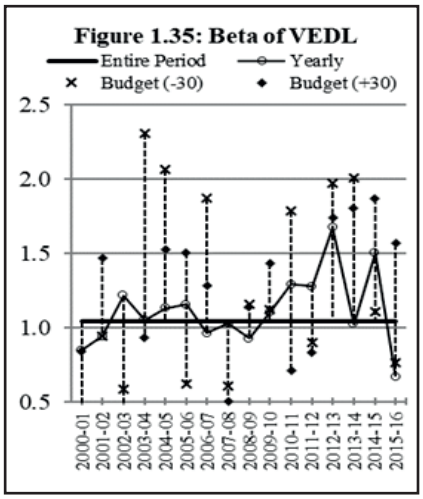



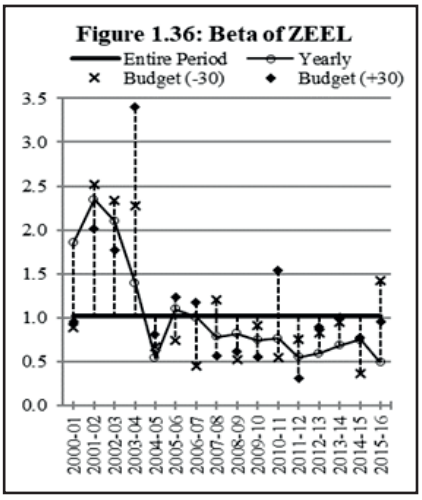



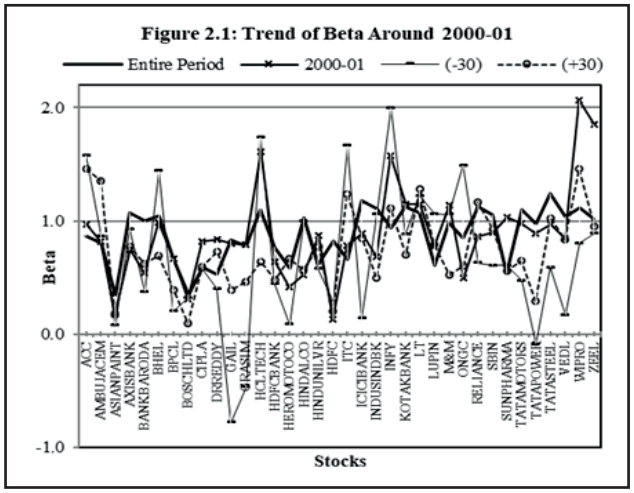



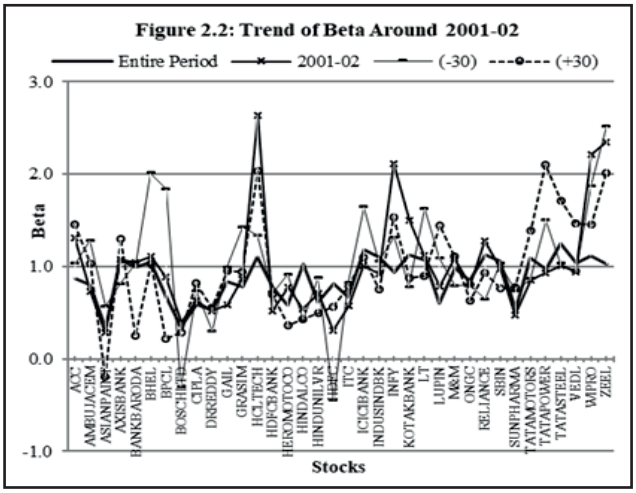



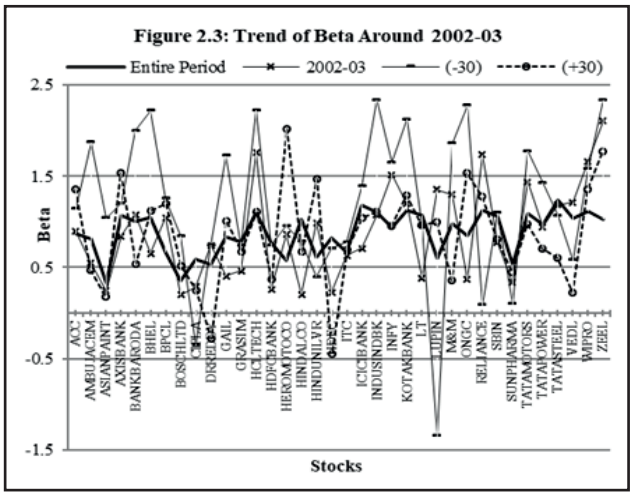



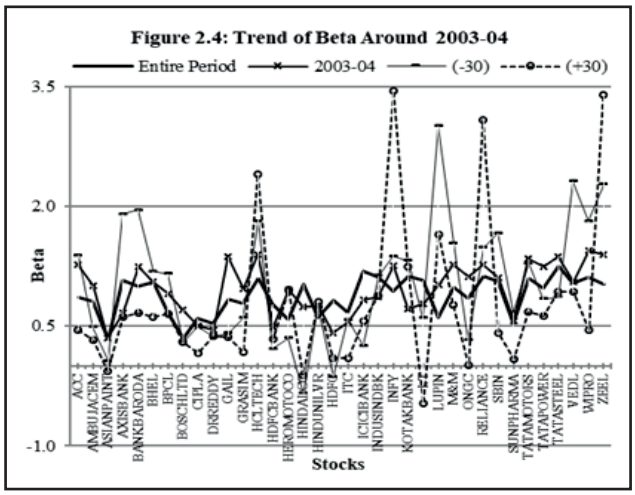

Source: Authors' estimation from the data compiled from Bloomberg Database, and NSE & BSE websites.

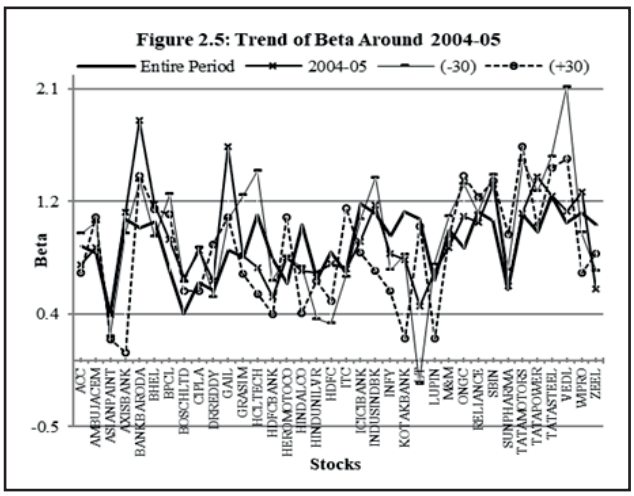
**Figure 2. Movement of Beta Around Budget Across Different Stocks During 2000-01 to 2015-16**

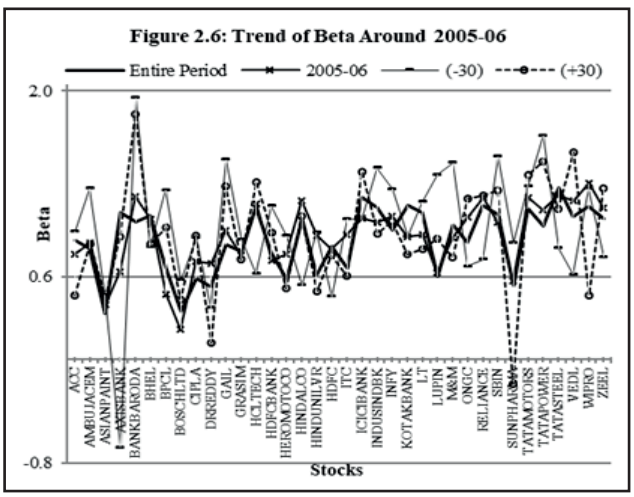


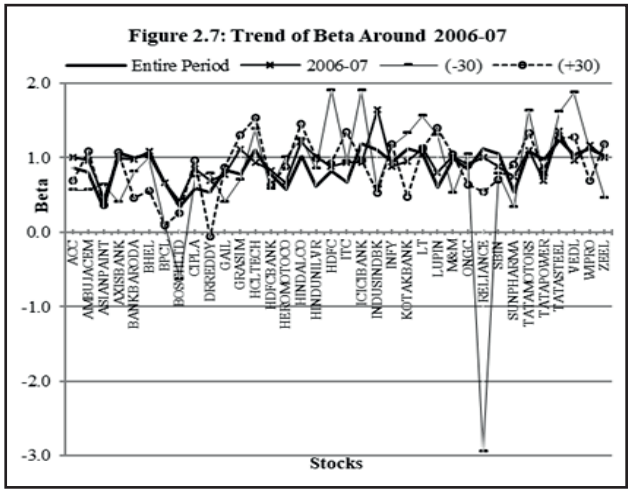


Figure 2.7: Trend of Beta Around 2006-07
Entire Period
2006-07
(-30)
(+30)
Beta
Stocks

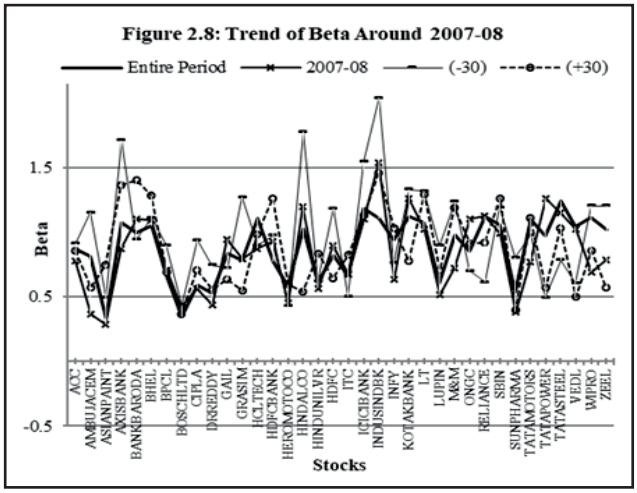


Figure 2.8: Trend of Beta Around 2007-08
Entire Period
2007-08
(-30)
(+30)
Beta
Stocks

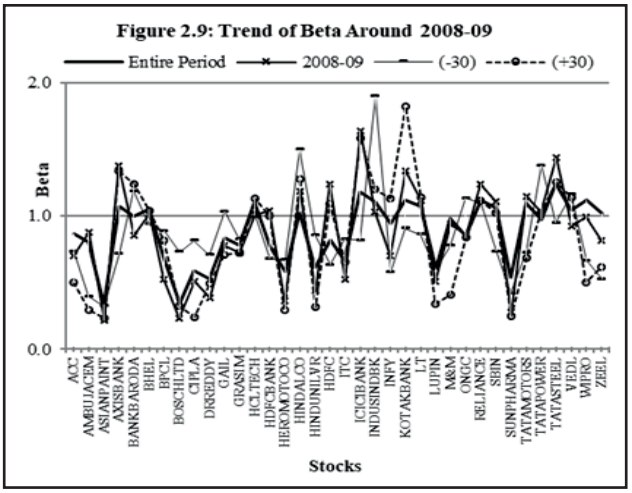


Figure 2.9: Trend of Beta Around 2008-09
Entire Period
2008-09
(-30)
(+30)
Beta
Stocks

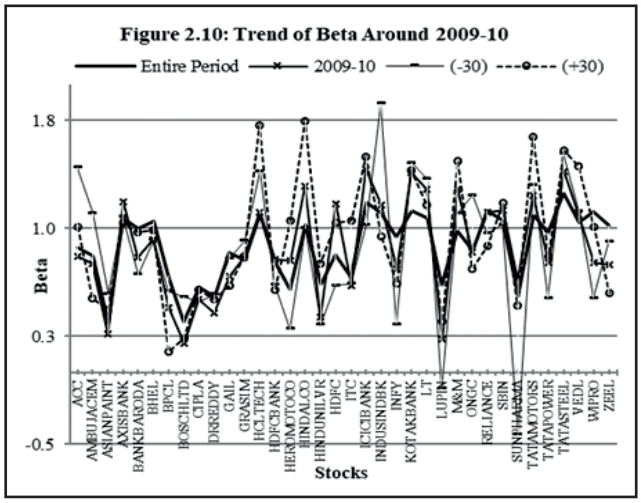


Figure 2.10: Trend of Beta Around 2009-10
Entire Period
2009-10
(-30)
(+30)
Beta
Stocks

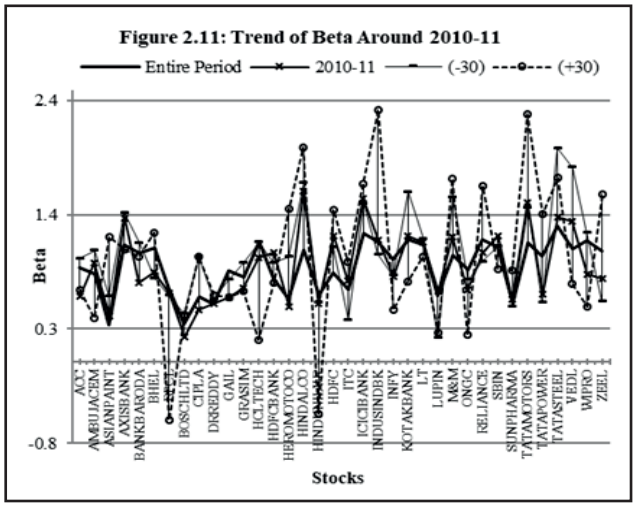


Figure 2.11: Trend of Beta Around 2010-11
Entire Period
2010-11
(-30)
(+30)
Beta
Stocks

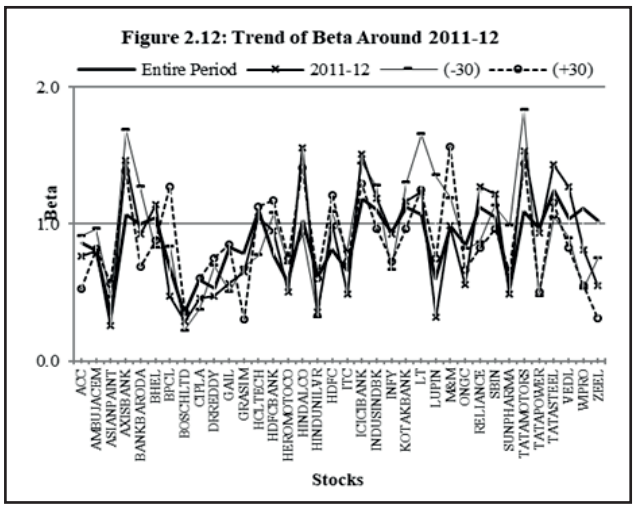
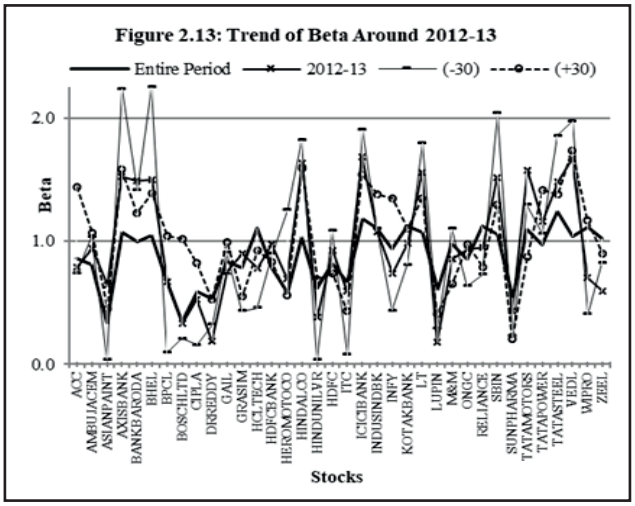
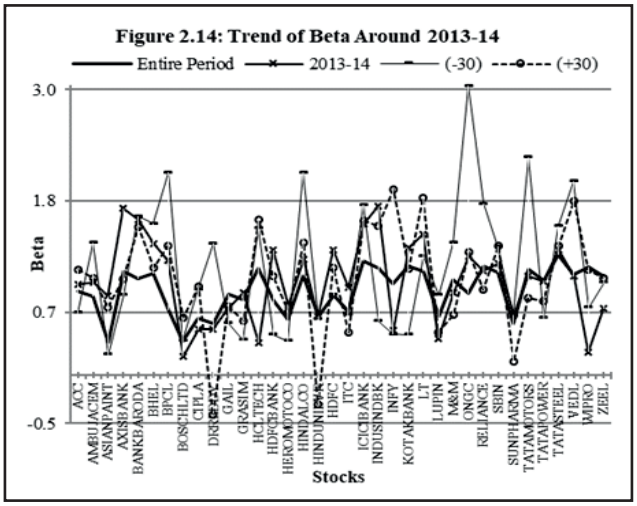
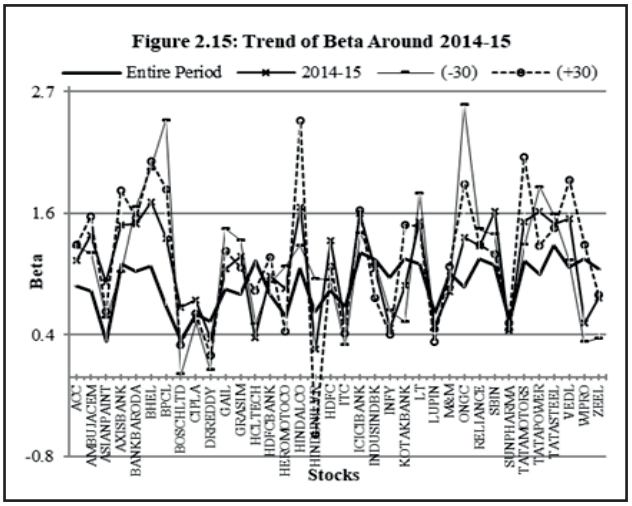
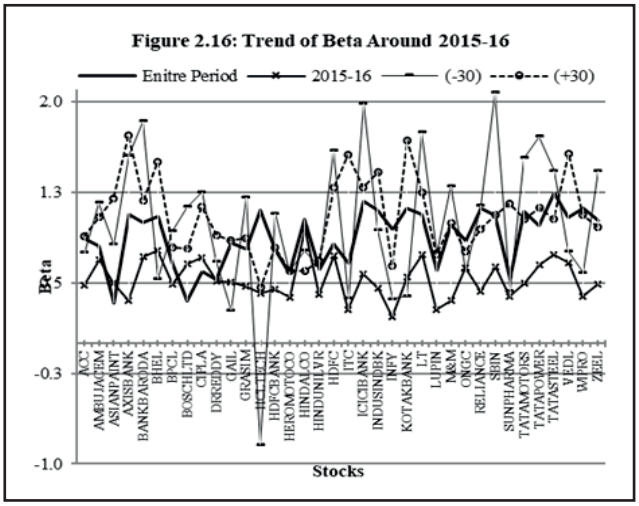


Figure 2.12: Trend of Beta Around 2011-12
Entire Period
2011-12
(-30)
(+30)
Beta
Stocks




Source: Authors' estimation from the data compiled from Bloomberg Database, and NSE & BSE websites.

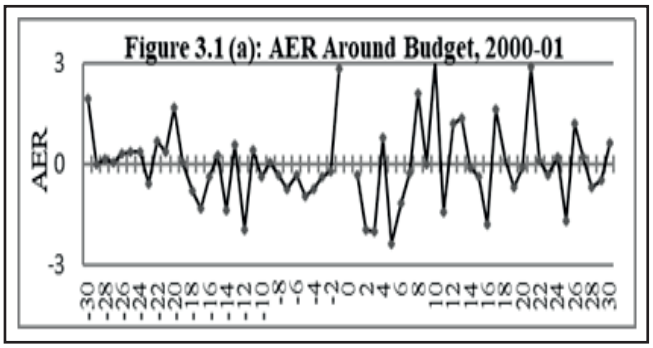
some broad patterns are visualized for specific industries.

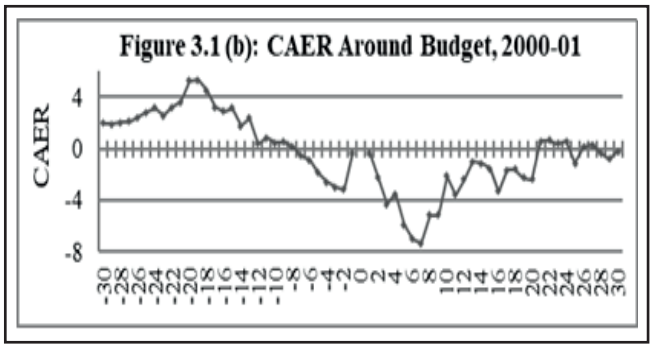
We have presented βs of different stocks around each year's budget against that of the entire study period in Figure 2 (Figures 2.1 through 2.16). From the figures, we can see that in general, the estimated βs of different companies do not exhibit any clear trend over time and around 30 trading days of budget announcement. The β shows a tendency to be below and above one. This provides opportunities for trading/investment because of varying β (risk).

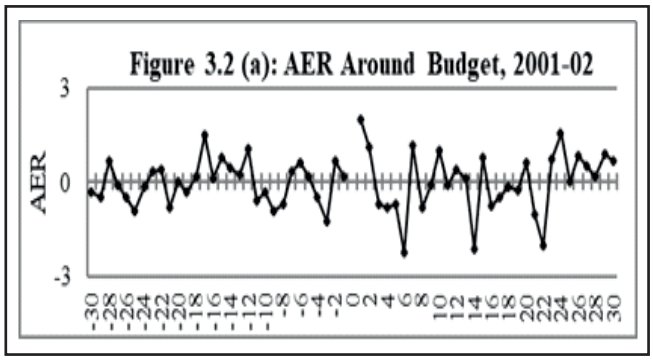
The difference between pre- and post- budget β are very large in values, but do not show any clear trend. As a result, it is difficult to frame any long-term trading or investment strategies around the budget based on β. Because of time varying β over the 16 years, there are perhaps opportunities in the market for the investors to adopt 'buy and hold strategy' as well as 'timing the market' depending on the risk profile. As it is difficult to predict β around the event, can we say it is random and/or efficiently inefficient?

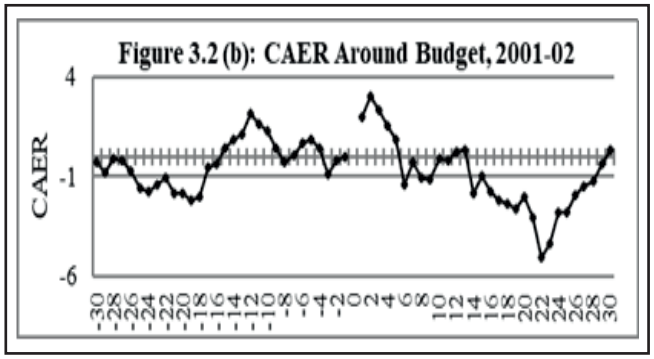
The results show that mostly, pre-budget β is higher than post-budget β. It is in line of general expectation as

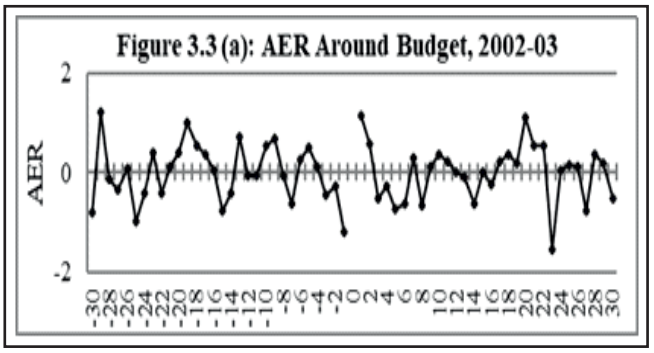
**Figure 3. Year - Wise Estimation of AER and CAER Around Budget During 2000-01 to 2015-16**

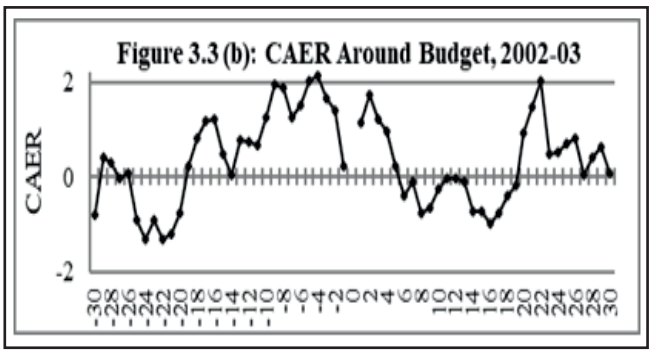


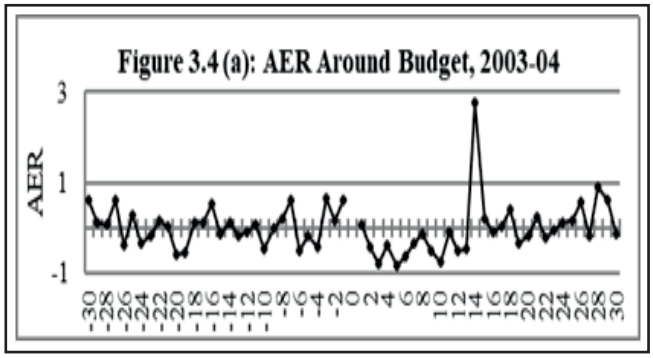



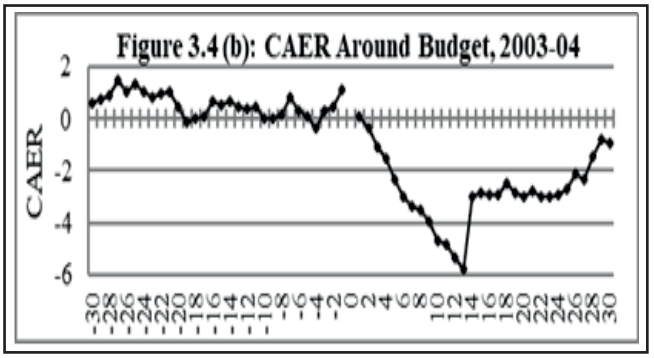



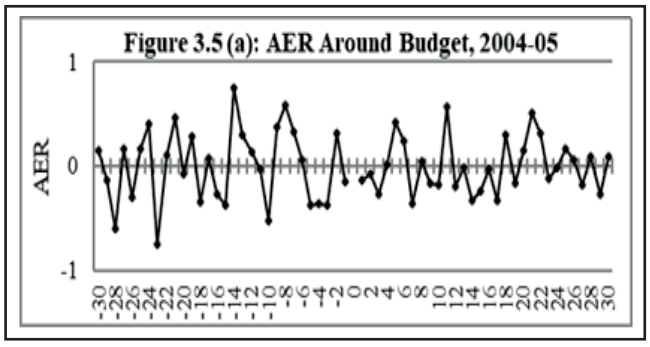


Figure 3.5 (a): AER Around Budget, 2004-05
AER
1
0
-1

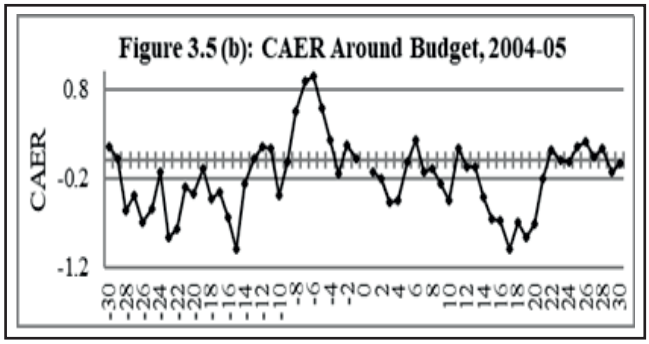


Figure 3.5 (b): CAER Around Budget, 2004-05
CAER
0.8
-0.2
-1.2

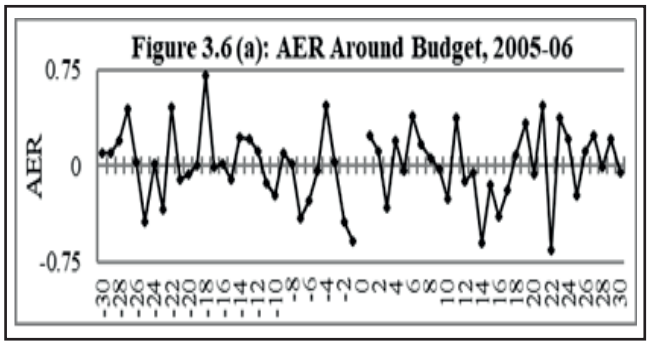


Figure 3.6 (a): AER Around Budget, 2005-06
AER
0.75
0
-0.75

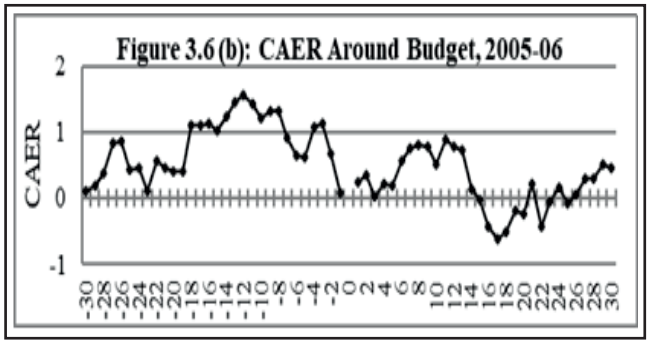


Figure 3.6 (b): CAER Around Budget, 2005-06
CAER
2
1
0
-1

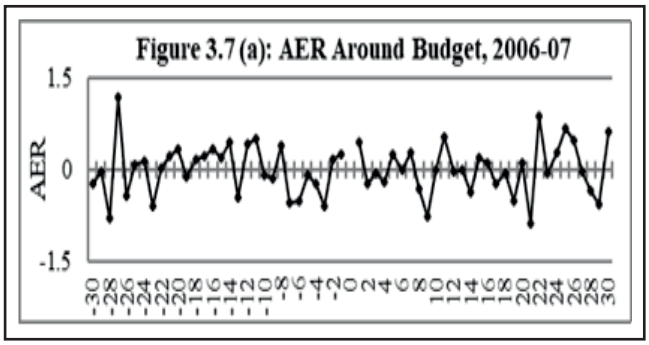


Figure 3.7 (a): AER Around Budget, 2006-07
AER
1.5
0
-1.5

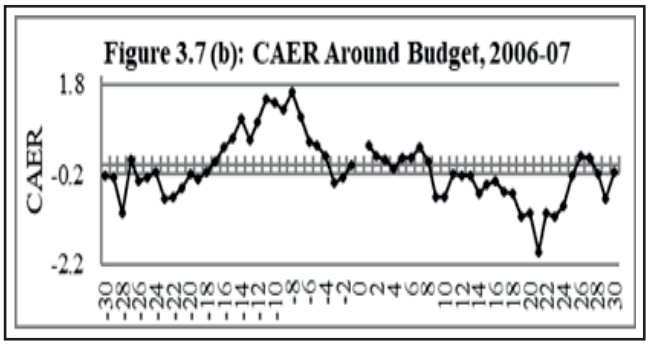


Figure 3.7 (b): CAER Around Budget, 2006-07
CAER
1.8
-0.2
-2.2

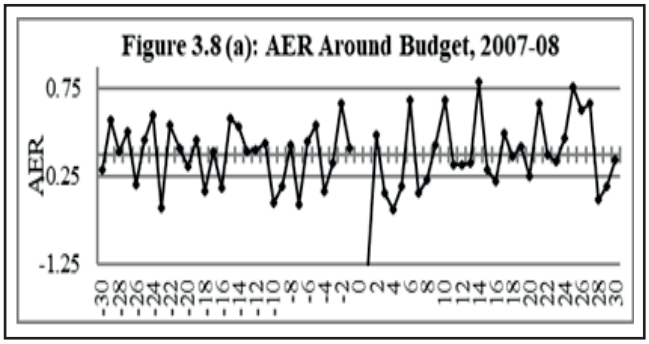


Figure 3.8 (a): AER Around Budget, 2007-08
AER
0.75
0.25
-1.25

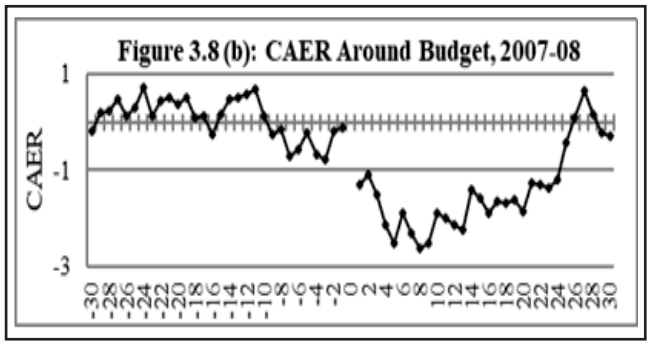


Figure 3.8 (b): CAER Around Budget, 2007-08
CAER
1
-1
-3

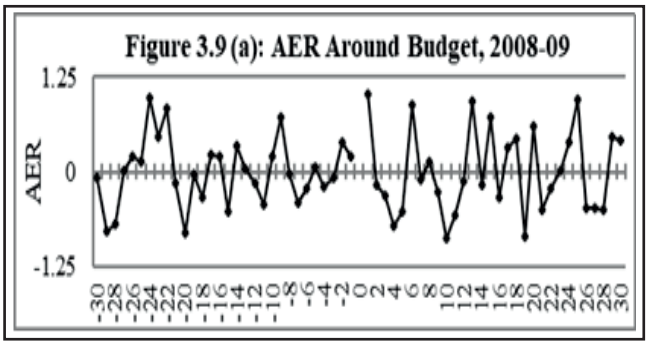


Figure 3.9 (a): AER Around Budget, 2008-09
AER
1.25
0
-1.25

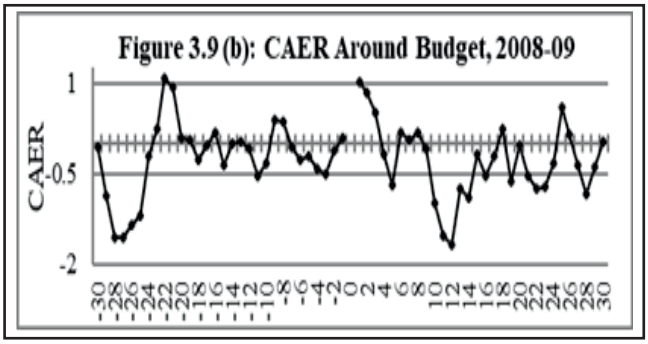


Figure 3.9 (b): CAER Around Budget, 2008-09
CAER
1
-0.5
-2

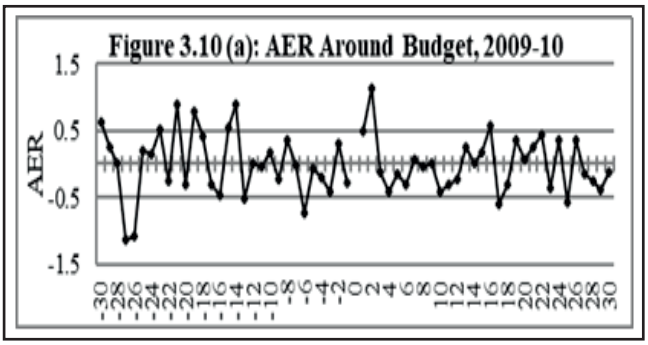


Figure 3.10 (a): AER Around Budget, 2009-10
AER
1.5
0.5
-0.5
-1.5

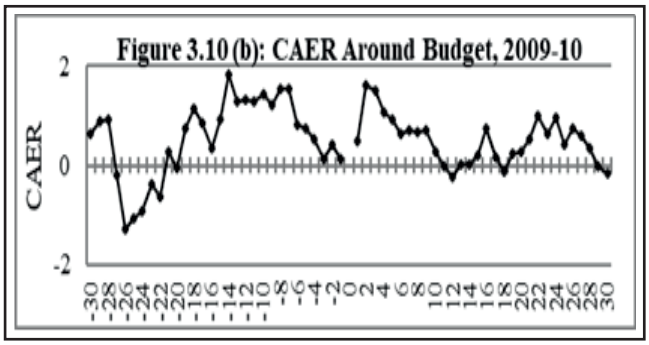


Figure 3.10 (b): CAER Around Budget, 2009-10
CAER
2
0
-2

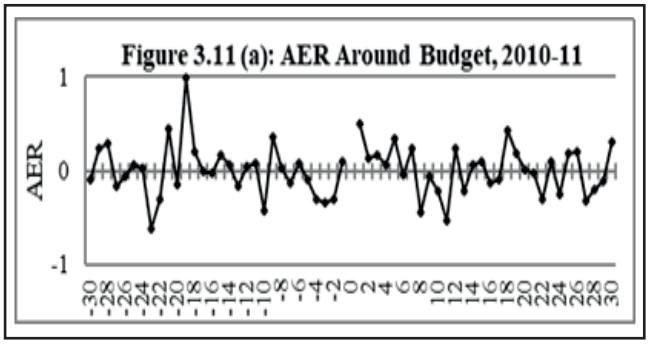


Figure 3.11 (a): AER Around Budget, 2010-11
AER
1
0
-1

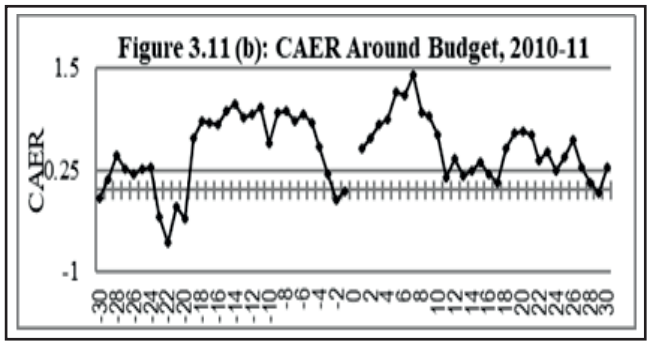


Figure 3.11 (b): CAER Around Budget, 2010-11
CAER
1.5
0.25
-1

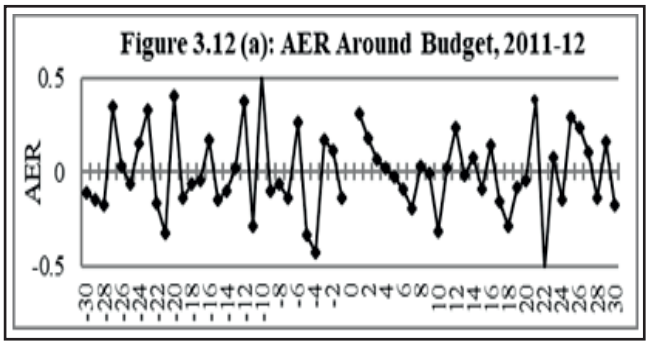


Figure 3.12 (a): AER Around Budget, 2011-12
AER
0.5
0
-0.5

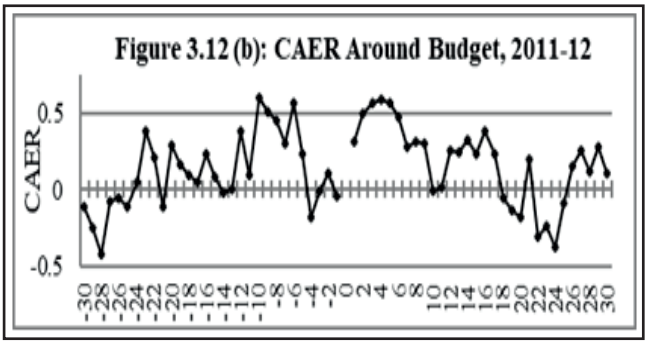
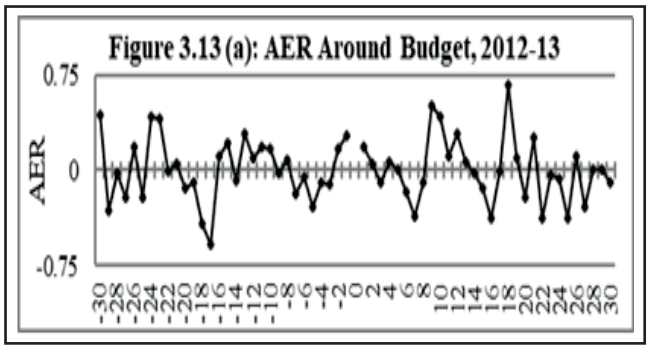
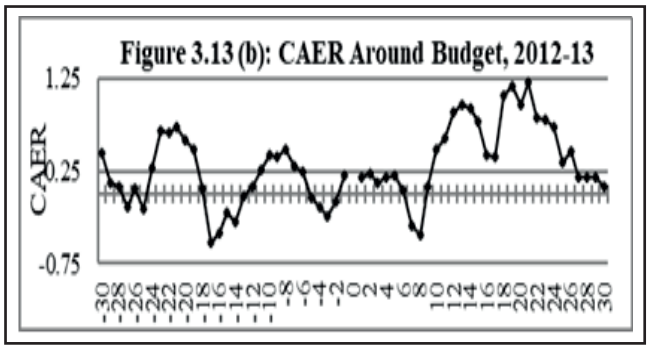
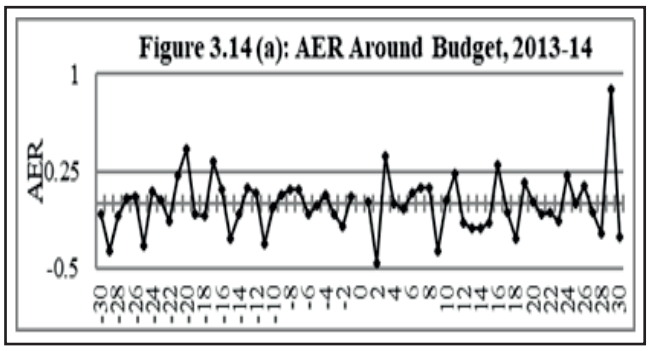
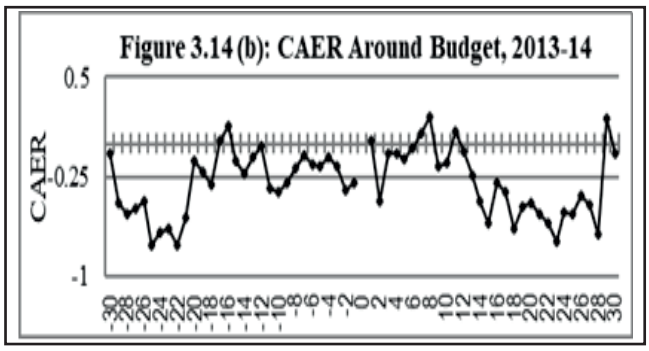


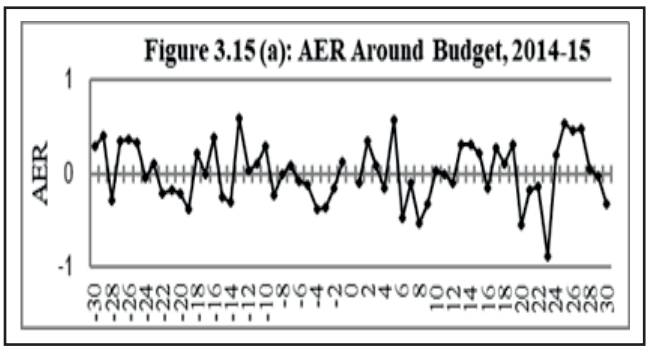
Figure 3.12 (b): CAER Around Budget, 2011-12
CAER
0.5
0
-0.5

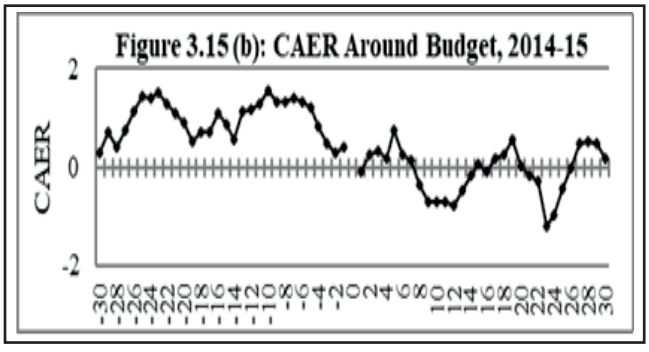


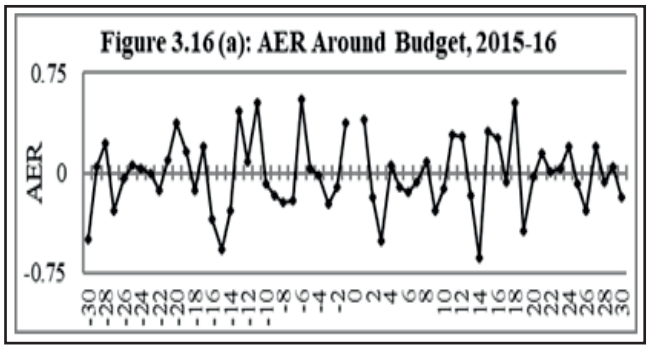



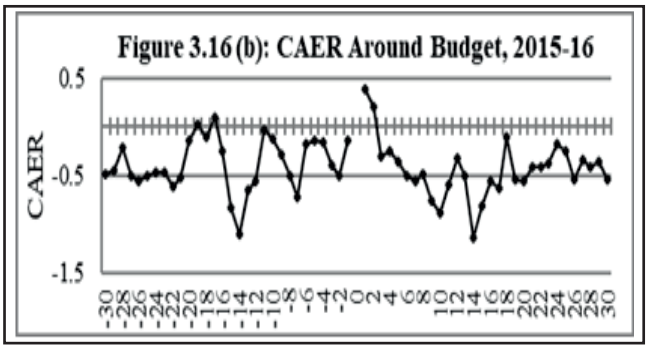




Source : Authors' estimation from the data compiled from Bloomberg Database, and NSE & BSE websites.

before the event outcome, uncertainty in the market increases and after the event as uncertainty reduces. Low risk investing can be done as a long short equity strategy called as 'betting against β'. News and other publicly available information simply do not always get reflected fully in the prices right away. Even though market prices certainly reflect a lot of relevant information, they do not always perfectly aggregate all information immediately. There are several tendencies of initial undervaluation and delayed overreaction that create trends and momentum. Therefore, the varying β makes it difficult for investment decisions to correctly reflect their risk perceptions.

The pre- and post- budget β remains volatile with reference to different stocks. The β may be changing not only because of the information flow of the budget announcements but yes, the budget announcement period does see volatility in the β. Is the varying β, the uncertainty of it being related to good or bad news surprising ? Deviation from the normal for good surprises in the budget like cut in excise, income tax, etc. may result in high post budget β.

The AER and CAER are estimated using the methods stated in the methodology section for before and after 30 trading days of announcement of budget of each year of the study period. The AER is estimated for each day in the event period by considering abnormal returns of all the 36 firms in the sample. We have looked at the average effect of the announcement rather than the effect for each firm separately because this will minimize the effect of other events occurring during this period [7]. The individual day's abnormal return is added together to compute the cumulative abnormal return from the beginning of the period of before and after announcement of the budget separately. The results are represented by graphs for each year and are reported in the Figure 3. The AER and CAER are represented respectively in Panel (a) and Panel (b) of Figure 3 (Figures 3.1 through 3.16).

If the market is to be efficient in the semi - strong form, we normally expect no abnormal return before and after the occurrence of the event. From the Figures 3.1(a) through 3.16 (a) of Panel (a), it can be summed up that average excess returns before and after 30 trading days of the announcement of central budgets are moving around zero. However, high abnormal return is found on the days surrounding the announcement. The abnormal return prior to announcement day of the budget may be due to the fact that the budget is an important event in the Indian context, and the market forms prior expectations at some hints even though the budget maintains secrecy. However, to say that the abnormal return prior to the announcement of the budget reflects leakage of information by those with excess to it needs thorough examination.

A similar pattern of average excess return is found after the announcement of the budget. If we expect 12.5% return from the Indian stock market, then the daily market return turns out to be around 0.05% assuming on average we have 250 trading days [8]. From the figures, we can clearly see that even average excess return on a daily basis exceeds 1% both positively and negatively. The excess daily return of +/-1 also indicates that over-reactions and under-reactions occur around the event ; thus, validating Shiller's argument. But over the 30 trading before and after budgets, the excess return is fluctuating around zero; thus, validating Fama's efficient market hypothesis.

The cumulative average excess return before and after the announcement of the budget is presented in Figures 3.1(b) through 3.16 (b). From the figures, we observe that in case of 30 trading days before announcement to announcement day, the cumulative average excess return remains high during most of the study period except for the years 2004 - 05, 2008 - 09, 2013 -14, and 2015 - 16. However, it is interesting to note that the CAER is converging to zero just before the announcement of the budgets except for a couple of years. After the announcement of the budget, largely we can see that there is a declining trend and recovery in the CAER, and

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[7] However, for studies where the magnitude of the announcement varies across firms (such as earnings surprises), it may be useful to examine individual firm behaviour (Elton et al., 2014). Again, in India, as different budgets affect different sectors differently, it may be appropriate to study the average effect.

[8] It is to be noted that over the last 20 years, the Indian stock market has produced, on an average, around 11 % return (authors' calculation).

finally, it is converging to zero. There is no post announcement drift, and hence, there are no opportunities to buying on announcement and holding it over a longer period of time to earn abnormal profits. However, in the short run, there are opportunities to make abnormal profit. This evidence suggests that the market is close to efficiency with inefficiencies.

This is the way the present study is different from other studies, particularly in the Indian context. Most of the studies in India have focussed on testing the empirical validity of the weak form of market efficiency (e.g. Ryaly, Kumar, & Urlankula, 2014 ; Ryaly, Raju, & Urlankula, 2017), though very few studies have talked about the semi - strong form of market efficiency (e.g. Rahmanizadeh & Mahesh, 2015 ; Thomas & Shah, 2002). No study in the Indian context has conducted such a detailed exercise with company level data and discussed inefficient market conditions to explore the plausibility of making abnormal profits.

## Conclusion

The budgets in India play an important role in economic growth as the study shows the policy direction. The changing policies and enhanced investment in different sectors in the budgets show the commitment of the government towards the growth of the economy. These policy changes lead to changes in the perception of risk and probably a varying β in the Indian context. The study finds that the βs show significant variability over the periods as indicated by both yearly and pre and post budget data across firms of different industries. This helps us to suspect the empirical validity of standard CAPM. However, to arrive at validity of the CAPM in the Indian stock market, a detailed study is warranted. The budget is found to be an important event in the Indian context.

The results of AER and CAER show that the market is informationally efficient in a semi-strong form, but there are also opportunities to earn abnormal profits. The arguments on market efficiency of both the schools of thought (Fama and Shiller) seem to be visible in the Indian stock market. This suggests that the Indian stock market may be "efficiently inefficient".

## Research Implications, Limitations of the Study, and Scope for Further Research

From our study, the implications can be drawn that it is not necessarily required to trade/ invest in high β stocks for getting higher returns. Some trading/ investment strategies may be formulated to earn excess returns, particularly around an event. For the long - term investors, the β gives a basis for investing. The level of market neutrality is measured by β, making a market neutral portfolio implying that the value of the portfolio has little correlation to the overall average price changes in the market. The market β is taken to be one and a market neutral β at zero. The portfolio with larger β or fluctuating β over short periods of time tends to move up or down with the market much more.

Depending upon the availability, a daily five - minute stock price series around the event can be analyzed. This may probably give better results as financial models generally underestimate the likelihood of very large change. Besides the time period and number of stocks considered, financial ratios have not been taken as a criterion for investing. Further research may look at combining beta and financial ratios for investment.

The present study has taken into consideration the stock market, individual stocks, and stock indices, not to a broad - based market portfolio as envisaged by CAPM. The different reactions to the returns around the budget may also be developed. Though the present study has not gone into the derivative strategy of a combination of out of the money put and call, it could be developed to exploit any inefficiency. This may be considered for a possible line for future research. However, broadly speaking, this area needs more research to make strong comment on CAPM, assess market efficiency, and formulate trading and investment strategies.

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