

Analyzing the Effect of Monthly Changes in Sales figures of Automobile Companies in Predicting the Return from the Stock

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Abstract— This paper studies the informational efficiency with respect to Indian Stock Market in the Semi Strong form of Efficient Market Hypothesis (EMH). We examine the stock price reaction to announcement of monthly automobile sales number for the period from 2013 to 2016. For the study, four automobile companies listed in the National Stock exchange (NSE) which were actively trading during the period is studied. Event study methodology is used to analyze the data for abnormal returns surrounding the announcement period or event. The event window traced the stock price movements on five trading days prior and post the announcement date. The result of the study showed that Indian stock markets are not efficient and therefore there is scope for the investors to make abnormal profit during the announcement time. The study showed that investors can make abnormal profit by engaging in short sell on the day of the announcement date if negative sales growth is observed or if it is positive sales growth, by buying on the announcement date and selling on second or third day post the event.

Keywords: Regression, Abnormal Return, Event Study Methodology

I. INTRODUCTION

The Indian automotive industry is considered as the largest and fast growing markets for automotive vehicles in the world. But it is currently experiencing flat or negative growth rates. India is the sixth largest in the world for manufacturing passenger cars and commercial vehicles. According to a report released by Deloitte, it is expected that India will be a major manufacturer in automobile industry and third largest auto market by 2020. 22 percent of India's manufacturing gross domestic product (GDP) is by the automobile industry. The Indian automobile industry is extremely sensitive to factors such as growth in gross domestic product, interest rate levels, stock market performance of other countries etc., and this is reflected in its daily stock price movement.

The present study analyses the impact of the monthly sales data of the automobile companies on their stock price. For the study, selected automobile companies listed in the National Stock exchange (NSE) which had shares actively trading for

the period 2013 to 2016 have been studied. The methodology used to analyze the data is the Event Study methodology. This study finds that investors and analysts can make abnormal profit.

II. LITERATURE REVIEW

Reference [1] analyzed event study methodology to study the security price behavior with respect to certain specific events and reaction of security price to such events. Reference [1] used event study are to test null hypothesis that whether the markets are efficient and use all the information that is accessible in the efficient market hypothesis originally introduced by Reference [2] and (b) to analyze the effect of a particular event on shareholder's wealth.

As of primary level, event studies do not include or need the stock market information. Instead, there may be a connection between a dependent variable and an event Reference [3]. Though, in this paper, considers that the event relates to a monthly automobile sales and the stock market response effect of the event is measured. Reference [13]. Reference [4] Matching the effect of an event with a stock market response allows researchers to determine if the event provides new and incremental information to participants in the stock market and the extent of the economic impact of the event on the value of the firm.

Reference [12] stated, "an event study methodology is a statistical technique that estimates the stock price impact of occurrences such as mergers, earnings announcements, and so forth. The basic notion is to disentangle the outcomes of two categories of information on stock prices –information that is specific to the firm under question (e.g., dividend announcement) and information that is likely to disturb stock prices market widespread (e.g., change in interest rates)". Therefore, event study methodology is used to analyze the functioning of prices of various stocks of firms.

Shaping event dates is considered a necessity as considered by Reference [5]. The poor outcome was caused due to uncertain events. Reference [5] claimed the improved statistical

power of event studies, while using exact date of daily events. Reference [14] informed about information leakage ahead of event actual dates. Reference [14] had mentioned to be cautious against the studies with the event dates, the predictions was made with clear-cut dates of events were more exact in contrast to the studies which had vague event occurring time.

In between the short horizon and long horizon there could be a difference in the event window outcomes. Reference [14] have an event period of 30 days prior announcements of the credit evaluation occurs and 12 days post announcement. Reference [15] took an event window of 11 days prior to rating announcements and 1-day post announcement. Reference [14] analyzed the abnormal performance by choosing a window of 90 days prior and post the credit evaluation change announcement date.

The researchers conducted previously have used event windows which are large, like returns which are monthly or weekly, but Reference [5] focused out that the larger even windows for small samples were ineffective Reference [7]. Reference [6] The main reason behind this is the impact of factors which are confounding to specific factors of the firm. Reference [5] exposed the redundancy which was poor in the results of long horizon window. Reference [3] analyzed event study in information system research and provided an overview. Rubin and Rubin (2007) took a narrow event window which was well-defined. The event window was defined as 10 days preceding and succeeding the event. Then the event window was further reduced to five days prior and post the event Reference [7].

Reference [8] in their research inferred that the current stock prices of companies can't help the investor to determine the future stock prices which leads to the investors not being able to reap profits.

However, Reference [9] contradicted the same in the case IT stocks where they concluded that stock prices of IT companies are affected by bonus announcement. Thus, efficient market hypothesis is not applicable here. Reference [10] have stated in their study that there exists the impact of mean reversion of market inefficiency in Indian stock market.

Reference [9] in their study focused on effect of stock split announcements on the Indian Stock market and concluded that the announcement creates an effect on the stock prices.

III. METHODOLOGY

We collected monthly sales data of 4 companies Maruti Suzuki, Hero Motor Corp, TVS Motors, Bajaj Motors belonging to the automobile sector for four financial years from April 2012 to March 2016, from their respective websites. The sales growth for each month was calculated using corresponding month in the previous year as base to eliminate seasonality effect. Thus, we had monthly sales growth for 4 companies for 36 months (April 2013 to March 2016) totaling to 144 event study points. Out of this, 53 had negative sales growth and 91 had positive sales growth. Then we collected the stock price of each of these companies and the Sensex data for the same period (April 2013 to March 2016) from capitaline website.

IV. RESEARCH FRAMEWORK

Reference [11] defined an outline for event study methodology consisting of the following steps:

- (A) Event of interest identification
- (B) Description of the window of the event.
- (C) Sample set selection of firms in the analysis.
- (D) "Normal" return prediction during the event window during absenteeism of the event
- (E) "Abnormal" return estimation in the event window, where there is a well-defined abnormal return and defined as the difference between the actual and predicted returns, without the happening of the event.
- (F) Testing of the abnormal return to analyze whether it is statistically different from zero.

The study is to analyze the effect of monthly changes in sales figures of automobile companies in predicting the return of the stock. The Hypothesis of the research are as follows

H0: There is zero impact of monthly sales figures in predicting the abnormal return of the stock.

H1: There is impact of monthly sales figures in predicting the abnormal return of the stock.

If monthly sales figure which is newly disclosed is beneficial to the firm, a favorable market response to the announcement is anticipated. Similarly, if the newly disclosed monthly sales figure is not beneficial to the firm, an unfavorable market response to the announcement is anticipated. E.g.: if the monthly sales figure of TVS Motors in January increased as compared to last year's January monthly sales, on the date of announcement, the stock price of company will move up and if the monthly sales figure is decreasing, the stock price of company will move down.

Here we define the event day (day 0) as the day of announcement of monthly automobile sales data for a company.

The "event window" specifies the days in number, prior and post the announcement on which the accumulation of abnormal return happens. An event window will be denoted by $[-x, +y]$, where,

x denotes days prior to the announcement

y denotes days post the announcement

The day of the announcement is referred to as "day 0". Announcement date is the date on which Monthly sales data is reported through the company's website. In this case, the event window is $[-5,+5]$ i.e. The estimation window is -5 prior the event to +5 post the event.

The main idea of event studies is to focus on analyzing the cumulative abnormal return (CAR). CAR is a measure which denotes the level to which the market adjusts the value of the firm with respect to the new information signal attained through the announcements made by the firm. The CAR result may be positive or negative depending on the investor sentiment that the event would result in positive or negative increase in future cash flows.

Beta is obtained by regressing the returns from the security to returns from the portfolio or the index. In our case we use NSE NIFTY as the index. To find the abnormal return due to the monthly sales figures, the actual returns from each day in the event window is compared with the market model predicted returns.

The abnormal return for the stock AR_{it} is checked using the formula,

$$AR_{it} = R_i - \text{Alpha} - (\text{Beta} * R_m)$$

Where (R_i) = Individual security return, (R_m) = Market Return, Alpha and Beta are coefficient of regressed values of R_i and R_m .

AR_{it} is calculated as the sum of the differences between the actual return and the expected return on a stock, which is how it is regularly preferred to evaluate the stock price impact. The average abnormal return is calculated by subtracting actual return minus predicted returns. The Cumulative Average Abnormal Return (CAART) is computed by adding the AART for the period of 11 days in the estimation window 5 days before the event to 5 days post or prior the event. AART is the summation of AART divided by the total number of securities.

V. ANALYSIS AND FINDINGS

We have classified the event study points into two cases, one when there is negative growth on monthly sales and other when there is positive growth. Using event study methodology, we calculated the abnormal returns for each of the 144 event study points. We summed up the abnormal returns to find AART and CAART for the automobile sector and the results are shown in Table 1 & 2.

Table 1 Negative Sales Growth

Event Window	AARt	CAARt
-5	0.002498953	0.002498953
-4	-0.002821605	-0.000322652
-3	0.001215989	0.000893337
-2	0.005809097	0.006702434
-1	0.002150006	0.008852441
0	0.002155468	0.011007908
1	-0.005338816	0.005669093
2	-0.001385073	0.00428402
3	0.000103568	0.004387588
4	-0.007813014	-0.003425427
5	0.007123543	0.003698117

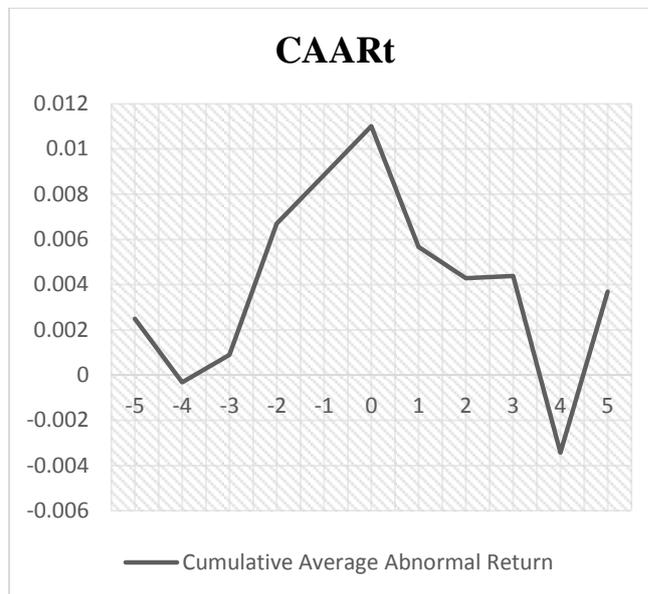


Figure 1 CAARt - Negative Sales Growth

In table 1 we have summarized the AART and CAART for the event window in the case when the sales growth is negative. The CAART (Negative sales growth) for the event window is plotted in figure 1. It is seen from figure 1 that 3 to 4 days prior to the event, cumulative average stock return starts increasing and once the announcement comes, the CAART returns starts decreasing from day 0 and hits the minimum point on day 4.

Table:2 Positive sales growth

Event Window	AARt	CAARt
-5	0.000785802	0.000785802
-4	0.003866076	0.004651878
-3	0.003118939	0.007770817
-2	-0.002432821	0.005337996
-1	-0.00061887	0.004719126
0	0.003233272	0.007952398
1	-0.000648067	0.007304331
2	0.003082074	0.010386405
3	0.000455242	0.010841647
4	-0.001073145	0.009768502
5	0.002117184	0.011885686

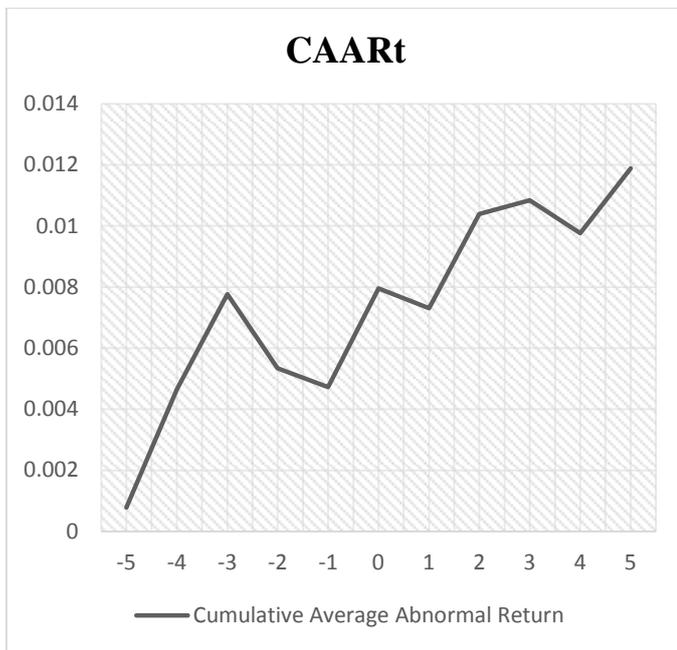


Figure 2 CAARt - Positive Sales Growth

In table 2 we have summarized the Average Abnormal return and Cumulative Average abnormal return for the event window in the case when sales growth is positive. The CAARt (Positive sales growth) during the event window is plotted in figure 2. It is seen from figure 2 that once the monthly sales figure is announced and the market finds it to be positive, cumulative average stock return starts increasing from day 0 onwards, and hits maximum by day 2 or 3.

Thus in both the cases, market is found to be not efficient and there is opportunity for making abnormal profit.

We have seen from the figure 2 that the positive sales growth prior and post announcement the cumulative average stock return is increasing so the investors take long position in order to make profits.

CONCLUSION

From our results we can see that during times of negative sales growth, there is increasing expectation of the stock going upwards up until the event day. Hence average abnormal return rises up until event day 0. Post event window, there is a sharp negative correction in returns of the stock as is expected due to the negative sales reported. Investors in this case can make profits by opting for short selling on event day 0.

During times of positive sales growth for a company, again, the stock shows downward movement from 3 days prior to event day till event day 0. The stock continues to provide higher average abnormal returns over the next 2 to 3 days. Investors can go for long position to make profits in such a scenario.

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