SHOCKING NEWS OUTBREAK AND STOCK MARKET REACTION:
A STUDY OF SATYAM COMPUTER SERVICES LIMITED SCAM IN INDIA

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ABSTRACT

Information plays a vital role in effecting price changes in the markets in general and stock markets in particular. Stock market efficiency can be termed as informational efficiency of the market in assimilating information signals into prices as quickly as possible, so that no individual or group of investors might be in a position to book excess returns on a sustained basis. Fama in his classical testimony of stock market efficiency categorized three forms of efficiency - Weak, Semi-strong and Strong and stressed the adjustment of information as the focal point. In this paper an attempt is made to study the informational efficiency of Indian stock market during the outbreak of Satyam scam by applying standard event study procedure to analyse absorption of the information content, signaling and price adjustment among companies in Information Technology (IT) sector and the results showed quick adjustment of share prices in IT stocks though in different directions to conclude that the market was efficient in its semi-strong form during the scam outbreak.

Key Words: Market Efficiency, Information Signals, Abnormal returns, Cumulative, Abnormal Returns, Market Adjusted Model, Special Economic Zone,

Introduction

Positive as well as negative information with respect to economy, industry and firms plays a vital role in signaling the markets in general and stock markets in particular in effecting returns on corporate stocks. Stock market efficiency can be termed as informational efficiency- that is the market assimilating new information and reflecting in prices as quickly as possible. Fama in his classical testimony of stock market efficiency categorized three forms of efficiency - Weak, Semi-strong and Strong. Weak form of efficiency represents a situation wherein all historical information is being taken care of by the market and
the price of a given security is the fair representation of its value considering all available information. When any new information is made known to the public, the arrival of which is always random, the impact of such information is expected to be incorporated into the prices as quickly as it can. This means there is no profitable trading opportunity to the investors in an enduring way. In other words the market is said to be in its semi-strong form. When, even with some insider information, that is information not yet known publicly, it does not provide abnormal profit opportunities for a long period of time, the market is said to be efficient in the strong form.

Normal Information and Shocking News

Periodical information release relating to general economic conditions (monthly/quarterly/half yearly/annually), industry wide policy changes (yearly budgets) and firm specific events (as and when they occur) like announcement of earnings, additional financing, redemption of debt capital, buy back of equity, bonus announcements, right issues, corporate mergers and takeovers are examples of usual information the market has been receiving from time to time. The general and usual information releases happen very frequently from the respective sources depending upon the nature of information listed above. Whenever the market comes to know of the new information, ultimately a change in price is expected to happen as a result of the perception of the market to such information content and signal a positive or negative reaction in prices to adjust itself to the new information release. There is certain information at macroeconomic level (National or International), industry wide information or firm level news, which is an outbreak of shocking news suddenly in the market. The economic crisis in India in 1990 and the sub-prime crisis in the U.S in 2007-08 can be cited as examples for such national and international macroeconomic shocks. Release of the report by Comptroller and Auditor General (CAG) of India on Telecommunication Scam in November, 2010 as regards 2G Spectrum allocation is an example of industry wide shock. The outbreak of corporate scams such as Enron (2001) and Xerox (2000) at international level and Satyam Computer Services (2009) at national level can be cited as firm specific shocks.

Normally, the shocks at macroeconomic level/ economic fundamentals affect the stock market conditions broadly. The industry wide shocks are supposed to spread over to the firms in the industry concerned and firm specific shocking news is expected to impact the concerned firm subjected to the shock. However, even a firm specific or industry wide shock can have an impact on the market as a whole depending upon the role, which the firm or industry is having in the overall economy. Ultimately, a particular industry or a firm, through its higher weight in the bench mark index is supposed to have carried the impact of shock also to the market, thereby affecting market movements. The outbreak of Satyam Accounting Scam (SAS) was one such firm specific event in the Information Technology (IT) sector, which sent shock waves to the stock market and on account of the pivotal role of IT sector in the growing Indian
economy, it is attempted to focus on the information signaling of this shocking information to comment on semi-strong form efficiency of the market during the outbreak of scam in India.

Dominance of Information Technology (IT) Sector

After the Asian financial crisis and as a result of international agreements, the Indian growth story of 7 per cent to 9 per cent during the first decade of 21st century can be attributed to the increase in real demand, increased Foreign Direct Investments (FDIs) and Foreign Portfolio Investments (FPIs). During that period, the economy supported the service sector to prove its mettle and to contribute more towards the share in growth. Indian service sector experienced phenomenal growth in the WTO regime and expected to dominate the growth driver after manufacturing sector. Fuelled by the new economic policy and propelled properly by the intellectual capital of India, the service sector started accelerating in its potential to tap international markets also in the context of globalization.

Among the service sector, the information technology (IT) sector played a vital role in transforming the growth trajectory and stamped as sector of 21st century growth and had much to its credit to make brand India - have a globally competitive potential supported by the Government from various facets like special zones, exemption from sales tax, Income tax and free licensing. The IT sector extended its wings around the globe to mark a good beginning of Indian entry into foreign markets. It is this Industry that epitomizes India’s post-liberalization success and has been celebrated by the Government and the economists. The sector which has been instrumental in the improved economic status in the first decade of 21st century, contributed significantly to the stock market also in attracting FPIs, a phenomenon believed to be driving the stock market to a great extent. IT sector in general and four companies in particular – Infosys, Tata Consultancy Services, Wipro and Satyam computers were much talked about in the IT glory of India not only for their tangible contribution to the economy in terms of employment and earnings but also for having adhered to best practices with regard to corporate governance, International Financial Reporting Standards (IFRS) and disclosure norms, since they serve international clients and have been listed in international markets.

Review of Literature

Fama (1965) published the first paper on information and capital markets to focus on efficiency of stock market in the U.S and was of the opinion that, since arrival of information has been proved as random, the prices of securities react according to the arrival of new information and the price adjustment was so quick so as to restrict abnormal profit booking by investors and concluded that market was efficient. When Ball and Brown (1968) tested the abnormal returns of securities with the help of Abnormal Performance Index (API) for announcement of accounting information, they found very little evidence of abnormal opportunities. It marked the birth to Event study method and the study was described as path breaking.


Rajagopalan and Shankar (2011) studied stock market reaction to Satyam Scam by taking four leading IT sector companies (Infosys, TCS, Wipro and Satyam) and a group company Mytas Infrastructure limited to find that the market was quick enough to incorporate the scam information in 3 days but with different signaling – very high negative for Satyam, low negative for Mytas and interestingly positive for other three major IT companies considered to confirm semi strong efficiency of the market. The present study fulfills the gap by extensively analysing the shocking news out break at industry level by taking all companies in IT sector.

**Statement of the Problem: The Satyam Accounting Scam**

One incident that attacked the much celebrated IT sector was the Satyam Accounting Scam (SAS), as it was quite unexpected and unfortunate too when during the early hours of trading on 7th January, 2009, the market received the information regarding the outbreak of Satyam Scam and that too was confessed by its own Chief Executive Officer (CEO) Mr. Ramalingaraju to the tune of around Rs. 7000 crores as a result of overstatement of assets and understatement of liabilities coupled with inflated revenues for years together - the biggest Indian corporate scam in the history of Corporate India. Satyam Computer Services Limited joined the list of greatest corporate scandals of the globe like (a) World.Com for $ 7.2 billion (2002) by overstating cash flows and which had given away $400 million loan to founder Bernard Ebbers off the books; (b) Xerox for $1.5 billion (2000) by falsifying financial results for 5 years and boosting income; (c) Mirat for $ 1.1 billion (2002) by overstatement of assets and liabilities and (d) the (in) famous Enron for $ 1
billion (2001) for having boosted profits and hiding debts, thereby manipulating Texas power market, California energy market and by bribing governments to win contracts.

The shocking news outbreak of Satyam Scam, rattled the Indian Stock Market with BSE sensex surrendering 749 points (7.5 per cent) and NIFTY surrendering 192 points (6.17 per cent) on a single day and all the sectoral indices of both the exchanges fell down as the scam signaled a negative perception in the market as to the credibility of brand India as a whole. Both the exchanges removed Satyam computers from the benchmark index and on 8th January, 2009. Trading was halted for the whole day to mitigate further reduction in market capitalization and to rescue investors’ confidence.

**Objectives**

1. To study the market reaction of Satyam scam in the IT sector to check the information content
2. To assess the persistence of the impact in the form of returns in IT stocks and Satyam shares
3. To verify whether the scam outbreak is firm specific or industry wide
4. To comment on market efficiency during the scam outbreak.

**Methodology**

The S&P CNX IT sectoral index comprising 20 companies have been considered to study the returns around scam information outbreak. Since 3 companies belonging to telecommunications have been included in the 20, these companies were not considered for the study, having 17 companies including Satyam computer services to form the IT sector companies (Later, Satyam was taken over by Tech Mahindra after the scam).

The share prices of select IT companies were collected from Prowess data base and NSE website and cross verified to confirm the same price data. The share price data consisting of IT companies selected from S&P CNX IT (17 companies) formed the first data set representing the IT sector. The second data set is formed by removing Satyam from the first data set and it consisted of 16 IT stocks and named for the study as IT without Satyam. Satyam standalone formed the third data set. The IT sector data set has been used to analyze the impact of the scam information content, signaling and its persistence in the IT sector returns around the scam outbreak period as a whole. The second data set (IT without Satyam) have been used to examine the scam information as to whether it was firm specific or industry wide. Satyam standalone forms third set of data for the analysis to assess the impact. All the three data sets taken together are used to comment on market efficiency during the scam outbreak.

**Event Study Procedure for Shocking News Outbreak**

Event Study Methodology (Market Adjusted Model) as suggested by Henderson was applied to study the information content and signaling of the scam. The Market Model which is normally recommended for event study methodology calculates the normal return or expected return of all the shares considered by regressing the individual share returns on the market returns by taking a broad based index, to
have the constant and the coefficient (beta) for a considerable number of trading days in the estimation window. Then the constants and coefficients are used to calculate the normal returns by taking the event-window index returns for each of the company separately.

The purpose of estimating the normal return during the event window by considering the index return is mainly to avoid the impact of the concerned event on normal return estimation of companies on the premise that a particular firm’s event on a particular day would not have affected the index considerably. In other words, the normal return estimation based on a CAPM model tries to estimate the security return as if no event happened. Then only the abnormal return would reflect a true picture of the impact of event(s) considered.

But the event considered under the Satyam Scam outbreak breached the assumption that individual firm’s event would not affect the market index considerably. As the outbreak of Satyam scandal also had major impact on the indices, the normal return estimation based on the Market Model fails to estimate the normal return since it had itself adjusted to the scam information to a great extent.

Henderson recommended “Market Adjusted Return Model” to get rid of such a problem as there is no need to form estimation window and simply the market (index) returns can be considered as normal returns and the individual security’s actual returns can be compared with the market adjusted returns to have abnormal returns calculation. Hence, the comparison is between the market return and individual security returns. The method is recommended especially to the cases for which there were no share prices before the event day as in the case of Initial Public Offers (IPOs) and when usual CAPM model fails to estimate the normal returns (as in case of the present Satyam scam context).

The scam outbreak date, 7th January, 2009 is set as day 0 or event day. Pre-event days consisted of three trading days prior to the event date, and named as days -3 to -1. Post-event period consisted of four trading days after the event date, and named as days +1 to +4. Thus the event window has been framed for 8 days (including the event day). Returns are presumed to be the change in stock prices and indices. Returns on individual stocks over and above the market returns are termed as Abnormal Returns (ARs). The abnormal returns were calculated by taking NIFTY Index returns as the benchmark return on account of its wide coverage, which spreads to include 22 sectors of the economy including the IT sector and for having recorded a less volatile movement during the year 2008-09, the year in which the scam information broke out. The calculated value of abnormal returns was averaged during event days across securities to calculate Average Abnormal Returns (AARs). The AARs are then cumulated during the event window to ascertain the Cumulative Average Abnormal Returns (CAARs). In case of individual companies the abnormal returns are cumulated to have Cumulated Abnormal Returns (CARs) over the event window. Even though majority of calculations are the same as recommended for conducting event study for normal announcements, event study for the shocking news information outbreak differ only in calculating the expected or normal returns by taking the NIFTY index returns as benchmark without estimation window. On account of a very small
event window of only 8 days, the absolute daily returns have been calculated for the analysis for individual
shares and the market and presented below.

**Calculations**

The Returns of individual securities are calculated as,

\[ R_{jt} = \frac{(P_{jt} - P_{jt-1})}{P_{jt-1}} \]

where, \( R_{jt} \) is return of security ‘j’ at time ‘t’

\( P_{jt} \) is price of security ‘j’ at time ‘t’

\( P_{jt-1} \) is price of security ‘j’ at previous time observed

The Abnormal Returns are calculated as,

\[ AR_j = R_{jt} - R_{mt} \]

where, \( AR_j \) is Abnormal Return of security ‘j’

\( R_{mt} \) is Return of the market at time ‘t,’ and

\[ R_{mt} = \frac{(I_{mt} - I_{mt-1})}{I_{mt-1}} \]

where, \( I_{mt} \) is Closing Market Index at time ‘t’

\( I_{mt-1} \) is Closing Market Index at previous time observed

The Average Abnormal Returns (AARs) for event days observed in the event window across
securities are calculated as,

\[ AAR_t = \frac{1}{n} \sum_{J=1}^{n} AR_t \]

where, \( AAR_t \) is Average Abnormal Returns at time ‘t’ for the sample securities

\( AR_{j1} \) is Abnormal Returns observed in security 1 at ‘t’

\( AR_{j2} \) is Abnormal Returns observed in security 2 at ‘t’

\( AR_{jn} \) is Abnormal Returns observed in security n at ‘t’

The Cumulative Abnormal Returns are calculated as,

\[ CAAR_t = \sum_{t=-k}^{k} AAR_t \text{ Where, } k = -3, \ldots, 0, \ldots, +4 \]

\[ t = -k \]
In case of individual securities, the Cumulative Abnormal Returns are calculated as,

\[ CAR_j = \sum_{t = -k}^k AR_t \]

Where, \( k = -3 \ldots 0 \ldots 4 \)

**Event Study Analysis of Satyam Accounting Scam**

The calculated parameters are presented in the following tables with discussion. Table 1 shows the abnormal returns of IT sector and IT sector without Satyam.

**Table 1**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Window Days</th>
<th>Dataset I IT sector (17)</th>
<th>Dataset II IT sector without Satyam (16)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AAR (%)</td>
<td>CAAR (%)</td>
</tr>
<tr>
<td>2\textsuperscript{nd} January</td>
<td>-3</td>
<td>0.412</td>
<td>0.412</td>
</tr>
<tr>
<td>5\textsuperscript{th} January</td>
<td>-2</td>
<td>-0.781</td>
<td>-0.369</td>
</tr>
<tr>
<td>6\textsuperscript{th} January</td>
<td>-1</td>
<td>0.866</td>
<td>0.497</td>
</tr>
<tr>
<td>7\textsuperscript{th} January</td>
<td>0</td>
<td>-5.288</td>
<td>-4.791</td>
</tr>
<tr>
<td>9\textsuperscript{th} January</td>
<td>+1</td>
<td>-2.788</td>
<td>-7.579</td>
</tr>
<tr>
<td>12\textsuperscript{th} January</td>
<td>+2</td>
<td>3.531</td>
<td>-4.048</td>
</tr>
<tr>
<td>13\textsuperscript{th} January</td>
<td>+3</td>
<td>-1.386</td>
<td>-5.434</td>
</tr>
<tr>
<td>14\textsuperscript{th} January</td>
<td>+4</td>
<td>16.214</td>
<td>10.780</td>
</tr>
</tbody>
</table>

**Source:** Computed from NSE data

It is observed that the IT sector was earning mixed (positive and negative) CAARs even before the event date due to Global financial crisis and the resultant fluctuations in the revenue due to fluctuation in the value of U.S. dollar. Day -1 showed a recovery when compared to Day -2 to get slightly above the Day -3 level. The event day (0) AAR of -5.288 per cent and the CARR of -4.791 per cent are the manifestations of the shock in IT sector stock returns. Day +1 CAAR also ended up with higher negative (-7.579 \%) due to the effect of AAR of -2.788 per cent on Day +1. But the CAAR of day +2 and +3 showed reduction in negatives (-4.048 \% and -5.434 \%), when compared to Day +1, which is the effect of a mild recovery from shock. The CARR in day +4, a higher positive with AAR 16.214 per cent and CAAR of 10.78 per cent denote the completion of price adjustment process.
The turnaround of AAR on day +4 was attributable to the announcement made by the government of India in changing the income tax rule relating to the tax exemption of 100 percent on profits earned by IT companies from the Special Economic Zones (SEZs) set up under the parent companies. Earlier the exemption was only available for the SEZs set up as separate legal entities. The Government of India’s move to favour the IT sector through the change in income tax rule reflected in the reversal of negative returns towards high positives. Three days trading (excluding the event day) resulted in final adjustment in prices and it is inferred that the scam information can be considered to have had a high negative, information content among the IT stocks and the CAARs are presented in Fig .1.

![FIG 1 - CAARs of IT Sector](image)

Source: Table 1

The results are completely a different one when the second data set consisting of 16 companies (IT without Satyam) has been considered. The CAARs of three pre event trading days i.e. -3 to -1 showed positive returns but with fluctuation and got reversed to have a negative CAAR of -0.401 percent on the event day and it got increased to -0.902 percent on day +1. A reduction in CAAR of -0.171 per cent is noticed in Day +2, but again it was increased to -1.100 per cent on Day +3 and had a very high positive 15.552 per cent on day +4 to get the price adjustments process settled after getting the announcement regarding change in income tax rule.

An interesting observation is that when compared to the negative CAARs on and after the event day for the first data set, the second data set (IT without Satyam) CAARs recorded a very low negative. It is inferred that in spite of having a negative content and signaling the scam information release affected the IT sector stocks with different dosages. Satyam got the hit in greater magnitude and all other IT stocks (16) taken together got the negative signals but with lower magnitude. In the same way the final adjustment on
day +4 as regards CAARs was different for the two data sets. The second data set ended up with higher positive CAARs (15.552%), whereas the same for IT sector with Satyam was only 10.720 percent. The CAARs of IT without Satyam are presented in Fig.2.

![FIG 2 - CAARs of IT Without Satyam](image)

**Source:** Table.1

Perhaps the AARs of the two data sets considered did not differ considerably on day +4, as the AAR for IT sector was 16.214 percent and that of the IT sector excluding Satyam was 16.652 percent, but a notable difference was observed in case of CARRs, which has been due to the different price adjustment process with a differing dosage of information signaling for the two respective data sets. It is inferred that the shock generated firm, Satyam made the difference. After having analysed the two data sets, IT sector and IT without Satyam and found different magnitude of information signaling in the returns observed in the same direction (negative), it is observed that the negative price adjustment process of Satyam impacted heavily the IT sector when taken together. In order to have a look at Satyam as a standalone case, the ARs and CARs of Satyam are analysed and presented in table 2.
Table 2
ARs and CARs of Satyam Standalone

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Window Days</th>
<th>AR (%)</th>
<th>CAR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(^{nd}) January</td>
<td>-3</td>
<td>-2.915</td>
<td>-2.915</td>
</tr>
<tr>
<td>5(^{th}) January</td>
<td>-2</td>
<td>-8.124</td>
<td>-11.039</td>
</tr>
<tr>
<td>6(^{th}) January</td>
<td>-1</td>
<td>7.337</td>
<td>-3.702</td>
</tr>
<tr>
<td>7(^{th}) January</td>
<td>0</td>
<td>-71.327</td>
<td>-75.029</td>
</tr>
<tr>
<td>9(^{th}) January</td>
<td>+1</td>
<td>-39.371</td>
<td>-114.399</td>
</tr>
<tr>
<td>12(^{th}) January</td>
<td>+2</td>
<td>48.323</td>
<td>-66.077</td>
</tr>
<tr>
<td>13(^{th}) January</td>
<td>+3</td>
<td>-8.693</td>
<td>-74.769</td>
</tr>
<tr>
<td>14(^{th}) January</td>
<td>+4</td>
<td>9.218</td>
<td>-65.551</td>
</tr>
</tbody>
</table>

Source: Computed from NSE data

The negative CARs observed on day -3 and -2 were traced back from 16\(^{th}\) December 2008 when Satyam announced the acquisition (100%) of Maytas Properties for $1.3 Billion and Maytas Infrastructure (51%) for $0.30 Billion, totaling $1.6 Billion in a totally unrelated business verticals, but with the hidden intension to fill the gaps in Satyam books. With the immediate reversal of acquisition move on the very next day as a result of investors outreach and the ban imposed by the World Bank on Satyam citing improper documentation and client information leakage, the corporate governance issue assumed central stage as the independent directors started resigning in a hurry. But a reduction in CAR negative on Day -1 was observed and it was on account of the reversal in AR from a negative 8.124 percent on day -2 to a positive 7.337 percent on the pre event day. The news release of proposed merger move by Tech Mahindra with Satyam turned the fortunes of Satyam returns on day -1. The reduced negative CAR of 3.702 percent got phenomenal increase on the event day as Satyam stock tumbled to have a negative CAR of 75.029 per cent and further to 114.40 per cent on day +1 as the result of the accounting scam information release by its chairman. Interestingly on day+2, a reduction in negative (- 66.077 per cent) was observed as a result of positive abnormal return of 48.323 per cent on day +2, on account of the announcement made by the Government of India regarding re-constitution of Satyam board to give same hopes for renewal of the Satyam affairs. After an increased negative of CAR on day +3 (-74.769 per cent) it was settled at day +2 level on day +4 (- 65.55 per cent) by having a positive AR of 9.218 percentage on that day as a result of change in income tax rule information. But the negative CARs continued in case of Satyam on day +4 (-65.55 per cent) also, where it got a reversal in other cases which denotes the completion of price adjustment process for the IT sector as a whole and IT without Satyam considered previously. The persistence of the scam information on Satyam stocks with the negative information signals continued and market discounted the Satyam stock to the rock bottom and the CARs of Satyam standalone case is presented in Fig 3.
Conclusion

The analysis of IT stock returns during the outbreak of Satyam Accounting Scam (SAS) revealed that the impact of the scam on the returns of the IT sector index companies was mixed. Very high negative abnormal returns were observed in case of Satyam and it got reversed to have a reduction on the last day of the event window considered and the persistence of scam information continued in Satyam as a standalone case. The price adjustment of IT companies with respect to speed (4 days) and direction (positive and negative) signified the view that the scam information had information content for the IT sector to effect a quick price change to incorporate the information into prices to have efficiency in the price adjustment process. Hence, the Satyam scam information outbreak and related information during post scam were not only firm specific but also industry wide to document a concrete support in favour of semi – strong form efficiency of the stock market during the scam outbreak.

REFERENCES