



ORIGINAL RESEARCH PAPER

Finance

AN EVENT STUDY ANALYSIS OF TATA STEEL STOCK PRICE IN NSE WITH REFERENCE TO BREXIT REFERENDUM

KEY WORDS: Brexit, NSE, Stock market and Tata Steel

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ABSTRACT

Stock Exchange provides a convenient and secured mechanism or platform for transactions in different securities. Such securities include shares and debentures issued by public companies which are duly listed at the stock exchange, and bonds and debentures issued by government, public corporations and municipal and port trust bodies. The current study has been undertaken in order to predict the day to day fluctuations in the Stock Market using Technical Analysis, analyse the average return and risk of Tata Steel Limited stock for the selected event window and study the impact of Brexit on Tata Steel Limited by applying Event Study analysis tools.

INTRODUCTION

The National Stock Exchange (NSE) of India Limited has genesis in the report of the High Powered Study Group on Establishment of New Stock Exchanges, which recommended promotion of a National Stock Exchange by Financial Institutions (FIs) to provide access to investors from across the country on an equal footing. Based on the recommendations, NSE was promoted by leading Financial Institutions at the behest of the Government of India and was incorporated in November 1992 as a tax-paying company unlike other stock exchanges in the country.

The National Stock Exchange of India (NSE) was recognized as a stock exchange in April 1993. NSE is a country wide stock exchange and has its access throughout the country. As it is screen based, there is no need for any stock exchange floor and all the members of National Stock Exchange are able to transact through their computer terminals, sitting at their respective offices. There is total transparency in trading operations of NSE as the opening and closing prices of stocks are available for the investors on screen in real time. Buy order and Sell orders are effectively and quickly matched with the help of the trading software, i.e., buying and selling adjustments. The system also ensures best prices for securities thorough out India (both for buying and selling). The network system enables the trader to find a perfect match for his order or the system holds the order until a perfect match for the Buy or Sell order is found. The objectives of National Stock Exchange have been:

- Establishing a nationwide trading facility for all types of securities.
- Ensuring equal access to all investors across the country.
- Providing a fair, efficient, and transparent securities market.
- Enabling shorter settlement cycles and book entry settlements.
- Meeting the international benchmarks and standards

One of the major industry with large amount of investment is the 'Steel Industry'. Steel has been crucial to the development of any modern economy and is considered to be the backbone of human civilization. The level of per capita consumption of steel is treated as an important index of the level of socioeconomic development and living standards of the people in any country. It is a product of a large and technologically complex industry having strong forward and backward linkages in terms of material flows and income generation.

Tata Steel has the major market share in the steel industry. It has an integrated steel plant, with an annual crude steel making capacity of 5 million tonnes located at Jamshedpur, Jharkhand. Tata Steel has completed the first six months of fiscal 2007-08 with impressive increase in its hot metal production. The hot metal production at 2.76 million tonnes is 4.6% more compared to the corresponding period of the previous year. The crude steel production during the period was 2.43 million tonnes which is marginally lower than the production of 2.45 million tonnes last year. The saleable steel production was at a lower level during the

period April September, 2007 (2.34 million tonnes) compared to the corresponding period of last year (2.36 million tonnes). Tata Steel is continuing with its programme of expansion of steelmaking capacity by 1.8 million tonnes to reach a rated capacity of 6.8 million tonnes. The Project is reported to be moving ahead of schedule and is likely to be commissioned by May 2008 against the original schedule of June 2008. The Company has planned to take the capacity to 10 million tonnes by the fiscal year 2010. Tata Steels Greenfield projects in Orissa and Chhattisgarh are progressing on schedule with placement of equipment order for Kalinganagar Project in Orissa and commencement of the land acquisition process. Jharkhand Project is awaiting announcement of Relief & Rehabilitation policy of the State Government.

Tata Steel Europe (erstwhile Corus) has a crude steel production capacity of 18 metric tons per annum. Tata Steel Europe has manufacturing operations in Western Europe, plants in UK, Netherlands, Germany, France and Belgium, backed by a sophisticated global network of sales offices and service centres.

Brexit is a portmanteau of "Britain" and "exit". It was derived by analogy from Grexit. The term Brexit may have first been used in reference to a possible UK withdrawal from the EU by Peter Wilding in a Euractiv blog post on 15 May 2012.

The United Kingdom (UK) intends to withdraw from the European Union (EU), a process commonly known as Brexit, as a result of a June 2016 referendum in which 51.9% voted to leave the EU. The separation process is complex, causing political and economic changes for the UK and other countries. As of September 2016, neither the timetable nor the terms for withdrawal have been established: in the meantime, the UK remains a full member of the European Union. The term "Brexit" is a portmanteau of the words "British" and "exit".

The chart 1 has shown the fall of SENSEX and NIFTY on the next date of Brexit referendum

FALL OF SENSEX AND NIFTY ON THE NEXT DATE OF BREXIT REFERENDUM CHART 1

(Source: www.nseindia.com)

REVIEW OF LITERATURE

Eugene F. Fama (1965)¹ in his study, "The Behavior of Stock Market Price" has analyzed the extent to which the past history of a common stock price can be used to make meaningful predictions concerning the future prices of the stock. The Theory of Random Walk on stock prices has been used in the study. Two hypotheses namely, Successive price changes are independent and the price changes conform to some probability distribution have been framed and tested. Data for the study consists of daily prices for each of the thirty stocks of the Dow-Jones industrial average. The findings of the study have shown that there is strong and voluminous evidence in favor of random walk theory.

Hemanth (2010)² in his study, "Technical Analysis on Different Sectors Stocks" has applied both Fundamental analysis and Technical analysis with the objective to predict the future behavior of stocks, the market trends and its price movements. The study has been done on 5 selected stocks of NIFTY. The two main mathematical indicators used for the analysis are Relative Strength Index and Moving Averages. It has been proved that the investor can identify oversold, overbought and trend reversals to take right decisions at minimum level of risk. Apart from the Relative Strength Index and Moving Average an investor can take decisions using the help of chart patterns such as Support and Resistance, Head and Shoulder, Triangles and Flag.

NageshwarRao S.V.D and Sreejith.U (2014)³ in their study, "Event Study Methodology: A Critical Review" have explained the meaning and techniques of Event Study Analysis and how to do an Event Study Analysis. The researchers have concluded that the event study methodology is one of the powerful techniques to ascertain the impact of the event and also their method accurately analyzes the daily return data. Moreover, this particular method will emerge as a perfect one for the investors to take their investment decisions.

Hemanth (2015)⁴ in his study "Technical Analysis – A study on selected stocks" aimed at undertaking technical analysis of selected companies included in CNX Nifty. For the study the stocks of 5 automobile companies are selected. The main objective is to predict the future share price movements of the selected companies. The indicators help the investors to decide on selling and buying of shares at right time. The study concludes that the technical indicators are very useful in finding the values of shares whereas, the exact value is difficult to analyze through the indicators.

Wong Shou Woon (2015)⁵ in his study "Introduction to Event Study Methodology" has explained what is event study and how it is used in different field of research such as academics, finance, accounting, management and marketing, This event study method is a widely used method as it shows the accuracy in analyzing an event and the value of the firm in different areas.

STATEMENT OF THE PROBLEM

Investors in stock markets of the present world face lot of difficulties while investing their earnings in shares, at right price to yield smarter returns due to lack of awareness among the investors in predicting the future value of shares using technical analysis. Using technical analysis the investors can come to an overall conclusion about the future value of shares in which the investors are interested to invest. Generally, share prices are volatile and it becomes severe during certain events. one such event has been Brexit . At the time of Brexit referendum, a great fall has been witnessed in BSE and Nifty. Already, Tata Steel Plant in UK has been facing a financial crisis where Brexit referendum has only made its position worse leading to a negative effect on the share price of Tata Steel limited in India as well. Hence, with the motive of helping investors to have a better understanding of the share price movements of Tata Steel the current study has been undertaken by applying event study methodology which has been considered suitable to measure the share price movements effectively.

OBJECTIVES OF THE STUDY

- To predict the day to day fluctuations in the Stock Market using Technical Analysis.
- To analyse the average return and risk of Tata Steel Limited stock for the selected event window.
- To study the impact of Brexit on Tata Steel Limited by applying Event Study analysis tools.

RESEARCH METHODOLOGY

Secondary data have been obtained from the National Stock Exchange website (www.nseindia.com). For the purpose of this study the daily closing prices of Tata Steels included have been taken and their price movements are computed and studied.

The daily share prices of Tata Steels and NIFTY were taken for event window (it is the time period covered for the analysis).The event window period for the analysis consists of 41 Days from 26th May 2016 to 22nd July 2016. The above mentioned period was taken specifically as the Referendum date was 23rd July 2016.Hence, 20 days before the referendum and 20 days after referendum have been studied keeping 23rd July 2016 as neutral.

TOOLS USED

• **EVENT STUDY TOOL**

The event study methodology is designed to investigate the effect of an event on a specific dependant variable. A commonly used dependent variable in event studies is the stock price of the company. The definition of such an event study will be 'a study of the changes in stock price beyond expectation (Abnormal returns) over a period of time (event window). We attribute the abnormal returns to the effects of the event.' The event study methodology seeks to determine whether there is an abnormal stock price effect associated with an event.

• **ABNORMAL RETURN**

An abnormal return is the difference between the actual return of a security and the expected return. Abnormal returns are sometimes triggered by "events." Events can include mergers, dividend announcements, company earnings announcements, interest rate increases, lawsuits, etc. all of which can contribute to an abnormal return. The formula used to find abnormal return is as follows:

Dependent value of Tata Steel Share price =Y
 Independent value of Nifty =X
 Alpha value and Beta value
 Abnormal Return = Y-Alpha-Beta*X

• **CUMULATIVE ABNORMAL RETURN**

Cumulative abnormal return, or CAR, is the sum of all abnormal returns. Cumulative Abnormal Returns are usually calculated over small windows, often only days. This is because evidence has shown that compounding daily abnormal returns can create bias in the results.

• **TECHNICAL ANALYSIS**

Technical analysis refers to the tools used to study the stock market itself rather than those external factors which are reflected in the market. It involves the examination of volume and price traded in the market.

• **SIMPLE MOVING AVERAGE**

In technical analysis the moving average is one of the key trend lines that are plotted on a chart reflecting the closing prices over weeks. When the moving average moves above or below the daily chart it may generate a buy signal when security price rises above the moving average or sell signal when the security price falls below the moving average.

A moving average is an indicator that shows the average value of security's price over a period of time. While calculating the moving average, a mathematical analysis of the security's average value over a predetermined time period is made. As the securities price changes, its average price moves up or down. Moving Average has been interpreted by comparing the relationship between the moving averages of the security's price with the security's price itself.

• **MONEY FLOW**

Money Flow measures the strength of money flowing in and out of the stock. Money Flow Index is a momentum indicator that measures the strength of money in and out of a security. The formula for calculating the Money Flow is as follows:

Typical Price = $\frac{\text{Day's High} + \text{Day's Low} + \text{Close}}{3}$
 MoneyFlow Traded = Typical Price x Days Volume

• **BETA VALUE**

The degrees to which different portfolios are affected by these systematic risks as compared to the effect on the market as a whole is different and is measured by Beta. The Beta factor describes the movement in a stock's or a portfolio's returns in relation to that of the market return.

The main purpose of using Slope or Beta is to predict the change in the market. Beta is a measure of the market or non-diversible risk associated with any given security in the market. The formula for predicting Beta is as follows:

$$\text{Market Value of Beta} = P1 - P0 / P0 * 100$$

Where,

P1 Today's Close.

P0 Previous Close.

$$\text{Beta} = \text{Cov}(x,y) / \text{var}(x)$$

Where,

X Market Value of Nifty

Y Market Value of the Company

The analysis is done based on the following rule:

- If the beta is 1 The Company will move along with the market.
- If the beta is >1 The share is more volatile than the market.
- If the beta is <1 The share is less volatile than the market.

MOMENTUM AND RATE OF CHANGE

Momentum (MTM) and Rate of Change (ROC) are simple technical analysis indicators showing the difference between today's closing price and the close N days ago. Momentum is the absolute difference in stock commodity.

"Momentum" in general refers to prices continuing to trend. The momentum and ROC indicators show trend by remaining positive while an uptrend is sustained, or negative while a downtrend is sustained. The Momentum and Rate of Change is calculated with a particular period selection to get the difference of prices for a period of time.

Momentum and Rate of Change has been calculated as follows:
 Momentum = Close price today – Close price 'n' days ago
 Rate of change = Momentum * 100

ANALYSIS AND INTERPRETATION

**TABLE 1
20 DAY SIMPLE MOVING AVERAGE**

| DATE | HIGH | LOW | CLOSE | VOLUME | SIMPLE MOVING AVERAGE |
|-----------|--------|--------|--------|----------|-----------------------|
| 26-May-16 | 329.35 | 320 | 325.2 | 12892426 | |
| 27-May-16 | 332 | 324.55 | 329.6 | 4404479 | |
| 30-May-16 | 334.6 | 321.45 | 322.35 | 6618099 | |
| 31-May-16 | 337.5 | 320.25 | 334.35 | 10042011 | |
| 01-Jun-16 | 339.6 | 329.4 | 332.15 | 6483031 | |
| 02-Jun-16 | 341.9 | 330.35 | 340.65 | 5572983 | |
| 03-Jun-16 | 348.3 | 336.4 | 338.55 | 8832388 | |
| 06-Jun-16 | 340.7 | 332.15 | 337.85 | 4969784 | |
| 07-Jun-16 | 343.85 | 337.05 | 342.6 | 3898620 | |
| 08-Jun-16 | 346.45 | 338.5 | 341.5 | 4466650 | |
| 09-Jun-16 | 346.7 | 340 | 342.05 | 5935910 | |
| 10-Jun-16 | 344.5 | 333.5 | 334.4 | 5506426 | |
| 13-Jun-16 | 329.95 | 321 | 323.1 | 6576686 | |
| 14-Jun-16 | 327.45 | 321.3 | 324.95 | 4008566 | |
| 15-Jun-16 | 331.5 | 323.8 | 330.25 | 4134184 | |
| 16-Jun-16 | 333.5 | 324.1 | 330.5 | 6490905 | |
| 17-Jun-16 | 333.5 | 323.8 | 325.45 | 5702881 | |
| 20-Jun-16 | 336.95 | 322.8 | 336.25 | 6200742 | |
| 21-Jun-16 | 337.7 | 332.75 | 334.05 | 3490952 | |
| 22-Jun-16 | 334 | 327.05 | 332.45 | 4627091 | 332.9125 |
| 23-Jun-16 | 335.95 | 327.6 | 333.95 | 4684494 | 333.35 |

| | | | | | |
|-----------|--------|--------|--------|----------|----------|
| 24-Jun-16 | 316.4 | 296.3 | 312.65 | 14410710 | 332.5025 |
| 27-Jun-16 | 312.55 | 307.5 | 310.5 | 6579079 | 331.91 |
| 28-Jun-16 | 314.4 | 307 | 311.5 | 7926086 | 330.7675 |
| 29-Jun-16 | 317 | 312.6 | 313.6 | 5616012 | 329.84 |
| 30-Jun-16 | 324.25 | 315.2 | 321.95 | 6392234 | 328.905 |
| 01-Jul-16 | 330.9 | 326.4 | 328.1 | 4994251 | 328.3825 |
| 04-Jul-16 | 333.9 | 327.95 | 331.25 | 3232796 | 328.0525 |
| 05-Jul-16 | 337.4 | 330.25 | 333.65 | 3943390 | 327.605 |
| 07-Jul-16 | 337.25 | 316.3 | 317.7 | 10126780 | 326.415 |
| 08-Jul-16 | 319.4 | 312.1 | 318.35 | 7764479 | 325.23 |
| 11-Jul-16 | 329.7 | 319.65 | 327 | 7692459 | 324.86 |
| 12-Jul-16 | 343.85 | 329 | 342.3 | 9886586 | 325.82 |
| 13-Jul-16 | 358.65 | 344.3 | 357.75 | 13345822 | 327.46 |
| 14-Jul-16 | 361.35 | 353.35 | 359.3 | 7970875 | 328.9125 |
| 15-Jul-16 | 374.4 | 356.75 | 372.9 | 13431169 | 331.0325 |
| 18-Jul-16 | 379.4 | 363.5 | 365.65 | 7697416 | 333.0425 |
| 19-Jul-16 | 371.65 | 362.35 | 370.25 | 8246048 | 334.7425 |
| 20-Jul-16 | 373 | 366.4 | 368.45 | 5907217 | 336.4625 |
| 21-Jul-16 | 370 | 361.1 | 362.3 | 5343359 | 337.955 |
| 22-Jul-16 | 368.9 | 356.45 | 365.45 | 7372910 | 339.53 |

(Source: Computed)

From the table 1 it has been seen that the Simple Moving Average price has been greater than the closing price of the stock post referendum for one week. Later on the closing price of the stock has seen a slight increase and sudden decrease during the next one week. There after the stock prices has revoked and has shown an increasing closing price until the last date of the chosen event window. For instance, the closing price as on 21st July, 2016 is Rs.362.30 which is greater than the moving average on the said date which is Rs.337.955. Hence, the security's price has been trending up. It shows a buy signal for the investors. For example, the closing price as on 27th June 2016 is Rs.310.5 which is lesser than the moving average on the said date which is Rs.331.92. Hence, the price of the security is falling down. It shows a sell signal for the investors.

**TABLE 2
MONEY FLOW OF TATA STEELS**

| DATE | HIGH | LOW | CLOSE | VOLUME | TYPICAL PRICE | MONEY FLOW |
|-----------|--------|--------|--------|----------|---------------|------------|
| 26-May-16 | 329.35 | 320 | 325.2 | 12892426 | 324.85 | 4188104586 |
| 27-May-16 | 332 | 324.55 | 329.6 | 4404479 | 328.7166667 | 1447825655 |
| 30-May-16 | 334.6 | 321.45 | 322.35 | 6618099 | 326.1333333 | 2158382687 |
| 31-May-16 | 337.5 | 320.25 | 334.35 | 10042011 | 330.7 | 3320893038 |
| 01-Jun-16 | 339.6 | 329.4 | 332.15 | 6483031 | 333.7166667 | 2163495495 |
| 02-Jun-16 | 341.9 | 330.35 | 340.65 | 5572983 | 337.6333333 | 1881624827 |
| 03-Jun-16 | 348.3 | 336.4 | 338.55 | 8832388 | 341.0833333 | 3012580340 |
| 06-Jun-16 | 340.7 | 332.15 | 337.85 | 4969784 | 336.9 | 1674320230 |
| 07-Jun-16 | 343.85 | 337.05 | 342.6 | 3898620 | 341.1666667 | 1330079190 |
| 08-Jun-16 | 346.45 | 338.5 | 341.5 | 4466650 | 342.15 | 1528264298 |
| 09-Jun-16 | 346.7 | 340 | 342.05 | 5935910 | 342.9166667 | 2035522471 |
| 10-Jun-16 | 344.5 | 333.5 | 334.4 | 5506426 | 337.4666667 | 1858235227 |
| 13-Jun-16 | 329.95 | 321 | 323.1 | 6576686 | 324.6833333 | 2135340333 |
| 14-Jun-16 | 327.45 | 321.3 | 324.95 | 4008566 | 324.5666667 | 1301046905 |
| 15-Jun-16 | 331.5 | 323.8 | 330.25 | 4134184 | 328.5166667 | 1358148347 |

| | | | | | | |
|-----------|--------|--------|--------|----------|-------------|------------|
| 16-Jun-16 | 333.5 | 324.1 | 330.5 | 6490905 | 329.3666667 | 2137887744 |
| 17-Jun-16 | 333.5 | 323.8 | 325.45 | 5702881 | 327.5833333 | 1868168768 |
| 20-Jun-16 | 336.95 | 322.8 | 336.25 | 6200742 | 332 | 2058646344 |
| 21-Jun-16 | 337.7 | 332.75 | 334.05 | 3490952 | 334.8333333 | 1168887095 |
| 22-Jun-16 | 334 | 327.05 | 332.45 | 4627091 | 331.1666667 | 1532338303 |
| 23-Jun-16 | 335.95 | 327.6 | 333.95 | 4684494 | 332.5 | 1557594255 |
| 24-Jun-16 | 316.4 | 296.3 | 312.65 | 14410710 | 308.45 | 4444983500 |
| 27-Jun-16 | 312.55 | 307.5 | 310.5 | 6579079 | 310.1833333 | 2040720654 |
| 28-Jun-16 | 314.4 | 307 | 311.5 | 7926086 | 310.9666667 | 2464748543 |
| 29-Jun-16 | 317 | 312.6 | 313.6 | 5616012 | 314.4 | 1765674173 |
| 30-Jun-16 | 324.25 | 315.2 | 321.95 | 6392234 | 320.4666667 | 2048497923 |
| 01-Jul-16 | 330.9 | 326.4 | 328.1 | 4994251 | 328.4666667 | 1640444978 |
| 04-Jul-16 | 333.9 | 327.95 | 331.25 | 3232796 | 331.0333333 | 1070163236 |
| 05-Jul-16 | 337.4 | 330.25 | 333.65 | 3943390 | 333.7666667 | 1316172136 |
| 07-Jul-16 | 337.25 | 316.3 | 317.7 | 10126780 | 323.75 | 3278545025 |
| 08-Jul-16 | 319.4 | 312.1 | 318.35 | 7764479 | 316.6166667 | 2458363459 |
| 11-Jul-16 | 329.7 | 319.65 | 327 | 7692459 | 325.45 | 2503510782 |
| 12-Jul-16 | 343.85 | 329 | 342.3 | 9886586 | 338.3833333 | 3345455926 |
| 13-Jul-16 | 358.65 | 344.3 | 357.75 | 13345822 | 353.5666667 | 4718637798 |
| 14-Jul-16 | 361.35 | 353.35 | 359.3 | 7970875 | 358 | 2853573250 |
| 15-Jul-16 | 374.4 | 356.75 | 372.9 | 13431169 | 368.0166667 | 4942894045 |
| 18-Jul-16 | 379.4 | 363.5 | 365.65 | 7697416 | 369.5166667 | 2844323502 |
| 19-Jul-16 | 371.65 | 362.35 | 370.25 | 8246048 | 368.0833333 | 3035232835 |
| 20-Jul-16 | 373 | 366.4 | 368.45 | 5907217 | 369.2833333 | 2181436784 |
| 21-Jul-16 | 370 | 361.1 | 362.3 | 5343359 | 364.4666667 | 1947476244 |
| 22-Jul-16 | 368.9 | 356.45 | 365.45 | 7372910 | 363.6 | 2680790076 |

(Source: Computed)

The above table 2 shows the analysis of Money Flow Index. Take for Example the 8th Day of June the Money Flow is 1528264298 and the money flow of 9th June is 2035522471. So it shows the Positive Money flow over the day. So, it can be concluded that the investors can purchase the securities. Take for example the 1st day of July the Money flow is 1640444978 and the money flow of 4th July is 1070163236. This is Negative and it can be concluded that it is not a good sign to Purchase.

TABLE 3
MOMENTUM AND RATE OF CHANGE

| DATE | HIGH | LOW | CLOSE | MOMENTUM | RATE OF CHANGE |
|-----------|--------|--------|--------|----------|----------------|
| 26-May-16 | 329.35 | 320 | 325.2 | | |
| 27-May-16 | 332 | 324.55 | 329.6 | | |
| 30-May-16 | 334.6 | 321.45 | 322.35 | | |

| | | | | | | |
|-----------|--------|--------|--------|--------------|--------------|--|
| 31-May-16 | 337.5 | 320.25 | 334.35 | | | |
| 01-Jun-16 | 339.6 | 329.4 | 332.15 | | | |
| 02-Jun-16 | 341.9 | 330.35 | 340.65 | | | |
| 03-Jun-16 | 348.3 | 336.4 | 338.55 | | | |
| 06-Jun-16 | 340.7 | 332.15 | 337.85 | | | |
| 07-Jun-16 | 343.85 | 337.05 | 342.6 | | | |
| 08-Jun-16 | 346.45 | 338.5 | 341.5 | | | |
| 09-Jun-16 | 346.7 | 340 | 342.05 | | | |
| 10-Jun-16 | 344.5 | 333.5 | 334.4 | 0.028290283 | 2.82902829 | |
| 13-Jun-16 | 329.95 | 321 | 323.1 | -0.019720874 | -1.972087379 | |
| 14-Jun-16 | 327.45 | 321.3 | 324.95 | 0.008065767 | 0.806576702 | |
| 15-Jun-16 | 331.5 | 323.8 | 330.25 | -0.012262599 | -1.226259907 | |
| 16-Jun-16 | 333.5 | 324.1 | 330.5 | -0.004967635 | -0.49676351 | |
| 17-Jun-16 | 333.5 | 323.8 | 325.45 | -0.044620578 | -4.462057831 | |
| 20-Jun-16 | 336.95 | 322.8 | 336.25 | -0.006793679 | -0.679367892 | |
| 21-Jun-16 | 337.7 | 332.75 | 334.05 | -0.011247595 | -1.124759509 | |
| 22-Jun-16 | 334 | 327.05 | 332.45 | -0.029626386 | -2.962638646 | |
| 23-Jun-16 | 335.95 | 327.6 | 333.95 | -0.022108346 | -2.210834553 | |
| 24-Jun-16 | 316.4 | 296.3 | 312.65 | -0.085952346 | -8.595234615 | |
| 27-Jun-16 | 312.55 | 307.5 | 310.5 | -0.071471292 | -7.147129187 | |
| 28-Jun-16 | 314.4 | 307 | 311.5 | -0.035902197 | -3.590219746 | |
| 29-Jun-16 | 317 | 312.6 | 313.6 | -0.034928451 | -3.492845053 | |
| 30-Jun-16 | 324.25 | 315.2 | 321.95 | -0.025132475 | -2.51324754 | |
| 01-Jul-16 | 330.9 | 326.4 | 328.1 | -0.007261725 | -0.726172466 | |
| 04-Jul-16 | 333.9 | 327.95 | 331.25 | 0.017821478 | 1.782147795 | |
| 05-Jul-16 | 337.4 | 330.25 | 333.65 | -0.007732342 | -0.773234201 | |
| 07-Jul-16 | 337.25 | 316.3 | 317.7 | -0.048944769 | -4.894476875 | |
| 08-Jul-16 | 319.4 | 312.1 | 318.35 | -0.042412393 | -4.241239284 | |
| 11-Jul-16 | 329.7 | 319.65 | 327 | -0.020811499 | -2.081149873 | |
| 12-Jul-16 | 343.85 | 329 | 342.3 | 0.094834479 | 9.483447945 | |
| 13-Jul-16 | 358.65 | 344.3 | 357.75 | 0.152173913 | 15.2173913 | |
| 14-Jul-16 | 361.35 | 353.35 | 359.3 | 0.153451043 | 15.34510433 | |
| 15-Jul-16 | 374.4 | 356.75 | 372.9 | 0.189094388 | 18.90943878 | |
| 18-Jul-16 | 379.4 | 363.5 | 365.65 | 0.135735363 | 13.57353626 | |
| 19-Jul-16 | 371.65 | 362.35 | 370.25 | 0.128466931 | 12.84669308 | |
| 20-Jul-16 | 373 | 366.4 | 368.45 | 0.112301887 | 11.23018868 | |
| 21-Jul-16 | 370 | 361.1 | 362.3 | 0.085868425 | 8.5868425 | |
| 22-Jul-16 | 368.9 | 356.45 | 365.45 | 0.150299024 | 15.02990242 | |

(Source: Computed)

Table 3 has shown the momentum and rate of change in stock price. The difference in stock price has been found for current day and 10 days ago. A negative momentum and rate of change has been identified for 10 days before and after Brexit referendum on 23rd July 2016. Thereafter a positive momentum and rate of change has been witnessed which has indicated that the stock price has been stabilised. The increased momentum and rate of change during the last 10 days of the study period concludes that the share value of the company is increasing slowly after the Brexit referendum.

TABLE 4
BETA VALUE OF TATA STEELS

| DATE | VALUE (Y) | VALUE (X) |
|-----------|-----------|-----------|
| 26-May-16 | 325.2 | 8069.65 |
| 27-May-16 | 329.6 | 8156.65 |
| 30-May-16 | 322.35 | 8178.5 |
| 31-May-16 | 334.35 | 8160.1 |
| 01-Jun-16 | 332.15 | 8179.95 |
| 02-Jun-16 | 340.65 | 8218.95 |
| 03-Jun-16 | 338.55 | 8220.8 |
| 06-Jun-16 | 337.85 | 8201.05 |
| 07-Jun-16 | 342.6 | 8266.45 |
| 08-Jun-16 | 341.5 | 8273.05 |
| 09-Jun-16 | 342.05 | 8203.6 |
| 10-Jun-16 | 334.4 | 8170.05 |
| 13-Jun-16 | 323.1 | 8110.6 |
| 14-Jun-16 | 324.95 | 8108.85 |

| | | |
|-------------|--------------------|---------|
| 15-Jun-16 | 330.25 | 8206.6 |
| 16-Jun-16 | 330.5 | 8140.75 |
| 17-Jun-16 | 325.45 | 8170.2 |
| 20-Jun-16 | 336.25 | 8238.5 |
| 21-Jun-16 | 334.05 | 8219.9 |
| 22-Jun-16 | 332.45 | 8203.7 |
| 23-Jun-16 | 333.95 | 8270.45 |
| 24-Jun-16 | 312.65 | 8088.6 |
| 27-Jun-16 | 310.5 | 8094.7 |
| 28-Jun-16 | 311.5 | 8127.85 |
| 29-Jun-16 | 313.6 | 8204 |
| 30-Jun-16 | 321.95 | 8287.75 |
| 01-Jul-16 | 328.1 | 8328.35 |
| 04-Jul-16 | 331.25 | 8370.7 |
| 05-Jul-16 | 333.65 | 8335.95 |
| 07-Jul-16 | 317.7 | 8337.9 |
| 08-Jul-16 | 318.35 | 8323.2 |
| 11-Jul-16 | 327 | 8467.9 |
| 12-Jul-16 | 342.3 | 8521.05 |
| 13-Jul-16 | 357.75 | 8519.5 |
| 14-Jul-16 | 359.3 | 8565 |
| 15-Jul-16 | 372.9 | 8541.4 |
| 18-Jul-16 | 365.65 | 8508.7 |
| 19-Jul-16 | 370.25 | 8528.55 |
| 20-Jul-16 | 368.45 | 8565.85 |
| 21-Jul-16 | 362.3 | 8510.1 |
| 22-Jul-16 | 365.45 | 8541.2 |
| BETA | 0.085056221 | |

(Source: Computed)

BETA=0.085056221 the beta value is LESSER than 1, that is security's price will be less volatile than the market, and therefore buying this share is less risky as the share is less correlated with the market. The less volatility has been identified owing to the larger market share held by Tata Steel Limited in India.

**TABLE 5
ABNORMAL RETURN AND CUMULATIVE ABNORMAL RETURN**

| DATE | VALUE (Y) | VALUE (X) | ALPHA | BETA | AR | CAR |
|-----------|-----------|-----------|------------------|-------------|-----------|-------|
| 26-May-16 | 325.2 | 8069.65 | -368.63 19815 | 0.085056221 | 7.46 | 7.46 |
| 27-May-16 | 329.6 | 8156.65 | | | 4.46 | 11.92 |
| 30-May-16 | 322.35 | 8178.5 | | | -4.65 | 7.27 |
| 31-May-16 | 334.35 | 8160.1 | | | 8.91 | 16.18 |
| 01-Jun-16 | 332.15 | 8179.95 | | | 5.03 | 21.21 |
| 02-Jun-16 | 340.65 | 8218.95 | | | 10.2 1 | 31.42 |
| 03-Jun-16 | 338.55 | 8220.8 | | | 7.95 | 39.37 |
| 06-Jun-16 | 337.85 | 8201.05 | | | 8.93 | 48.30 |
| 07-Jun-16 | 342.6 | 8266.45 | | | 8.12 | 56.42 |
| 08-Jun-16 | 341.5 | 8273.05 | | | 6.46 | 62.88 |
| 09-Jun-16 | 342.05 | 8203.6 | | | 12.9 1 | 75.79 |
| 10-Jun-16 | 334.4 | 8170.05 | | | 8.12 | 83.91 |
| 13-Jun-16 | 323.1 | 8110.6 | | | 1.87 | 85.78 |
| 14-Jun-16 | 324.95 | 8108.85 | | | 3.87 | 89.66 |
| 15-Jun-16 | 330.25 | 8206.6 | | | 0.86 | 90.52 |

| | | | | | | |
|-----------|--------|---------|--|--|------------|------------|
| 16-Jun-16 | 330.5 | 8140.75 | | | 6.71 | 97.23 |
| 17-Jun-16 | 325.45 | 8170.2 | | | -0.84 | 96.38 |
| 20-Jun-16 | 336.25 | 8238.5 | | | 4.15 | 100.5 3 |
| 21-Jun-16 | 334.05 | 8219.9 | | | 3.53 | 104.0 6 |
| 22-Jun-16 | 332.45 | 8203.7 | | | 3.31 | 107.3 6 |
| 23-Jun-16 | 333.95 | 8270.45 | | | -0.87 | 106.4 9 |
| 24-Jun-16 | 312.65 | 8088.6 | | | -6.70 | 99.79 |
| 27-Jun-16 | 310.5 | 8094.7 | | | -9.37 | 90.42 |
| 28-Jun-16 | 311.5 | 8127.85 | | | -11.1 9 | 79.23 |
| 29-Jun-16 | 313.6 | 8204 | | | -15.5 7 | 63.66 |
| 30-Jun-16 | 321.95 | 8287.75 | | | -14.3 4 | 49.31 |
| 01-Jul-16 | 328.1 | 8328.35 | | | -11.6 5 | 37.67 |
| 04-Jul-16 | 331.25 | 8370.7 | | | -12.1 0 | 25.57 |
| 05-Jul-16 | 333.65 | 8335.95 | | | -6.74 | 18.83 |
| 07-Jul-16 | 317.7 | 8337.9 | | | -22.8 6 | -4.03 |
| 08-Jul-16 | 318.35 | 8323.2 | | | -20.9 6 | -24.99 |
| 11-Jul-16 | 327 | 8467.9 | | | -24.6 2 | -49.61 |
| 12-Jul-16 | 342.3 | 8521.05 | | | -13.8 4 | -63.44 |
| 13-Jul-16 | 357.75 | 8519.5 | | | 1.75 | -61.70 |
| 14-Jul-16 | 359.3 | 8565 | | | -0.57 | -62.27 |
| 15-Jul-16 | 372.9 | 8541.4 | | | 15.0 3 | -47.24 |
| 18-Jul-16 | 365.65 | 8508.7 | | | 10.5 6 | -36.67 |
| 19-Jul-16 | 370.25 | 8528.55 | | | 13.4 8 | -23.20 |
| 20-Jul-16 | 368.45 | 8565.85 | | | 8.50 | -14.69 |
| 21-Jul-16 | 362.3 | 8510.1 | | | 7.10 | -7.60 |
| 22-Jul-16 | 365.45 | 8541.2 | | | 7.60 | 0.00 |

(Source: Computed)

Table 5 illustrates the Abnormal Returns and Cumulative Abnormal Returns for each day of 41 days event window (i.e.) 20 days preceding and 20 days following the Brexit Referendum and actual day of referendum.

There has been a positive abnormal return during pre-Brexit study period for all days except two days, 30th May 2016 and 17th June 2016 which has shown a negative abnormal return. On the date of referendum there has been a negative abnormal return. During the post-Brexit period majority of the days have had a negative abnormal return and last one week has given positive abnormal return on shares. When the Cumulative Abnormal Return has been examined it has been found that the returns have turned negative after one week after Brexit Referendum.

Therefore, it has been concluded that the abnormal returns of Tata

Steel Limited shares in NSE have been positive on majority of the days preceding Brexit referendum, negative on majority of the days following Brexit referendum and negative on the date of Brexit referendum which suggests the investors not to buy the shares of the company for at least 10days until the price fluctuations become stable.

CONCLUSION

Investment in shares is an art and investing in it needs a lot of strategies to make a smarter returns. On analyzing the market of Tata Steel during the event window period i.e. pre-brexit referendum and post-brexit referendum using event study tools and technical tools for the study reveals that the share prices have shown a huge volatility on the day and the next of the Brexit referendum. The BSE Sensex and Nifty points had shown a great fall around 1000 points. The company share price had seen a slight growth one week later from the date of referendum. Technical analysis help the investors to predict the future price movements of the share which will very useful for them to invest their money into the right share. Overall, trading of shares is not an easy task if the investor wants to make money from it, therefore, having a wide knowledge on the share market is must rather than depending purely on fundamental analysis, broker advice, newspaper articles and trade channels for investment.

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