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An Analytical Study on the Form of Efficiency of SBI in 2016-17

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Abstract: *Market efficiency refers to the accuracy and quickness with which prices reflect market related information. In the weak form of the market, current price reflect all the information found in past prices and traded volumes. Further, prices cannot be predicted by analysis of past prices. Everyone has access to past prices even though some people can get these more easily than others. Liquidity traders may sell their stocks without considering the intrinsic value of the shares and cause price fluctuations. Buying and selling of the information traders lead the market price to align itself with the intrinsic value. The filter rule, runs test and serial correlation are adopted to find out market efficiency. In this paper runs test has been used to find out market efficiency. The stock price of the selected companies i.e. SBI has been taken from NSE (National Stock Exchange). The results of the study supports the findings that SBI has weak form efficiency in the Indian capital market i.e. share prices move independently of each other during the successive days.*

Keywords*: Market efficiency, weak form, runs test, and stock prices.*

1. INTRODUCTION

The efficient market hypothesis (EMH) is an investment theory that states it is impossible to "beat the market" because stock market efficiency causes existing share prices to always incorporate and reflect all relevant information. According to the EMH, stocks always trade at their fair value on stock exchanges, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. As such, it should be impossible to outperform the overall market through expert stock selection or market timing, and the only way an investor can possibly obtain higher returns is by purchasing riskier investments.

Strong form efficiency is where all information, public, personal and confidential, is reflected in share prices. Therefore investors are unable to achieve a competitive advantage and deters insider trading. This degree of market efficiency implies that above average return cannot be achieved regardless of an investor's access to information.

To a lesser degree, **semi-strong** efficiency proposes that share prices are a reflection of publicly available information. Since market prices already reflect public information, investors are unable to gain abnormal returns.

In its last degree, **weak form** efficiency claims all previous stock prices are a reflection of today's price. Therefore, technical analysis is not a practical tool to predict future price movements.

Weak form efficiency

Weak form efficiency is one of the three different degrees of efficient market hypothesis (EMH); it claims that past price movements and volume data do not affect stock prices. As weak form efficiency is theoretical in nature, advocates assert that fundamental analysis can be used to identify undervalued and overvalued stocks. Therefore, keen investors looking for profitable companies can earn profits by researching financial statements.

How Weak Form Efficiency Can Be Used

The main tenet of weak form efficiency is the randomness of stock prices makes it impossible to find price patterns and take advantage of price movements. Specifically, daily stock price movements are completely independent of each other, and it is assumed price momentum does not exist. Additionally, past earnings growth does not predict current or future earnings growth.

Weak form efficiency does not consider technical analysis to be accurate and asserts that even fundamental analysis, at times, can be flawed.

2. REVIEW OF LITERATURE:

Sharma and Kennedy (1977) compared the behavior of stock indices of the Bombay, London and New York stock exchanges during 1963-73 using run test and spectral analysis. Both test confirmed the random movement of stock indices for all the three stock exchanges. They concluded that stocks on the BSE (Bombay Stock Exchange) follow random walk and are weak- form efficient.

Ramachandran (1986) tested for the weak - form of Efficient Market Hypothesis using weekend prices of 60 scrips over the period 1976-81. He used filter rule tests in addition to runs test and serial correlation tests and found support for the weak - form of EMH.

Yalawar (1988) conducted an intensive study on the efficiency of BSE (Bombay Stock Exchange). He studied the month end closing prices of 122 stocks listed on the BSE during the period 1963-82. He used only the non-parametric tests, Spearman's rank correlation test and found the behavior of stock prices to be random.

Keasey and Mobarek (2000), in their paper investigated the weak-form efficiency of an emerging market by taking evidence from Dhaka Stock Market of Bangladesh over the period 1988 to 1997 by employing both parametric and non parametric tests. The study reveals that Dhaka Stock Market of Bangladesh is weak - form inefficient.

Pandey (2003) analyzed the efficiency of the Indian stock markets by using three Indian stock indices to test the efficiency level in Indian stock market and the random walk nature of the stock market by using the runs test and the Auto Correlation Function ACF (K) for the period from January 1996 to June 2002. The study found that the series of stock indices in the Indian stock market biased the random time series and do not confirm the Random Walk Theory.

Sharma et al. (2009) examined the weak-form efficiency of eleven (11) securities listed on the BSE using weekly data from July 2007 to October 2007 by employing runs test and auto-correlation tests. The study concludes that the BSE is weak-form efficient and the stock prices are having very scrimpy effect on future prices which implies that an investor cannot reap out abnormal profits as the current share prices already reflect the effect of past share prices.

3. OBJECTIVE OF THE STUDY

The study is conducted to determine whether SBI has weak form efficiency in Indian market or not.

3.1 HYPOTHESIS

H_0 = NULL HYPOTHESIS = SBI has weak form efficiency in Indian market

i.e. "price change is random"

H_a = ALTERNATIVE HYPOTHESIS = SBI doesn't have weak form efficiency in Indian market i.e. "price change is not random"

Hypothesis was tested at 20 percent significance level at which **Z** value is 1.28

4. RESEARCH METHODOLOGY:

Research Type	: Empirical
Type of sampling	: Judgmental Sampling
Sampling unit	: Banking Companies in India {SBI}
Sampling universe	: Bank scrip listed and traded in NSE.
Data type	: Secondary data
Data source	: www.nseindia.com
Tools for analysis	: RUNS Test

STATE BANK OF INDIA

The **State Bank of India** (**SBI**) is an Indian multinational, public sector banking and financial services statutory body. It is a government corporation statutory body headquartered in Mumbai, Maharashtra. SBI is ranked as 236th in the Fortune Global 500 list of the world's biggest corporations of 2019. It is the largest bank in India with a 23% market share in assets, besides a share of one-fourth of the total loan and deposits market.

The bank descends from the Bank of Calcutta, founded in 1806, via the Imperial Bank of India, making it the oldest commercial bank in the Indian subcontinent. The Bank of Madras merged into the other two "presidency banks" in British India, the Bank of Calcutta and the Bank of Bombay, to form the Imperial Bank of India, which in turn became the State Bank of India in 1955. The Government of India took control of the Imperial Bank of India in 1955, with Reserve Bank of India (India's central bank) taking a 60% stake, renaming it the State Bank of India.

5. DATA ANALYSIS:

Series	Date	Close Price	Runs {+/–}
EQ	1-Apr-16	195.65	
EQ	4-Apr-16	194.7	-
EQ	5-Apr-16	184.35	-
EQ	6-Apr-16	183.85	-
EQ	7-Apr-16	181.95	-
EQ	8-Apr-16	183.1	+
EQ	11-Apr-16	188.25	+
EQ	12-Apr-16	187.8	-
EQ	13-Apr-16	191.9	+
EQ	18-Apr-16	186.75	-
EQ	20-Apr-16	187.3	+
EQ	21-Apr-16	194.35	+
EQ	22-Apr-16	200.15	+
EQ	25-Apr-16	197.05	-
EQ	26-Apr-16	200.95	+
EQ	27-Apr-16	196.15	-
EQ	28-Apr-16	192.05	-
EQ	29-Apr-16	189	-
EQ	2-May-16	186	-
EQ	3-May-16	184.05	-
EQ	4-May-16	179.95	-
EQ	5-May-16	180.35	+
EQ	6-May-16	184.35	+
EQ	9-May-16	188.7	+
EQ	10-May-16	189.5	+
EQ	11-May-16	185	-
EQ	12-May-16	188.5	+
EQ	13-May-16	184.85	-
EQ	16-May-16	176.8	-
EQ	17-May-16	176.85	+
EQ	18-May-16	179.95	+
EQ	19-May-16	172.7	-
EQ	20-May-16	171.35	-
EQ	23-May-16	168.4	-
EQ	24-May-16	169.5	+
EQ	25-May-16	175.1	+

EQ	26-May-16	184.15	+
EQ	27-May-16	195.9	+
EQ	30-May-16	198.85	+
EQ	31-May-16	204.95	+
EQ	1-Jun-16	198.25	-
EQ	2-Jun-16	200.55	+
EQ	3-Jun-16	196.6	-
EQ	6-Jun-16	198.9	+
EQ	7-Jun-16	210.15	+
EQ	8-Jun-16	210.7	+
EQ	9-Jun-16	209.95	-
EQ	10-Jun-16	205.95	-
EQ	13-Jun-16	201.8	-
EQ	14-Jun-16	207.7	+
EQ	15-Jun-16	216.05	+
EQ	16-Jun-16	216	-
EQ	17-Jun-16	213.45	-
EQ	20-Jun-16	215.9	+
EQ	21-Jun-16	214	-
EQ	22-Jun-16	212.9	-
EQ	23-Jun-16	217.55	+
EQ	24-Jun-16	211.25	-
EQ	27-Jun-16	217.15	+
EQ	28-Jun-16	215.9	-
EQ	29-Jun-16	217.2	+
EQ	30-Jun-16	218.8	+
EQ	1-Jul-16	219.6	+
EQ	4-Jul-16	223	+
EQ	5-Jul-16	223.5	+
EQ	7-Jul-16	220.05	-
EQ	8-Jul-16	218.3	-
EQ	11-Jul-16	224.7	+
EQ	12-Jul-16	226.7	+
EQ	13-Jul-16	227.7	+
EQ	14-Jul-16	232	+
EQ	15-Jul-16	231.5	-
EQ	18-Jul-16	228.75	-
EQ	19-Jul-16	229.6	+
EQ	20-Jul-16	231.15	+
EQ	21-Jul-16	225.65	-
EQ	22-Jul-16	223.5	-
EQ	25-Jul-16	229.9	+
EQ	26-Jul-16	226.7	-
EQ	27-Jul-16	229.25	+
EQ	28-Jul-16	231	+

EQ	29-Jul-16	229.4	-
EQ	1-Aug-16	227.3	-
EQ	2-Aug-16	228.05	+
EQ	3-Aug-16	226.65	-
EQ	4-Aug-16	225.65	-
EQ	5-Aug-16	232.75	+
EQ	8-Aug-16	233.25	+
EQ	9-Aug-16	235.15	+
EQ	10-Aug-16	231.5	-
EQ	11-Aug-16	227.15	-
EQ	12-Aug-16	243.3	+
EQ	16-Aug-16	246.75	+
EQ	17-Aug-16	246.25	-
EQ	18-Aug-16	248.4	+
EQ	19-Aug-16	258.5	+
EQ	22-Aug-16	254.8	-
EQ	23-Aug-16	254.75	-
EQ	24-Aug-16	254.4	-
EQ	25-Aug-16	250.15	-
EQ	26-Aug-16	246.6	-
EQ	29-Aug-16	249.05	+
EQ	30-Aug-16	252.25	+
EQ	31-Aug-16	252.5	+
EQ	1-Sep-16	252	-
EQ	2-Sep-16	254.6	+
EQ	6-Sep-16	260.1	+
EQ	7-Sep-16	266.8	+
EQ	8-Sep-16	268.35	+
EQ	9-Sep-16	264.1	-
EQ	12-Sep-16	252.75	-
EQ	14-Sep-16	257.55	+
EQ	15-Sep-16	256	-
EQ	16-Sep-16	254.3	-
EQ	19-Sep-16	255.65	+
EQ	20-Sep-16	254.45	-
EQ	21-Sep-16	251.15	-
EQ	22-Sep-16	257.9	+
EQ	23-Sep-16	254.55	-
EQ	26-Sep-16	251.65	-
EQ	27-Sep-16	249	-
EQ	28-Sep-16	253.75	+
EQ	29-Sep-16	247.25	-
EQ	30-Sep-16	251.25	+
EQ	3-Oct-16	255.3	+
EQ	4-Oct-16	259.75	+

EQ	5-Oct-16	260.85	+
EQ	6-Oct-16	256.8	-
EQ	7-Oct-16	258.7	+
EQ	10-Oct-16	256.6	-
EQ	13-Oct-16	249.65	-
EQ	14-Oct-16	252.1	+
EQ	17-Oct-16	253.2	+
EQ	18-Oct-16	256.9	+
EQ	19-Oct-16	255.4	-
EQ	20-Oct-16	260.2	+
EQ	21-Oct-16	258.5	-
EQ	24-Oct-16	262.95	+
EQ	25-Oct-16	261.45	-
EQ	26-Oct-16	258.75	-
EQ	27-Oct-16	255.4	-
EQ	28-Oct-16	258	+
EQ	30-Oct-16	257.6	-
EQ	1-Nov-16	258.95	+
EQ	2-Nov-16	251.05	-
EQ	3-Nov-16	245.65	-
EQ	4-Nov-16	242.85	-
EQ	7-Nov-16	252.7	+
EQ	8-Nov-16	252.65	-
EQ	9-Nov-16	260	+
EQ	10-Nov-16	281.3	+
EQ	11-Nov-16	273	-
EQ	15-Nov-16	278.2	+
EQ	16-Nov-16	277.2	-
EQ	17-Nov-16	277.45	+
EQ	18-Nov-16	275.8	-
EQ	21-Nov-16	257.35	-
EQ	22-Nov-16	257.35	
EQ	23-Nov-16	258.65	+
EQ	24-Nov-16	261.75	+
EQ	25-Nov-16	260.95	-
EQ	28-Nov-16	253.55	-
EQ	29-Nov-16	252.7	-
EQ	30-Nov-16	258.35	+
EQ	1-Dec-16	255.65	-
EQ	2-Dec-16	254.1	-
EQ	5-Dec-16	256.9	+
EQ	6-Dec-16	259.1	+
EQ	7-Dec-16	255.6	-
EQ	8-Dec-16	259.9	+
EQ	9-Dec-16	266.65	+

EQ	12-Dec-16	263.65	-
EQ	13-Dec-16	266.15	+
EQ	14-Dec-16	262.9	-
EQ	15-Dec-16	265.4	+
EQ	16-Dec-16	264.75	-
EQ	19-Dec-16	261.35	-
EQ	20-Dec-16	254.55	-
EQ	21-Dec-16	255.35	+
EQ	22-Dec-16	249.8	-
EQ	23-Dec-16	249.15	-
EQ	26-Dec-16	244.2	-
EQ	27-Dec-16	248.75	+
EQ	28-Dec-16	247.75	-
EQ	29-Dec-16	247.65	-
EQ	30-Dec-16	250.2	+
EQ	2-Jan-17	243.6	-
EQ	3-Jan-17	244.9	+
EQ	4-Jan-17	242.9	-
EQ	5-Jan-17	245.35	+
EQ	6-Jan-17	245.9	+
EQ	9-Jan-17	247.05	+
EQ	10-Jan-17	248.3	+
EQ	11-Jan-17	252.15	+
EQ	12-Jan-17	251.25	-
EQ	13-Jan-17	250.9	-
EQ	16-Jan-17	255.75	+
EQ	17-Jan-17	256	+
EQ	18-Jan-17	258.35	+
EQ	19-Jan-17	258.4	+
EQ	20-Jan-17	251.05	-
EQ	23-Jan-17	254.15	+
EQ	24-Jan-17	254.9	+
EQ	25-Jan-17	259.2	+
EQ	27-Jan-17	266.45	+
EQ	30-Jan-17	263.95	-
EQ	31-Jan-17	260.35	-
EQ	1-Feb-17	270.7	+
EQ	2-Feb-17	273.3	+
EQ	3-Feb-17	277.55	+
EQ	6-Feb-17	277.05	-
EQ	7-Feb-17	277.9	+
EQ	8-Feb-17	277.2	-
EQ	9-Feb-17	275.85	-
EQ	10-Feb-17	276.35	+
EQ	13-Feb-17	271.65	-

EQ	14-Feb-17	270.2	-
EQ	15-Feb-17	268.95	-
EQ	16-Feb-17	270.5	+
EQ	17-Feb-17	269.35	-
EQ	20-Feb-17	269.65	+
EQ	21-Feb-17	270.7	+
EQ	22-Feb-17	272.3	+
EQ	23-Feb-17	270.45	-
EQ	27-Feb-17	268.25	-
EQ	28-Feb-17	269.2	+
EQ	1-Mar-17	271.75	+
EQ	2-Mar-17	267.3	-
EQ	3-Mar-17	265.05	-
EQ	6-Mar-17	269.85	+
EQ	7-Mar-17	267.8	-
EQ	8-Mar-17	269.9	+
EQ	9-Mar-17	273.25	+
EQ	10-Mar-17	272.05	-
EQ	14-Mar-17	274.65	+
EQ	15-Mar-17	277.35	+
EQ	16-Mar-17	279.3	+
EQ	17-Mar-17	274.15	-
EQ	20-Mar-17	273.9	-
EQ	21-Mar-17	272.35	-
EQ	22-Mar-17	267.5	-
EQ	23-Mar-17	268.5	+
EQ	24-Mar-17	276.5	+
EQ	27-Mar-17	279.45	+
EQ	28-Mar-17	282.1	+
EQ	29-Mar-17	288.45	+
EQ	30-Mar-17	291.05	+
EQ	31-Mar-17	293.4	+

$$\mu = \frac{2n_1n_2}{n_1+n_2} + 1$$

$$\sigma^2 = \frac{2n_1n_2(2n_1n_2 - n_1 - n_2)}{(n_1+n_2)^2(n_1+n_2-1)}$$

Where n_1 = + Runs = 129 and n_2 = – Runs =117

After putting these value in μ and σ we get,

μ = 123.71, σ = 7.81

UPPER LIMIT = μ +1.28 σ and LOWER LIMIT = μ -1.28 σ

UPPER LIMIT = 123.71 + 1.28×7.81 = 133.71

LOWER LIMIT = 123.71 – 1.28×7.81 = 113.71

OBSERVED RUNS = 126

Interpretation

The observed runs fall between the upper and lower limit, so the null hypothesis $\{H_0\}$ is accepted and the alternate hypothesis $\{H_a\}$ is rejected.

6. CONCLUSION:

Null hypothesis has been accepted, which supports the findings that SBI has weak form efficiency in the Indian capital market i.e. share prices move independently of each other during the successive days.

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