



## Demonetization and Stock Market Efficiency: An Empirical Study of Selected BSE SENSEX Companies

\*Dr. Harmender Singh Saluja  
Professor and HOD  
MBA Programs

\*Maharaja Ranjit Singh Group of Institutions

\*\*Dr. Sunita Totala (Asst. Professor)

\*\*Shri Cloth Market Kanya Vanijya Mahavidyalaya  
Indore, Madhya Pradesh, India

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### Abstract

*Demonetization is the act of divesting a present currency unit of its status as legal tender of exchange. Demonetization brings enormous changes forth with directly or indirectly in various sectors of any economy. It was considered as a weapon against fighting lack money, inflation, corruption and crime. It acted as a liquidity shock and affected money supply in the market and economy. Demonetization might have affected economic activities and consequently might have affected the stock market efficiency of Indian Stock Market.*

*The present study empirically examines the Weak Form of Market Efficiency of selected Bombay Stock Exchange (BSE) SENSEX companies for one year before and after demonetization. For this purpose daily stock returns of selected BSE SENSEX companies will be considered for pre demonetization period (9<sup>th</sup> November 2015 to 8<sup>th</sup> November 2016) and post demonetization period (9<sup>th</sup> November 2016 to 8<sup>th</sup> November 2017) to find out is there any change in stock market efficiency of the selected companies due to demonetization.*

**Key Words:** *Demonetization; Stock Market Efficiency; Bombay Stock Exchange; SENSEX Companies; Weak Form of Stock Market Efficiency.*

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### Introduction

Demonetization is the act of divesting a present currency unit of its status as legal tender of exchange. Demonetization brings enormous changes forth with directly or indirectly in various sectors of any economy. It was considered as a weapon against fighting lack money, inflation, corruption and crime. It acted as a liquidity shock and affected money supply in the market and economy. Demonetization might have affected economic activities and consequently might have affected the stock market efficiency of Indian Stock Market.

Stock market efficiency refers to a state in which current stock prices reflect all the publicly available information about the security and market. Stock market efficiency is an important parameter to judge the efficiency of a financial system. Market efficiency has an influence over the investment strategy because if market is efficient, trying to pickup winners will be a waste of time. The accepted view is that when information arises, the news spreads very quickly and is incorporated into the prices of securities without any delay. Under such a condition, the current market price in any financial market could be the best unbiased estimate of the value of the investment (Vaidyanathan and Gali, 1994).

### Demonetization

Demonetization is the act of stripping a currency unit of its status as legal tender. When any Government withdraws the legal tender rights of any currency, it is known as demonetization. Demonetization in a booming economy is like a huge gamble played by the government to impact on black money (unaccounted money), corruption, terrorist activities, cash hoarders, counterfeit currency, etc..

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## BSE SENSEX Index

The Indian Stock Market is considered to be one of the earliest in Asia and is regarded as the barometer of the health of the Indian economy. Indian Stock Market is represented by two major stock exchanges i.e., Bombay Stock Exchange (BSE) and National Stock Exchange (NSE), and their representative index are SENSEX, currently known as S&P BSE SENSEX and S&P CNX Nifty respectively. Standard and Poor's Bombay Stock Exchange Sensitivity Index popularly known as S&P BSE SENSEX, is a value-weighted index which was started on January 1st, 1986. The S&P BSE SENSEX is regarded as the pulse of the domestic Indian Stock Market. It consists of the 30 largest and most actively traded stocks, representative of various sectors, on the Bombay Stock Exchange ([www.bseindia.com](http://www.bseindia.com)).

## Weak Form of Market Efficiency

The Weak Form of Market Efficiency emphasizes that the current market price of a security fully reflect all information including history of past prices, trading volume data, and other market generated information. The Weak Form of the Efficient Market Hypothesis holds that information on the past movements of stock prices and volumes cannot be used to predict future stock prices. Therefore, there is no benefit as far as forecasting the future is concerned in examining the historical sequence of the prices (Fama, 1970).

## Rationale Of The Study

Stock market indices are acting as barometer to measure the performance of shares of various companies from different sectors. The investors normally identify the most promising sectors and review the performance of companies within the sector to determine which individual stock would provide better returns and invest accordingly. The demonetization causes liquidity shocks in the economy. In this type of situation, investors try to reconstruct the portfolio according to the information available to them; this may lead to change in the efficiency of the stock market. The present study empirically examines the Weak Form of Market Efficiency of selected BSE SENSEX companies for one year before and one year after demonetization.

## Literature Review

An another study examined the Weak Form of Market Efficiency of Indian Stock Market using daily returns of 50 Nifty Stocks for 11 years from 2003-2013 using 2742 observations. Runs Test and Autocorrelation Test were applied; the study concluded that Indian Stock Market was inefficient in the Weak Form (Shafi, 2014). An attempt was made to examine the Weak Form of Efficient Market Hypothesis of selected 8 stocks of Indian Stock Market by using daily stock returns for a period of 11 February 2013 to 10 February 2014. Auto Correlation Test and Run Test were used for testing Weak Form of Market Efficiency. The result of Run Test showed that Weak Form of Market Efficiency existed for daily price movement of stocks but Weak Form of Efficiency did not hold good for all the stock in Autocorrelation Test. The study suggested that with the help of strong and adequate supervision by the regulations and authorities, efficiency of market can be improved and weak form may be converted into semi strong and strong form (Lavleen and Malhotra, 2015).

To investigate the Weak Form Efficiency in the Karachi Stock Exchange, daily, weekly and monthly data were taken from July 1997 to April 2012. On applying Descriptive Statistics, Unit Root Test, Kolmogrov-Smirnov Test and Runs Test, it was resulted that Karachi Stock Market of Pakistan was not Weak Form Efficient in short run time-period at daily and weekly prices. But in long run time-period at monthly data, the market became Weak Form Efficient and proved the Random Walk Hypothesis (Nawaza, et. al., 2017). A study analyzed the impact of demonetization on the stock market by using efficient market hypothesis. It took 16 companies from National Stock Exchange, India from year 2012 to year 2016. The study found a significant impact of demonetization on the stock market and also observed some fluctuations (Bhardwaz, et. al., 2017).



## Objectives

- To test the Weak Form of Stock Market Efficiency of Selected BSE SENSEX Companies for pre demonetization period.
- To test the Weak Form of Stock Market Efficiency of Selected BSE SENSEX Companies for post demonetization period.
- To compare the Weak Form of Stock Market Efficiency of Selected BSE SENSEX Companies for pre and post demonetization period.

## Hypothesis

For accomplishment of the objectives following Null Hypothesis were drawn:

- H<sub>01</sub>: Daily Returns of Selected BSE SENSEX Companies are Normally Distributed for the Pre Demonetization Period.
- H<sub>02</sub>: Daily Returns of Selected BSE SENSEX Companies are Normally Distributed for the Post Demonetization Period.
- H<sub>03</sub>: Daily Returns of Selected BSE SENSEX Companies are Random i.e., Weak Form Efficient for Pre Demonetization Period.
- H<sub>04</sub>: Daily Returns of Selected BSE SENSEX Companies are Random i.e., Weak Form Efficient for Post Demonetization Period.
- H<sub>05</sub>: There is no change in Weak Form of Stock Market Efficiency of the Selected BSE SENSEX Companies for Pre and Post Demonetization.

## Research Methodology

### The Study

The present study undertakes empirical examination of Weak Form of Market Efficiency of Selected BSE SENSEX Companies for one year before and one year after the demonetization. For this purpose, daily returns of Selected BSE SENSEX Companies will be considered for pre demonetization period (9<sup>th</sup> November 2015 to 8<sup>th</sup> November 2016) and post demonetization period (9<sup>th</sup> November 2016 to 8<sup>th</sup> November 2017) to find out is there any change in stock market efficiency of the selected companies.

### The Methodology

The seven BSE SENSEX companies were selected from 7 sectors of the economy. Daily returns of Selected BSE SENSEX Companies were used. The available secondary data were collected from official website of Bombay Stock Exchange i.e., [www.bseindia.com](http://www.bseindia.com). To normalize the time series data, natural returns have been calculated by taking natural log of the daily closing values of the selected companies. The normality of data series of daily returns of the selected companies was tested by Descriptive Statistics using SPSS 17 Version. Weak Form of Market Efficiency of the Selected BSE SENSEX Companies was tested by Non-parametric Runs Test using software SPSS 17.

## Results, Analysis And Interpretation

### Normality Test

The normality of the data series was tested by Descriptive Statistics. The details are as follows:

### Descriptive Statistics

As per Descriptive Statistics Analysis, Values for Skewness at 0 and Kurtosis at 3 reveal that the observed financial data series is normally distributed. Jarque-Bera Test is also a statistics for testing whether or not a data series is normally distributed. Under the normality in distribution, the Jarque-Bera is to equal to 0. The Descriptive Statistics was applied to examine the normal distribution of daily stock returns for the pre and post period of demonetization separately and their interpretations are as follows:

Table 1.a. Descriptive Statistics (Pre Demonetization Period)



Variables	Infosys Ltd.	Maruti Ltd.	NTPC Ltd.	Reliance Ltd..	SBI Ltd.	Sun Pharma Ltd.	Tata Steel Ltd.
Mean	0.000584	- 0.000815	- 0.000586	-0.000178	- 0.00010	0.000715	-0.002487
Median	0.0012	- 0.001058	- 0.00131	-0.000991	0.000812	0.000246	-0.001921
Maximum	0.092232	0.050058	0.046836	0.052758	0.067073	0.077004	0.074478
Minimum	-0.055389	- 0.075101	- 0.040197	-0.041444	- 0.10883	-0.056631	-0.122337
Std. Dev.	0.014833	0.016748	0.014957	0.014194	0.0226	0.016367	0.024296
Skewness	0.697912	-0.35099	0.186746	0.367415	- 0.55961	0.408198	-0.283134
Kurtosis	9.08638	5.056541	3.72392	3.875015	5.497016	5.840648	5.749984
Jarque-Bera	398.0469	48.20517	6.77381	13.32826	76.43742	89.1778	80.47301
Probability	0	0	0.033813	0.001276	0	0	0
Sum	0.143057	- 0.199571	-0.1435	-0.043668	- 0.026069	0.175213	-0.609384
Sum Sq. Dev.	0.053682	0.068444	0.054588	0.049156	0.124621	0.065365	0.14403
Observations	245	245	245	245	245	245	245

Table 1.a as presented above, showed that on application of Descriptive Statistics on daily returns of the BSE SENSEX companies using 245 observations for each sample company for the pre demonetization period, it was found that the value of Skewness and Kurtosis for all the selected BSE SENSEX Companies were not equal to 0 and 3 respectively. Moreover, the value of Jarque-Bera is not equal to 0. So, the Null Hypothesis,  $H_{01}$ : Daily Returns of Selected BSE SENSEX Companies are Normally Distributed for the Pre Demonetization Period was rejected. It indicated that the daily stock returns of BSE SENSEX companies were not normally distributed during the Pre Demonetization Period.

**Table 1.b. Descriptive Statistics (Post Demonetization Period)**

Variables	Infosys Ltd.	Maruti Ltd.	NTPC Ltd.	Reliance Ltd.	SBI Ltd	Sun Pharma Ltd.	Tata Steel Ltd.
Mean	1.65E-05	- 0.001701	- 0.000537	0.0005	-0.00071	0.000832	-0.002211
Median	0.000166	- 0.000198	0.000623	-0.000899	8.70E-05	0.000854	-0.00065
Maximum	0.100947	0.058831	0.034222	0.69729	0.067323	0.122797	0.081225
Minimum	-0.04671	- 0.045802	- 0.055315	-0.104105	-0.24360	-0.045905	-0.088625
Std. Dev.	0.014397	0.012726	0.01297	0.046937	0.022151	0.019392	0.018492



Skewness	1.315151	-0.088664	0.673339	13.20347	-5.32833	1.008987	-0.568763
Kurtosis	12.94334	5.845531	4.949225	197.5642	60.58384	8.967105	6.841055
Jarque-Bera	1093.148	83.99439	58.00119	398376.2	35437.78	410.0119	165.8259
Probability	0	0	0	0	0	0	0
Sum	0.004088	-0.421968	0.133166	0.124037	-0.176046	0.206418	-0.548332
Sum Sq. Dev.	0.051197	0.040004	0.041551	0.544152	0.121196	0.092881	0.084465
Observations	248	248	248	248	248	248	248

Table 1.b as presented above, showed that on application of Descriptive Statistics on daily returns of the selected BSE SENSEX Companies using 248 observations for each sample company for the Post Demonetization Period, it was found that the value of Skewness and Kurtosis for all the BSE Sectoral Indices were not equal to 0 and 3 respectively. Moreover, the value of Jarque-Bera is not equal to 0. So, the Null Hypothesis,  $H_0$ : "Daily Returns of Selected BSE SENSEX Companies are Normally Distributed for the Post Demonetization Period" was rejected. It indicated that the daily stock returns of BSE SENSEX Companies were not normally distributed during the Post Demonetization Period. On the basis of Descriptive Statistics, finally, it is concluded that the financial data series for Pre and Post Demonetization Period were not normally distributed. So, further analysis on the data series is to be done with the help of non parametric test Runs Test.

### Test Of Weak Form Of Stock Market Efficiency

The Test of Weak Form of Stock Market Efficiency of selected BSE SENSEX Companies was tested with the help of Runs Test.

Table 2.a. Runs Test (Pre Demonetization Period)

Variables	Infosys Ltd	Maruti Ltd.	NTPC Ltd.	Reliance Ltd.	SBI Ltd.	Sun Pharma Ltd	Tata Steel Ltd
Test Value	0.001200	-0.001058	0.001309	-0.000991	0.000811	0.000245	-0.00192
Cases < Test Value	122	122	122	122	122	122	122
Cases >= Test Value	123	123	123	123	123	123	123
Total Cases	245	245	245	245	245	245	245
Number of Runs	122	138	121	125	116	129	127
Z	-0.191798	1.856842	-0.319838	0.192321	-0.960039	0.704481	0.448401
Asymp. Sig. (2-tailed)	0.84789	0.06333	0.74909	0.84749	0.33703	0.48113	0.65386
a. Median							

Table 2.b. Runs Test (Post Demonetization Period)

Variables	Infosys Ltd.	Maruti Ltd.	NTPC Ltd.	Reliance Ltd.	SBI Ltd.	Sun Pharma Ltd.	Tata Steel Ltd.
Test Value	0.000166	-0.00019	0.00062	-0.000898	8.69943	0.00085	-0.00065



Cases < Test Value	124	124	124	124	124	124	124
Cases >= Test Value	124	124	124	124	124	124	124
Total Cases	248	248	248	248	248	248	248
Number of Runs	141	119	144	122	134	123	126
Z	0.903612	-0.763547	1.41790	-0.38177	1.1453	-0.25451	0.12725
Asymp. Sig. (2-tailed)	0.06173	0.445136	0.315610	0.702629	0.252075	0.799096	0.898736
a. Median							

On application of Runs Test using Median as base to test the Weak Form Market Efficiency of daily returns of the selected BSE SENSEX Companies to decide the randomness of the data set for Pre Demonetization and Post Demonetization Period individually, the study found that for all the sample companies, the calculated P Values > 0.05 and the calculated Z Values fall in the acceptance region limited by the critical value  $\pm 1.96$  at 5% level of significance. So, the Null Hypothesis, H0<sub>3</sub>: Daily Returns of Selected BSE SENSEX Companies are Random i.e., Weak Form Efficient for Pre Demonetization Period, H0<sub>4</sub>: Daily Returns of Selected BSE SENSEX Companies are Random i.e., Weak Form Efficient for Post Demonetization Period" were accepted. On the basis of Runs Test, it indicated that there is an existence of Weak Form Efficient for both the period i.e., Pre Demonetization Period and Post Demonetization Period. On the basis of Runs Test, the null hypothesis, "H0<sub>5</sub>: There is no change in Weak Form of Stock Market Efficiency of the Selected BSE SENSEX Companies for Pre and Post Demonetization" was also accepted. It indicated that daily returns of selected BSE SENSEX Companies are Random i.e., Weak Form Efficient for both the period, i.e. Pre Demonetization Period and Post Demonetization Period.

### Conclusion

The data set was not normally distributed for the study period. The results of Runs Test showed that there is an existence of Weak Form Efficient during Pre Demonetization Period and Post Demonetization Period also, for the selected BSE SENSEX companies. So, there is no change in the efficiency level of selected BSE SENSEX companies during Pre Demonetization Period and Post Demonetization Period. The demonetization did not affect the stock market efficiency for the concerned companies; it remained as it was even after the demonetization.

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