Impact of Demonetization on Stock Market Efficiency: A Study of BSE SENSEX and NSE NIFTY Index

H.S. Saluja

Management Department, Maharaja Ranjit Singh Group of Institutions, Devi Ahilya Vishwavidyalaya, Indore, India

*Corresponding Author: harmendersaluja@gmail.com. Tel.: +91-94254-75270

Abstract— Demonetization may affect the various sectors of the Indian economy. As Demonetization affect liquidity in the economy that impacted economic activities. The change in the money supply in any economy might have affected the performance of its various sectors and might affect the Stock Market Efficiency. So, the present study empirically examines the Weak Form of Market Efficiency changes of BSE SENSEX Index and NSE Nifty Index of Indian Stock Market, due to demonetization. For this purpose daily returns of BSE SENSEX Index of Bombay Stock Exchange (BSE) and CNX Nifty Index of National Stock Exchange (NSE) will be considered.

Keywords **-** Demonetization; Bombay Stock Exchange, National Stock Exchange, Weak Form of Stock Market Efficiency, BSE SENSEX Index; NSE Nifty Index.

I. INTRODUCTION

Demonetization may affect the various sectors of the Indian economy. As Demonetization affect liquidity in the economy that impacted economic activities. Demonetization affects the money supply and any changes in either the cash flows or the discount rate will affect the fundamentals of stocks. Various economic theories had also validated the strong relationship between money supply and stock price movements. The change in the money supply in any economy might have affected the performance of its various sectors and might affect the Stock Market Efficiency. As demonetization leads to a situation where the country would suddenly feel short of the money that it required needed to enable the transactions. It is resulting into decrease in prices of goods and services. Until money comes into circulation the purchasing power of people would negatively impact the prices in various industries in the economy. Due to this a resultant impact on stock market was also well expected [1].

The present study empirically examines the changes in Weak Form of Market Efficiency level of BSE SENSEX Index and NSE Nifty Index of Indian Stock Market, due to demonetization. For this purpose daily closing index returns of BSE SENSEX Index of Bombay Stock Exchange (BSE) and CNX Nifty Index of National Stock Exchange (NSE) have been taken for 18 months before and 18 months after the demonetization. Secondary data for 18 months before from 1st May 2015 to October 2016 taken as Pre Demonetization Period and 18 months after i.e., from November 2016 to April 2018 taken as Post Demonetization

Period. The paper is organized as follows, Section I contains the introduction of Demonetization, Stock Market Efficiency and Indian Stock Market, Section II contain the Literature Review, Section III contain the Objectives of the Study, Hypotheses and Research Methodology, Section IV describes Results, Analysis and Interpretation along with tables, Section V contains Conclusions, Section VI describes Implications and Suggestions with future directions.

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. In a booming economy like India it is like a huge gamble played by the government to impact on black money (unaccounted money), counterfeit currency, corruption, terrorist activities, cash hoarders, etc.

STOCK MARKET EFFICIENCY
The main objective of stock market is the allocation of economic resources into productive activities of the economy. This is possible only if the securities traded in the stock markets are priced appropriately. A stock market in which stock prices fully reflect all available information, termed as efficient stock market. The Stock Market Efficiency has been classified into three categories depending on the information set that is fully reflected in the security prices, Weak Form of Efficiency, Semi Strong Form of Efficiency and Strong Form of Efficiency [2]. Weak Form of Efficiency states that the current stock prices reflect all the information that is contained in the historical sequence of

prices. It is also called as Random Walk Theory Semi-strong Form of Efficiency, states that current market prices not only reflect all information content of historical prices but also reflect all the information, which are publicly available about the companies being studied; and Strong Form of Efficiency, states that current market prices reflect all information whether it is publicly available or private information i.e., insiders information [3].

INDIAN STOCK MARKET: BSE SENSEX INDEX AND NSE NIFTY INDEX

The Indian Stock Market is considered as the barometer of the health of the Indian economy. Indian Stock Market is represented by two major stock exchanges. The Bombay Stock Exchange and National Stock Exchange, and their representative index are SENSEX and S & P CNX Nifty respectively. Bombay Stock Exchange Sensitivity Index (BSE SENSEX) is a value-weighted index that was started on January 1st, 1986. The BSE SENSEX is regarded as the pulse of the domestic stock markets in India. It comprises of the 30 largest and most actively traded stocks of various sectors on the Bombay Stock Exchange (www.bseindia.com). Standard & Poor's CRISIL NSE Index 50 or S&P CNX Nifty nicknamed Nifty 50 or simply Nifty is the leading index for large companies on the National Stock Exchange. It comprises of 50 stocks of large companies accounting for 23 sectors of the Indian economy. Nifty is used for a variety of purposes such as benchmarking fund portfolios, index funds and index based derivatives (www.nseindia.com).

II. LITERATURE REVIEW

A study empirically examined the relationship between money supply and stock prices. Study also analyzed the impact of unanticipated and anticipated changes in money supply on the US stock market using quarterly data from 1959 to 2006. On application of Regression Analysis it was found that both anticipated and unanticipated changes in money supply were positively related with stock prices. It was also concluded that anticipated changes in money supply matter more than the unanticipated changes in money supply in order to determine stock prices [4]. Another study investigated the interrelationship between stock prices and monetary variables . Study used variables namely, money supply, interest rate, inflation rate and exchange rate for Jamaican economy with a sample of monthly data from Jan. 1990 to Mar. 2009. On application of Johansen's Co-integration and Granger Causality it was confirmed the existence of a long term relationship between the variables. The study found a significant long term relationship between the JSE Index and the monetary variables. Study further concluded that only money supply to be a consistent predictor of the stock prices [5]. Another study suggested that the changes in money supply affect the real interest rates

in the economy, affecting the economic activities and its transmission mechanisms. The change in the economic activities of the companies is represented by their stocks listed in the stock exchanges. It will also affect the future expected cash flows to the stockholders. It showed a positive relationship between money supply and stock prices. Study also found that any change in the interest rate also affects the discounting process and accentuates this positive relationship. However, the real side impact of any demonetization move will also depend upon the relative share of connected and unconnected sectors of the economy [1].

III. OBJECTIVES OF THE STUDY

The objectives of the study were:
- To test the normality of the daily returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period.
- To test the normality of the daily returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period.
- To test the Weak Form Market Efficiency of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period.
- To test the Weak Form Market Efficiency of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period.
- To find out is there any change in Stock Market Efficiency level of BSE SENSEX Index and NSE Nifty Index for pre and post demonetarization.

HYPOTHESIS

Followings were the Null Hypothesis to test the above objectives:
- $H0_1$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period are Normally Distributed.
- $H0_2$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period are Normally Distributed.
- $H0_3$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period are Weak Form Efficient i.e., Random.
- $H0_4$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period are Weak Form Efficient i.e., Random.
- $H0_6$: There is no change in efficiency level of Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period and Post Demonetization Period.

RESEARCH METHODOLOGY

The present study explored the impact of demonetization on Stock Market Efficiency level of Indian Stock Market. The study empirically examines the Weak Form of Market Efficiency by using daily returns of BSE SENSEX Index and NSE Nifty Index during demonetization period. The objective of the study is to identify the difference in level of market efficiency, if any, arising due to the demonetization. Daily closing index values of have been taken for 18 months before and 18 months after the demonetization. Secondary data for 18 months before from 1st May 2015 to October 2016 taken as Pre Demonetization Period and 18 months after i.e., from November 2016 to April 2018 taken as Post Demonetization Period. The secondary data were collected from official website of Bombay Stock exchange i.e., http://www.bse.com and National Stock Exchange i.e., https://nseindia.com. The normality of the daily index returns were tested by One Sample Kolmogorov-Smirnov (K-S Test) using software Eviews 7 Version. Weak Form of Market Efficiency of daily index returns was tested by Non-parametric Runs Test using software SPSS 17 Version.

IV. RESULTS, ANALYSIS AND INTERPRETATION
TEST OF NORMALITY

The normality of the data series was tested by One-Sample Kolmogorov-Smirnov Test. The details are as follows:

Table 1.a. One-Sample Kolmogorov-Smirnov Test (Pre Demonetization Data)

One-Sample Kolmogorov-Smirnov Test			
Variables		**SENSEX**	**Nifty**
N		370	370
Normal Parameters[a,b]	**Mean**	.00004287874170	.00009364485574
	Std. Deviation	.009887199563426	.009922699091510
Most Extreme Differences	**Absolute**	.073	.070
	Positive	.042	.055
	Negative	-.073	-.070
Kolmogorov-Smirnov Z		1.405	1.344
Asymp. Sig. (2-tailed)		.039	.045
a. Test Distribution is normal			
b. Calculated from data			

One-Sample Kolmogorov-Smirnov Test was applied on the BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period to test the normality of the data series. The KS results are shown in Table 1.a, as presented above, which indicate p<0.05 for the Z at the 5 percent level of significance for both the stock market indices, so the null hypothesis, H0$_1$: Daily Returns of BSE SENSEX Index and

NSE Nifty Index for the Pre Demonetization Period are Normally Distributed was rejected. It shows that BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period were not normally distributed.

Table 1.b. One-Sample Kolmogorov-Smirnov Test (Post Demonetization Data)

One-Sample Kolmogorov-Smirnov Test			
Variables		SENSEX	Nifty
N		371	371
Normal Parameters[a,b]	**Mean**	.00062569090489	.00059057866814
	Std. Deviation	.006572964193206	.006756523460292
Most Extreme Differences	**Absolute**	.056	.066
	Positive	.032	.030
	Negative	-.056	-.066
Kolmogorov-Smirnov Z		1.075	1.265
Asymp. Sig. (2-tailed)		.198	.081
a. Test Distribution is normal			
b. Calculated from data			

One-Sample Kolmogorov-Smirnov Test was applied on the BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period to test the normality of the data series. The KS results are shown in Table 1.a, as presented above, which indicate p>0.05 for the Z at the 5 percent level of significance for both the stock market indices, so the null hypothesis, H0$_2$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period are Normally Distributed was accepted. It shows that Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period were normally distributed.

TEST OF WEAK FORM OF STOCK MARKET EFFICIENCY

On the basis of One-Sample Kolmogorov-Smirnov Test, it is concluded that the financial data series for Pre Demonetarization Period were not normally distributed. So, further analysis on the data series is to be done with the help of Non Parametric Runs Test.

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

Runs Test		
Variables	**SENSEX**	**Nifty**
Test Value[a]	.000258052316	.000180719374
Cases < Test Value	185	185
Cases >= Test Value	185	185
Total Cases	370	370

Number of Runs	187	189
Z	.104	.312
Asymp. Sig. (2-tailed)	.917	.755
a. Median		

Non Parametric Runs Test, using Median as base, was applied to test the Weak Form Market Efficiency of daily returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period. The study found that for both the indices, the calculated P Values > 0.05 and the calculated Z Values fall in the acceptance region limited by the critical value ±1.96 at 5% level of significance. So, the Null Hypothesis, H0$_3$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period are Weak Form Efficient i.e., Random was accepted. It indicated that there is an existence of Weak Form Efficient during Pre Demonetarization Period on the basis of Runs Test.

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

Runs Test		
Variables	**SENSEX**	**Nifty**
Test Value[a]	.000806704721	.000766800990
Cases < Test Value	185	185
Cases >= Test Value	186	186
Total Cases	371	371
Number of Runs	182	182
Z	-.468	-.468
Asymp. Sig. (2-tailed)	.640	.640
a. Median		

Non Parametric Runs Test using Median as base was applied to test the Weak Form Market Efficiency of daily returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period. The study found that for both the indices, the calculated P Values > 0.05 and the calculated Z Values fall in the acceptance region limited by the critical value ±1.96 at 5% level of significance. So, the Null Hypothesis, H0$_4$: Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Post Demonetization Period are Weak Form Efficient i.e., Random are Weak Form Efficient i.e., Random was accepted. It indicated that there is an existence of Weak Form Efficient during Pre Demonetarization Period on the basis of Runs Test.

Further, on the basis of Runs Test the null hypothesis, H0$_6$: There is no change in efficiency level of Daily Returns of BSE SENSEX Index and NSE Nifty Index for the Pre Demonetization Period and Post Demonetization Period was also accepted. It indicated that there is no change in the Stock market Efficiency Level of Indian Stock Market due to Demonetization.

V. CONCLUSION

The Daily Returns of BSE SENSEX Index and NSE Nifty Index were found not normally distributed during the study period. On the basis of results of Non Parametric Runs Test it was concluded that there was an existence of Weak Form of Market Efficiency during Pre Demonetarization Period and Post Demonetarization Period for both the selected indices. So, the study concluded that there was no change in the efficiency level of BSE SENSEX Index and NSE Nifty Index due to Demonetarization.

VI. IMPLICATIONS & SUGGESTIONS

The study showed that the existence of Weak Form of Stock Market Efficiency in Indian Stock Market. There was no change in the efficiency level due to Demonetarization. The outcomes of the study are useful in accessing the possibility of gaining advantage in portfolio construction and diversification from the companies listed in BSE SENSEX Index and NSE Nifty Index. So, invertors should make decisions accordingly and create their portfolio. It is also advisable to the investors and financial analyst that there exists more chance for the speculative activities in the markets as it is possible to forecast the future price based on past data.

REFERENCES

[1]. P. Waknis, "Demonetisation: Some Theoretical Perspectives", Retrieved from MPRA: https://mpra.ub.uni-muenchen.de/id/eprint/76391
[2]. E. Fama, "The Behaviour of Stock Market Prices", Journal of Business, Vol. 38, pp. 34-104, 1965.
[3]. E. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work", Journal of Finance, Vol. 25, pp. 383-417, 1970.
[4]. B. Maskay, "Analyzing the Effect of Change in Money Supply on Stock Prices", The Park Place Economist, Vol.15, pp. 72-79, 2007.
[5]. K. Raymond, "Is There a Long Run Relationship between Stock Prices and Monetary Variables? Evidence from Jamaica. Bank of Jamaica", Financial Stability Department, Kingston, 2009.
www.bseindia.com
www.nseindia.com

Authors Profile

Dr. Harmender Singh Saluja pursed Bachelor of Commerece and Master of Commerce from Devi Ahilya Vishwavidyalaya, Indore. He pursued MBA (Finance) for IGNOU, New Delhi and Ph.D.in Management from Devi Ahilya Vishwavidyalaya, Indore. He is currently working as Professor in Management and HOD, MBA Programs at Maharaja Ranjit Singh Group of Institutions, Devi Ahilya Vishwavidyalaya, Indore. He has 22 years of teaching experience and 18 years of Research Experience. He has published more than 30 research papers in reputed journals. He has credit of attending and publication of more than 40 research papers at National and International level Conferences. His paper claimed as the best all around paper award in International Conference at Pacific University Udaipur in the year 2012. He has won Best Research Paper Awards in the year 2012, 2014 and 2015 at International Conferences. He is recognized Ph.D. Supervisor in Management Faculty at Devi Ahilya Vishwavidyalaya, Indore.