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Demonetization and Weak form Market Efficiency An Empirical Study

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Abstract:
The present study empirically examines the weak-form market efficiency of selected banking companies listed on the Indian stock market after demonetization. For this purpose, daily stock returns of selected NSE companies have been considered to find out any change in stock market efficiency post-demonetization period (9th November, 2016 to 9th November, 2018). This study concludes that there is weak-form market efficiency of the Indian stock market post demonetization period and these companies followed the random walk model.
Keywords: Demonetization; Stock Market Efficiency; National Stock Exchange; Banking Companies; Weak Form Market Efficiency.

Introduction:
Demonetization is the act of baring a currency unit of its status as legal tender. There is a change in national currency. The old currency unit must be replaced and retired with a new currency unit. The highest demonetization of India was the Rs.10000 note in 1938 and again in 1954. But these notes were demonetized in January 1946 and again demonetized in January 1978, according to RBI data. On 8th November 2016, The Government of India had taken a big economically change the decision. Prime Minister Narendra Modi had come out with his masterstroke on corruption, counterfeit currency, terrorism, and black money by announcing demonetization and ceasing Rs.500 and 1000 notes as a part of legal tender in India. However, this is the first time that the Rs.2000 currency note is being in circulation since November 10th, 2016. Demonetization has affected economic activities and consequently has affected the stock market efficiency of the Indian stock market.

Stock Market Efficiency:
The term stock market efficiency is used to explain the association between information and market prices. **Fama (1970)** defined market efficiency as the situation in which market security values still rapidly adjust at the beginning of new information. Fama suggested that the efficient market hypothesis can be divided into three categories:- **Weak form, Semi-Strong form, and Strong form market efficiency.**

Weak form market efficiency:
In weak-form market efficiency, we cannot earn an abnormal profit on the basis of historical stock prices. If the market is efficient then it would be useless to do technical analysis of past prices to predict future value as the information that will be obtained from the analysis will already be included in the current market prices. **Samuelson (1965)** and **Mandelbrot (1966)** have proved that if there is no transaction cost in the business and the flow of information is unaffected, then price changes in speculative markets tomorrow will only reflect the news and today will be independent of price changes. But by definition the news is unpredictable and the result should also be unpredictable and random. The term random walk is used in the financial literature to characterize a value chain, in which all current price changes with past prices represent a random departure. This model suggests that investment returns are chronologically independent and their probability distribution is constant over time. The subject was the process of searching for a drunken man that was abandoned in the middle of a field. That point was an unbiased estimate of the future state of intoxicated as he would presumably stagger along in an unpredictable. **Malkiel (2018)**

Review of Literature:
Many studies have been conducted to access market efficiency. It became all more important in present times because this particular event can be considered as a major event in the history of India's growth story. So various people, be it, consumers, be it the government, be it the political parties, be it the corporate houses, be the individuals or researcher. So there is a lot of confusion in the mind of the people about how is demonetization going to leave its imprints? A lot of works have been conducted regarding market efficiency some of these have been mentioned as under.
Chaudhuri S.K.(1991) analyzed weak form efficiency in short-run share price behavior and taken the period from January 1988 to April 1990 of daily price quotations of 93 actively traded shares. In this paper, the serial correlation test and the run

test had been applied to examine the stock market efficiency in weak form. This study concluded that the null hypothesis was rejected and the stock market was not weak-form efficient in short-run share price behavior.

Ranganatham & Subramanian (1993) examined the weak form of the efficient market hypothesis (EMH) and had taken seven years (1984-90) on a daily basis. The result of the analysis showed that to the assertion of the weak form of EMH there are some periodic cycles in the price movements.

Belgaumi (1995) investigated the weak-form efficiency of the Indian stock market. The data have been taken from 70 companies listed on the Bombay Stock Exchange (BSE) and the period of the study was from 1st April 1991 to 31st March 1992. For analysis the serial correlation test and runs test used and concluded that the Indian stock exchanges (BSE) are efficient in the weak form.

Poshakwale (1996) investigated the week effect on the Indian stock Market and evidence on week form efficiency in stock market efficiency. This study used different types of statistical tests like a run test, autocorrelation tests etc for analysis of market efficiency in BSE. The study concluded that the stock market is not weak-form efficient.

Hudson et al. (1996) examined the weak-form efficiency of the capital market and had taken 30 UK companies for analysis of technical trading rule from 1935 to 1994. For solving this problem it was concluded that term UK data has the predictive capacity by examining the technical trading rules but it would not allow the to Investor earn an excess return in the costly environment. This study used Moving Average Rules and Trading Range break out rules to finding out this conclusion. It had also revealed that the stock market was weak-form efficient.

Stephenson& Hubbard (1997) examined a large sample of bankrupt companies that have submitted reorganization plans. Evidence indicates that stockholders of these companies have unreasonably high expectations about their prospects.

Ahmad et al. (2006) testing the weak-form efficiency of the Indian stock market using the daily data for stock indices of NSE Nifty and BSE Sensex. For analysis, the study used many tests like Unit Root test, GARCH Model, Non -Parametric test (Run test), Kolmogorov-Smirnov (KS) test, etc. With the help of these tests, this study concluded that both stock indices NSE Nifty and BSE Sensex were inefficient in weak form.

Filis (2006) analyzed the market efficiency level of the Athens Stock Exchange (ASE) and for data analysis unit root tests (ADF test), Runs test, GARCH test have been used. On the basis of overall tests finally concluded that the Athens Stock Exchange was a weak-form an efficient market.

Islam, Sethapong & Clark (2007) examined the market efficiency of the emerging financial market of the Thai Stock Market. For analysis of the efficient market, the hypothesis applied two tests: Run test and Autocorrelation function test. The study concluded that the stock market was inefficiently caused by the implication of policy choices and a combination of the lack of its development.

Wickremasinghe and Kim (2008) examined the weak-form efficient Market Hypothesis (EMH) for the foreign exchange market of Sri Lanka and using univariate and panel unit root tests. In this study, according to the result, the investors cannot reflect various trading rules or techniques for transactions in the foreign exchange market to make abnormal profits.

Lim, Habibullah & Hinich (2009) re-examined the weak-form efficiency of Shanghai and Shenzhen Stock Exchanges of Chinese Stock Markets. The data have been taken from daily closing prices. For data analysis used thin trading, nonlinearity, and episodic serial dependencies tests and concluded that both markets follow a random walk for long periods.

Cheung k. & Andrew J. (2010) tested the weak-form efficiency of the Hong Kong Stock Exchange and employed the Variance Ratio test. The period had taken from January 1985 to June 1997. This study finally concluded that the Hong Kong stock exchange was weak-form efficient.

Gupta & Yang (2011) investigated the weak form of efficiency for the two major equity markets BSE and NSE. For testing the result of weak-form efficiency three methods were used that was ADF, PP, and KPSS tests. All methods rejected weak form efficiency for daily and weekly during all sample periods.

Jiang (2011) examined the market efficiency of the Chinese stock market within 15 to 30 minutes. For testing the weak form market efficiency used the daily return of data with ACF and PACF test. It concluded that the Chinese stock market was weak-form efficient and rejected semi-strong form efficiency.

Patel, Radadia & Dhawan (2012) analyzed the weak form of market efficiency of Asian four selected stock markets. This study employed different tests like runs test, unit root test, variance ratio, autocorrelation, and other tests. The runs test concluded that weak form inefficient in BSE Sensex and NIKKEI Market. According to the autocorrelation test, the equity markets of the Asian region remained inefficient for some lag whereas they were efficient for the other lag under the study.

Vidanage & Dayaratna-Banda (2012) examined the market efficiency of the Colombo Securities Exchange (CSE). Findings of the ADF and PP test are that future stock prices can not be predicted on the basis of past information and the results of

serial correlation tests, runs test, and variance ratio test that future price movements can be predicted by using past price movements. So finally concludes that the weak-form inefficiency is the normal situation in the Colombo Securities Exchange (CSE).

Mobarek & Fiorant (2012) determined the weak-form market efficiency of Brazil, Russia, India, and China (BRIC) by used daily data. This study also tests the random walk properties of stock prices by applying many tests like The serial correlation test, run test, two types of variance ratio test, etc. The study found that BRIC was weak-form efficient.

Kapusuzoglu (2013) examined the weak form of market efficiency that exists or not in the Istanbul Stock Exchange(ISE). The data collected from 1996 to 2012 of daily closing values and testing the weak form market efficiency used unit root tests, descriptive statistics, t-test, autocorrelation, and partial correlation. On the basis of the above test, the findings suggest that the ISE National 100 market was not efficient in weak form.

Kumar & Singh (2013) examined the Weak Form of Market Efficiency of selected Indian Stock Market indices and used Unit root test, Run test, and Kolmogorov Smirnov Goodness of Fit Test for finding the result. Finally, concluded that Indian Stock markets did not present a weak-form of market efficiency.

Worthington & Higgs examined the random walk hypothesis and weak-form efficiency in European Stock Market and taken 20 companies daily returns out of which 16 companies are related to the developed market and 4 companies are related to the emerging market. Finally concluded that the Emerging stock market only Hungary was weak-form efficient and developed stock market of Germany, Ireland, Portugal, Sweden, and The UK were weak-form efficient.

Kim, Yu & Zhang (2015) deals with the media in China have undergone extensive commercialization to become more market-driven over the last 35 years. Based on a sample of over two million newspaper articles, this study investigates whether the media in China has an incremental impact on stock price efficiency. We find that as media coverage of a firm increases: (1) its stock price synchronicity decreases, (2) the probability of informed trading of its stock increases, and (3) the extent to which its stock price deviates from random walk decreases. This study suggests that market-driven media can play the role of compensating for the underdeveloped governance institutions in transitional economies such as China.

Premalatha & Nedunchezhian (2016) investigated the Weak Form Efficient Market Hypothesis in the National Stock Exchange of selected 5 banks. The author used three tests: augmented dickey fuller test, autocorrelation, and run test. This study had taken the sample period from 1st January 2011 to December 2015. It concluded that NSE was not efficient in a weak form.

Kalu (2017) investigated the weak-form market efficiency of the Nigerian Stock Exchange. In this study five indexes were analyzed namely NSE banking index (BI), NSE 30 index (NI), Oil & Gas index (OG), NSE consumer goods index (CG), and NSE Lotus Islamic Index (LII). For the analyzed autocorrelation test, the Ljung–Box Q test, McLeod-Li portmanteau test, and ARCH-LM test have been used. On the basis of all tests concluded that the consumer goods sector and the oil and gas sector may be predicted and Share equities sector returns required nonlinear model and fundamental analysis.

Objective:

To test the weak form efficiency of selected banking companies listed on the Indian stock market after demonetization.

Research Methodology:

Tools for Analysis:

- **Descriptive statistics**
- **Unit Root Tests**
- **Serial correlation test**
- **Run test**

- **Unit Root Tests:**

  Augmented Dickey-Fuller test (ADF) and Phillips–Peron (PP) test are used to find out that unit root is available in time series data or not. ADF test is applied to determine the stationarity of stock prices. The stationarity process is considered an important property of the time series which must be carefully addressed.

  Unit Root Test investigates that the time series data is stationary or nonstationary. Market efficiency also demands nonstationary in stock prices so unit root test can be used for testing the market efficiency. The simplest form of the ADF Unit root equation as follows:-

  $\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_1 \sum_{t=1}^{m} \Delta Y_{t-1} + \varepsilon_t$

  In the above equation, ΔY represents the first-difference operator ($\Delta Y_t = Yt - Y_{t-1}$) and t represents the time variable. Here β denotes the intercept coefficient. Y_t, Y_{t-1}, represent NSE share price at time t and the NSE share price at time t-1, respectively. **Vidanage & Banda (2012)**

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- **Serial correlation test:**
  This test is also known as Durbin-Waston Test and Autocorrelation test. James Durbin and Geoffrey Watson had endorsed first time Durbin Waston test to check whether the series is autocorrelation or not. Autocorrelation is used to find out the correlation between current and previous returns. If the correlation between current return and previous return is positive then we can calculate that there is non- randomness in data and certain trends in return series. If the correlation between current return and previous return is negative then we can still calculate that there is also non- randomness in data and reverse trends in return series. If the correlation between current return and previous return is zero only then calculate that there is randomness in data. Given below equation is used to find out the correlation between current return and previous return :
  $\mathbf{Rt = \alpha + \beta\ Rt\text{-}1 + \varepsilon}$
  Here Rt is represented current period return (dependent variable), α is the constant term, β is the estimated parameter whose value is ($-1 < \beta < 1$), Rt-1 is represented previous period return and ε is the error term. **(Nisar & Hanif, 2012)**
- **Runs Test :**
  The run test is a nonparametric test and it is used to know the randomness in data and used to test the market efficiency. Given below equation used to find out randomness in data:
  $Z = R - X / \sigma$
  Here Z is represent Normalvariate, R is total number of runs, $X = (2n1n2+1/ n1+ n2)$, n1 is number of positive runs, n2 is number of negative runs and $\sigma = \sqrt{2n1n2\ (2n1n2\text{-}n) / n^2(n\text{-}1)}$ **(Nisar & Hanif, 2012)**

Sample selection:

To conduct this study, the closing price has been taken from 38 companies in the banking sector listed on the NSE (National stock exchange) of the Indian stock market. These companies are AU Small Finance Bank Ltd., Allahabad Bank, Axis Bank Ltd., Andhra Bank, Bank of Maharashtra, Bandhan Bank Ltd., Bank of Baroda, Bank of India, Canara Bank, City Union Bank Ltd., Corporation Bank, DCB Bank, Federal Bank Ltd., Dhanlaxmi Bank, IOB, HDFC Bank Ltd., J & K Bank, Karnataka Bank, Karur Vysya Bank, ICICI Bank Ltd., Lakshmi Vilas Bank, Oriental Bank, IDBI Bank Ltd., Pun. & Sind Bank, South Ind. Bank, Indian Bank, IndusInd Bank Ltd., Kotak Mahindra Bank Ltd., Syndicate Bank, UCO Bank, United Bank, Punjab National Bank, RBL Bank Ltd., State Bank of India, Union Bank of India, Yes Bank Ltd., IDFC First Bank Ltd., Central Bank of India.

Sample Period:

To find out the weak form of market efficiency of selected banking companies, the period of this study have been included 9th November 2016 to 9th November 2018.

Significance Testing:

Hypothesis:

H_0: There is no weak form market Efficiency of Indian stock market of selected banking companies Listed on the NSE post-demonetization period.

H_1: There is weak-form market efficiency of the Indian stock market of selected banking companies listed on the NSE post-demonetization period.

P-value: Here p-value is used to test the significance of random walk in the stock market. The level of significance is 5% i.e., $\alpha = 0.05$

Results and Interpretation:

Table 1. Descriptive statistics of stock returns:

Companies	N	Minimum value	Maximum value	Mean ($\bar{x}$)	Std. deviation (σ)
AU Small Finance Bank Ltd.	332	0.00	736.75	630.03	67.88
Allahabad Bank	332	33.85	89.95	61.28	14.27
Axis Bank Ltd.	497	0.00	660.05	523.38	50.95

Andhra Bank	497	25.55	74.20	48.8404	11.84563
Bank of Maharashtra	497	10.75	38.00	23.0298	8.10422
Bandhan Bank Ltd.	154	0.00	729.70	541.0762	100.55239
Bank of Baroda	497	0.00	194.34	151.1388	21.99778
Bank of India	497	0.00	207.85	128.4662	33.34099
Canara Bank	497	0.00	439.90	304.2455	49.49045
City Union Bank Ltd.	497	105.72	202.65	149.4392	21.26077
Corporation Bank	497	21.70	62.45	39.6355	10.12053
DCB Bank	497	100.67	209.84	169.1549	26.26001
Federal Bank Ltd.	497	61.20	125.01	93.6352	15.95144
Dhanlaxmi Bank	497	11.10	43.05	27.0569	8.65247
IOB	497	11.55	31.50	21.6394*	4.83582
HDFC Bank Ltd.	497	1150.46	2202.15	1738.2940*	288.08623*
J & K Bank	497	38.75	157.96	81.7747	34.61003
Karnataka Bank	497	94.05	165.88	127.4456	19.66565
Karur Vysya Bank	497	65.95	133.85	96.1170	16.25603
ICICI Bank Ltd.	497	218.51	356.85	283.3749	32.55010
Lakshmi Vilas Bank	497	71.80	191.70	131.5058	29.75585
Oriental Bank	497	60.05	181.75	112.9650	27.73096
IDBI Bank Ltd.	497	48.10	85.15	64.3759	8.39691
Pun. & Sind Bank	497	25.35	69.35	44.1400	10.29615
South Ind.Bank	497	12.60	32.66	23.3436	5.02930
Indian Bank	497	193.85	410.54	300.7221	47.81690
IndusInd Bank Ltd.	497	1032.36	2023.05	1592.3855	252.54191
Kotak Mahindra Bank Ltd.	497	694.81	1408.45	1029.4604	178.21855
Syndicate Bank	497	29.80	94.50	63.2650	16.00522
UCO Bank	497	15.55	43.70	28.6706	7.18689

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United Bank	497	9.45	27.95	17.0913	4.52835*
Punjab National Bank	497	59.70	213.60	127.6759	36.73234
RBL Bank Ltd.	497	325.58	639.90	499.6190	65.86288
State Bank of India	497	233.20	337.50	277.8756	23.26386
Union Bank of India	497	62.15	190.50	125.7377	32.49452
Yes Bank Ltd.	497	180.70	394.00	305.4153	47.82442
IDFC First Bank Ltd.	164	33.35	49.33	41.7746	4.67530*
Central Bank of India	497	0.00	120.90	78.7334	17.33377

Table 1 present the result of the descriptive statistics of the returns. The highest mean returns of HDFC Bank Ltd. which is 1738.29 and the lowest mean return of IOB which is 21.63. Bandhan Bank Ltd. and IDFC First Bank Ltd. having the lowest number of trading days have mean returns of 541.07 and 41.77 with a standard deviation of 100.55 and 4.67. The highest standard deviation of HDFC Bank Ltd. which is 288.08 and The lowest standard deviation of the United Bank which is 4.53.

Table 2. Results of the run test:

Companies	Test Value	Cases<Test Value	Cases≥Test Value	Total Cases	Number Of Runs	Z –Value	P-Value
AU Small Finance Bank Ltd.	637	166	166	332	15	-16.709	0
Allahabad Bank	67	248	249	497	24	-20.251	0
Axis Bank Ltd.	516	248	249	497	28	-19.891	0
Andhra Bank	52	248	249	497	16	-20.969	0
Bank of Maharashtra	26	248	249	497	10	-21.508	0
Bandhan Bank Ltd.	519	77	77	154	7	-11.48	0
Bank of Baroda	154	248	249	497	13	-21.238	0
Bank of India	127	248	249	497	15	-21.059	0
Canara Bank	300	248	249	497	13	-21.238	0
Central Bank of India	78	247	250	497	20	-20.61	0
City Union Bank Ltd.	150	248	249	497	20	-20.61	0
Corporation Bank	41	248	249	497	9	-21.598	0
DCB Bank	175	248	249	497	21	-20.52	0
Federal Bank Ltd.	91	247	250	497	13	-21.238	0
Dhanlaxmi Bank	25	247	250	497	11	-21.418	0
IOB	23	246	251	497	10	-21.508	0
HDFC Bank Ltd.	1824	248	249	497	12	-21.328	0
J & K Bank	75	248	249	497	28	-19.891	0
Karnataka Bank	126	248	249	497	5	-21.957	0
Karur Vysya Bank	96	248	249	497	27	-19.981	0
ICICI Bank Ltd.	286	248	249	497	38	-18.993	0

Lakshmi Vilas Bank	134	248	249	497	14	-21.149	0
Oriental Bank	119	248	249	497	23	-20.34	0
IDBI Bank Ltd.	**62**	247	250	497	38	-18.993	0
Pun. & Sind Bank	47.7	248	249	497	16	-20.969	0
South Ind.Bank	24	247	250	497	21	-20.52	0
Indian Bank	301	248	249	497	27	-19.981	0
IndusInd Bank Ltd.	1638	248	249	497	29	-19.802	0
Kotak Mahindra Bank Ltd.	1015	248	249	497	18	-20.789	0
Syndicate Bank	66	248	249	497	14	-21.149	0
UCO Bank	31	245	252	497	16	-20.969	0
United Bank	18	248	249	497	12	-21.328	0
Punjab National Bank	137	248	249	497	20	-20.61	0
RBL Bank Ltd.	513	248	249	497	36	-19.173	0
State Bank of India	274	248	249	497	30	-19.712	0
Union Bank of India	136	248	249	497	17	-20.879	0
Yes Bank Ltd.	310	248	249	497	39	-18.903	0
IDFC First Bank Ltd.	41	82	82	164	16	-10.496	0

Table 2 presents the result of the run test of the banking companies listed on the national stock exchange. In this result, the p-value of all banking companies is less than 0.05 so the null hypothesis is rejected and the alternate hypothesis is accepted. So there is weak-form market efficiency of the Indian stock market of selected banking companies listed on the NSE post-demonetization period and the Indian stock market followed a random walk model.
Table 3 presents the result of serial correlation. The Ljung-Box statistics show that there is no autocorrelation between the current and previous returns. This result shows that all Leg value of all companies is greater than 0.05 so, reject the null hypothesis and accept the alternate hypothesis. This indicates that these banking companies follow the random walk and the weak-form market efficiency is present in these stock returns.

Table:4 Augmented Dickey-Fuller Test Statistics:

	Level		
Companies	t-statistics critical-value (5% level)	t-statistics calculated-value	p-Value
AU Small Finance Bank Ltd.	-2.870110	-2.262442*	0.185
Allahabad Bank	-2.867147	-1.012223	0.7503
Axis Bank Ltd.	-2.867171	-2.102700*	0.2438
Andhra Bank	-2.867147	-0.670101	0.8516
Bank of Maharashtra	-2.867147	-0.527134	0.8829
Bandhan Bank Ltd.	-2.880591	-1.015036	0.7472

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Bank of Baroda	-2.867171	-1.868897	0.3471
Bank of India	-2.867171	-1.139018	0.7016
Canara Bank	-2.867171	-1.891124	0.3365
Central Bank of India	-2.867183	-0.462261	0.8954
City Union Bank Ltd.	-2.867147	-1.650275	0.456
Corporation Bank	-2.867147	-0.827280	0.8101
DCB Bank	-2.867147	-2.152054*	0.2245
Federal Bank Ltd.	-2.867147	-1.552136	0.5064
Dhanlaxmi Bank	-2.867147	-0.719896	0.8393
IOB	-2.867147	-0.668652	0.8519
HDFC Bank Ltd.	-2.867147	-1.626315	0.4683
J & K Bank	-2.867147	-1.988628*	0.2919
Karnataka Bank	-2.867147	-1.470346	0.548
Karur Vysya Bank	-2.867147	-1.432013	0.5672
ICICI Bank Ltd.	-2.867147	-1.319816	0.6217
Lakshmi Vilas Bank	-2.867147	-0.658087	0.8544
Oriental Bank	-2.867147	-1.164805	0.6909
IDBI Bank Ltd.	-2.867147	-2.382219*	0.1473
Pun. & Sind Bank	-2.867147	-0.600245	0.8676
South Ind.Bank	-2.867147	-0.803944	0.8167
Indian Bank	-2.867147	-2.119452*	0.2372
IndusInd Bank Ltd.	-2.867147	-1.612206	0.4756
Kotak Mahindra Bank Ltd.	-2.867147	-1.146324	0.6986
Syndicate Bank	-2.867147	-0.614110	0.8645
UCO Bank	-2.867147	-0.877423	0.7951
United Bank (I)	-2.867147	-0.799395	0.818
Punjab National Bank	-2.867147	-1.009964	0.7511
RBL Bank Ltd.	-2.867159	-2.126185*	0.2345
State Bank of India	-2.867147	-2.957498*	0.0398
Union Bank of India	-2.867147	-0.992799	0.7572
Yes Bank Ltd.	-2.867147	-1.685731	0.4379
IDFC First Bank Ltd.	-2.879155	-1.484255	0.5392

Table 4 shows the result of the unit root test on the daily share prices. In the ADF test, the null hypothesis shows that there is a unit root in the series. The result shows that all companies' p-values are greater than 0.05 except only the State Bank of India so, null hypothesis is accepted. It means the series is nonstationary and exhibits a random walk. This stock return series efficiency is weak form and prices are unpredictable.

Conclusion:

The main objective of this study to find out the weak-form market efficiency of the Indian stock market of selected banking companies listed on the NSE post-demonetization period. Based on the run test concluded that the Indian stock market was weak-form efficient and followed the random walk model. Based on the autocorrelation test result found that there is no autocorrelation between the current and previous return of banking companies. It is indicated that these banking companies followed the random walk and the weak-form market efficiency is present in this stock return series. On the basis of the unit root test (ADF) concluded that the series is nonstationary and exhibits a random walk. This stock return series efficiency is weak form and prices are unpredictable.

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