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A study on weak form efficiency of equity share price returns of selected sample banks listed in Bombay stock exchange Bankex

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Abstract
The present study is an attempt to assess whether the daily share price returns of the selected banks listed in Bombay Stock Exchange Bankex are efficient in weak form or not. For the purpose of analysis, ten Banks listed in Bombay Stock Exchange Bankex as on 18th August 2017 were selected. The daily share price returns of the selected sample Banks were collected from the website of Bombay Stock Exchange. The weak form efficiency of selected banks listed in Bombay Stock Exchange from 1st April 2007 to 31st March 2017, were analyzed using Descriptive statistics, Augmented Dickey Fuller Test, Phillips Perron Test for Stationarity, Autocorrelation, Normality test using Kolmogorov- Smirnov and Shapiro –Wilk Test and Runs Test (Mean and Median base). The findings of the study indicated that there were no continuous upward and downwards trend of share price returns of selected sample banks listed in Bombay Stock Exchange Bankex, so the daily share price returns of sample Banks are not random during the study period.

Keywords: Bombay stock exchange, runs test, autocorrelation test, augmented dickey fuller test, normality test

1. Introduction

Stock prices are determined by a number of factors like Fundamental, Technical and Psychological factors. The behavior of stock prices is studied with the help of different methods such as Fundamental analysis and Technical analysis. In the case of Fundamental Analysis, the basic factor which affects the performance of the economy, industry and companies are taken into account for analyzing the share prices. Technical analysis believes that the past behavior of stock prices gives an indication of the future behavior. The technical analysis presumes that the variations in the stock prices are not random but follows a sequence. From the results of several empirical studies on stock price movements, a theory was advocated which assert that share price movements are random. The theory came to be known as Random Walk Theory because of its principal contention that share price movements represent a random walk rather than an orderly movement. (Kevin S., 2006 [11]. Security analysis and Portfolio Management, Tenth ed. PHI Learning Private ltd, New Delhi).

The basic premise in random walk theory is that the information on changes in the economy, industry and company performance is immediately and fully spread, which implies all investors have full knowledge of the market information. The stock price movements either increase or decrease based on the information available in the stock market.

The random walk theory presupposes that the stock markets are so efficient and competitive that there is immediate price adjustment. This is the result of good communication system through which information can be extend nearly anywhere in the country immediately. Thus, the random walk theory is based on the hypothesis that the stock markets are efficient. Hence this theory later came to be known as the efficient market hypothesis or efficient market model.

The capital market is considered to be efficient in three different forms. They are 1) Weak Form Efficiency – The weak form of the efficient market hypothesis says that the current prices of the stock already fully reflect all the information that is contained in the historical sequence of prices. 2) Semi Strong Form Efficiency - The semi – strong form of the efficient market hypothesis says that current prices of stocks not only reflect all information content of historical prices, but also reflect all publicly available information about the company being studied. 3) Strong Form Efficiency – The strong form hypothesis, the extreme case of market efficiency, maintains that the current security prices reflect all information both publicly available information as well as private or inside information.

The present study evaluated the efficiency of selected sample banks listed in Bombay stock Exchange Bankex as on 18th August 2017. The study period was from 1st April 2007 to 31st March 2017. Using Descriptive statistics, Normality Test, Stationarity Test, Runs Test and Auto correlation Test, the study is an attempt to find the share price efficiency of selected banks. This study will help the investors by providing information on scope for earnings superior returns through investments in Indian banking Sector.

2. Review of literature

Anil K Sharama, Neha Seth (2011) [1], in the article, "Recent Financial Crisis and Market Efficiency: An Empirical Analysis of Indian Stock Market" investigated the literature of market efficiency and the impact of financial crisis on stock market efficiency, during the period 1st November 2000 to 31st October 2010, using Random walk, Autocorrelation, Jarque Bera Test, Kolmogorov Smirnov Test, Runs Test and Augmented Dickey Fuller Unit Root Test. The findings indicated that Indian Stock market did not exhibit weak form market efficiency and does not follow random walk.

"Testing Weak form Market Efficiency of Indian capital market: A case of National Stock Exchange(NSE) and Bombay Stock Exchange (BSE)", by Khan A.Q, Sana Ikram and Mariyam Mehtab (2011) [4], developed an understanding of the various forms of efficiency of the stock market, during the study period 1st April 2000 to 31st March 2010, using Runs Test. It was found that Indian capital markets neither follow random walk nor is weak form efficient during the study period.

Shikha Mahajan and Manisha Luthra (2013) [9] in the paper, "Testing weak form Efficiency of BSE Bankex" analysed the random walk hypothesis to determine the validity of weak form efficiency for Bombay Stock Exchange (BSE) Bankex, during the study period 2002 to 2013, using Auto Correlation Test, Non – Parametric Runs test and Augmented Dickey Fuller Unit root test. It was found that BSE Bankex was weak form efficient and abnormal returns cannot be generated based on past prices trends.

Batool Asiri and Hamed Alzeera (2013) [3] in the article, "Is the Saudi Stock Market Efficient? A case of Weak – form Efficiency" determined the Saudi Arabia's stock markets efficiency, Tadawul during the study period 15th October 2006 to 15th November 2012, using Unit root Dickey-Fuller test, Pearson Correlation test, Durbin-Watson test and Wald-Wolfowitz Runs-Test. The findings confirmed weak-form efficiency in Saudi Arabia's stock market.

Using Descriptive Statistics and ARIMA test, TarunKanti Bose, Md. Reaz Uddin and Md. Wahidul Islam (2014) [10] in the paper entitled "Measuring and Comparing the Efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange" analyzed the relationship between past information and share price of capital market (The prices follow random walk or not) during the period 1996 to 2011. The findings indicated that the return series of Dhaka Stock Exchange and Chittagong Stock Exchange do not follow normal distribution.

In the paper, "The Efficiency Testing of Weak Form of the Indian Stock Market" by Sachin K and Kantesha Sanningammanavara (2014) [8], determined whether the Indian stock market followed random walk, during the study period 1st April 2004 to 31st March 2014 using ANOVA test, Runs Test and Auto Correlation. The findings indicated that the Indian stock market was not efficient and it was found that the market was in the state of weak form efficiency for FMCG and Energy sectors.

"Equity Share Price Efficiency of Indian Banking Sector", by Babu. M and Srinivasan. S (2014) [2], analyzed the market efficiency of daily share prices of banks listed in National Stock Exchange of India Ltd during the study period 1st April 2004 to 31st March 2014, using Unit Root Test, Runs Test and Autocorrelation function. It was found that the daily share price returns of sample banks were not found to be efficient in weak form and there was no hidden insider information with respect to performance of selected banks.

Md. Abu Hasan (2015) in the article, "Testing Weak Form Market Efficiency of Dhaka Stock Exchange" investigated the weak form efficiency in the framework of the random walk for Dhaka stock market during the study period 2nd January 1993 to 27th January 2013, using Phillips Perron test, Autocorrelation test, Augmented Dickey Fuller Test and Variance Ratio test. The findings indicated that the historical stock prices can be used to achieve superior gains and the Dhaka Stock Exchange was inefficient in weak form.

Premalatha S and Nedunchezhian V.R (2016) [6] "An Analysis of Weak Form Efficiency in Banking Sector: A Study with Special Reference to National Stock Exchange" analysed the Weak Form Efficient Market Hypothesis in National Stock Exchange, during the study period 1st January 2011 to 31st December 2015, using Runs test, Augmented Dickey Fuller Unit root test and Auto Correlation Test. It was found that National Stock Exchange was not efficient in a weak form.

In the paper, "Evaluation of Weak form of Market Efficiency Theory for Selected five Companies from Nifty" by Pushkar Dilip Parulekar (2017) [7], determined whether all the past information reflected in current share price, during the study period 1st April 2004 to 31st March 2016 using Runs Test and Auto Correlation. The findings indicated that the stock returns were not efficient in extreme short term.

While analyzing the previous work related to the present study, the following points were noted. The Market efficiency and weak form efficiency of the share prices was worked out in different study periods by Anil K Sharama, Neha Seth (2011) [1], Khan A.Q, Sana Ikram and Mariyam Mehtab (2011) [4], Batool Asiri and Hamed Alzeera (2013) [3], Shikha Mahajan and Manisha Luthra (2013) [9], TarunKanti Bose, Md. Reaz Uddin and Md. Wahidul Islam (2014) [10], Sachin K and Kantesha Sanningammanavara (2014) [8], Babu. M and Srinivasan. S (2014) [2], Md. Abu Hasan (2015), Premalatha S and Nedunchezhian V.R (2016) [6], Pushkar Dilip Parulekar (2017) [7], using Unit Root Test, Runs Test, Auto Correlation Analysis, ANOVA, Regression Techniques, Random Walk Stationarity, Augmented Dickey Fuller and Phillips- Perron test, Johansen Co-integration test and Variance Ratio Test. The studies found that the daily Shares Price returns of sample banks were not efficient in weak form.

Taking into account, the above analysis, the present study considered the Bombay Stock Exchange Bankex to analyze the Share price Efficiency using Descriptive statistics, Augmented Dickey Fuller Test, Phillips Perron Test for Stationarity, Autocorrelation, Normality test using Kolmogorov- Smirnov and Shapiro –Wilk Test, Runs Test (Mean and Median base) during the study period 01st April 2007 to 31st March 2017 to know the Weak form efficiency of Equity Share price returns of selected banks listed in Bombay Stock Exchange Bankex.

The study is different from earlier studies that Weak form efficiency of Equity Share price returns of sample banks listed in Bombay Stock Exchange Bankex were taken into consideration for the present study during the period 01st April 2007 to 31st March 2017. An efficient market has been defined

as one where share prices always fully reflect available information on companies. Generally, a change occurs in the price of the stock only because of certain changes in the economy, industry or company. Information about these changes alters the stock prices immediately and stock moves to a new level, either upwards or downwards, depending on the types of information. Therefore, it becomes necessary to evaluate the share price returns of Banks from time - to - time.

3. Design of the study

3.1 Statement of problem

The investors will get change in the information about economy, industry and company performance based on random walk theory. The price of the each day is independent. It may be unchanged, higher or lower from the previous price, but that depends on new pieces of information being received in each day.

The investors should assess the day to day information about the share price, to know the impact of information flow on share prices which leads to variation in share prices for more days. This provides an opportunity to the analyst who is superior analytical to earn excess returns.

The efficient market theory holds the view that in an efficient market, new information is processed and evaluated as it arrives and prices instantaneously adjust to new and correct level. An investor cannot consistently earn excess returns by undertaking fundamental and technical analysis.

From the above details, it is found that the different forms of efficient market hypothesis have been tested through several empirical studies. The tests of the weak form hypothesis are essentially tests of whether all information contained in historical prices of securities is fully reflected in current prices and this study tries to fill the research gap by finding results to the following questions:

1. What is the nature of share prices returns of selected banks listed in Bombay Stock Exchange Bankex?
2. Whether historical Share Prices of sample banks can be used as an indicator to predict future movements of Share Prices?

3.2 Need for the Study

The present study is based on the efficiency in weak form of daily share price returns of the selected banks listed in Bombay Stock Exchange Bankex. This study will help the investors to understand how the current prices of stock reflect all the information that is contained in the historical sequence of prices and this study will provides an idea to investors to understand the movement of share prices to know the timings of buying and selling of shares with the aim of making profit. This paper also helps the investor to plan for further investment in the share market.

3.3 Objectives of the Study

- To test the normality and stationarity of the selected banks listed in Bombay Stock Exchange Bankex.
- To assess whether the daily share price returns of the selected banks listed in Bombay Stock Exchange Bankex are efficient in weak form.
- To test the randomness in the daily share price returns of the selected banks listed in Bombay Stock Exchange Bankex.

3.4 Null Hypotheses of the Study

H01: There is no normality in the daily shares price returns of selected banks during the study period.

H02: There is no stationarity in the daily shares price returns of selected banks during the study period.

H03: The daily share price returns of selected banks listed in Bombay Stock Exchange Bankex are not efficient in weak form.

H04: The daily share price returns of sample banks are not random

3.5 Source of Data collection

The data for the present study was collected through secondary data. The daily share price of selected banks listed in Bombay stock exchange Bankex data were taken from BSE Website (www.bseindia.com). Other relevant data were collected from various books, journals and online sources.

3.6 Period of the Study

The present study is an attempt to find the efficiency of sample banks in weak form listed in Bombay Stock Exchange Bankex, during the study period from 1st April 2007 to 31st March 2017.

3.7 Limitations of the Study

- The data for the present study was based only on Secondary data.
- Duration of the study period is restricted to ten years from 1st April 2007 to 31st March 2017.
- The selected banks were restricted those listed in Bombay Stock Exchange bankex as on 18th August 2017.
- The limitations of all statistical tools namely, Summary Statistics, Kolmogorov- Smirnov, Shapiro –Wilk, Autocorrelation, Augmented Dickey Fuller, Phillips Perron, Runs Test using (Mean and Median base) and Autocorrelation test are applicable to the present study also.

3.8 Table

Table 1: List of Banks studied for the current Study (Listed in Bombay Stock Exchange Bankex) as on 18th August 2017.

Bank	Industry	Market Capitalisation (Rs Cr) as on 18th August 2017
Axis Bank	Banks – Private Sector	1,17,621.46
Bank of Baroda	Banks – Public Sector	33,986.72
Federal Bank	Banks – Private Sector	21,083.54
HDFC Bank	Banks – Private Sector	4,51,381.92

ICICI Bank	Banks – Private Sector	1,87,927.98
IndusInd Bank	Banks – Private Sector	96,917.91
Kotak Mahindra	Banks – Private Sector	187218.83
PNB	Banks – Public Sector	30,280.99
SBI	Banks – Public Sector	2,40,532.08
Yes Bank	Banks – Private Sector	78,693.63

***Source*:** "Money Control", dated on 25th August 2017.

3.9 Tools used for analysis

Table 2: Statistical/Econometric tools used in the study

S. No	Statistical Tools	Significance to the study
1	Mean	It is used to measure for representing the entire data by one value called an average.
2	Standard Deviation	It is a measure of how much"Spread" or "variability" is present in the sample.
3	Skewness	When a distribution is not symmetrical it is called a skewed distribution. It is said to be positive (Mean < Mode) or negative Distribution (Mode < Mean).
4	Kurtosis	It refers to the degree of flatness or peakedness in the region about the mode of frequency curve.
5	Run Test (Mean and Median base)	Used to test the randomness in stock price movements.
6	Normality Test (Kolmogorov- Smirnov and Shapiro –Wilk)	A normality test is used to determine whether sample data has been drawn from a normally distributed population (within some tolerance).
7	Stationarity test (using ADF and PP)	If trend persists, prediction is not possible, data convert trend data to stationarity data. In simple trend data convert into Stationarity data.
8	Jarque-Bera	Indication of Normality
9	Autocorrelation	To investigate the weak form Efficiency Market Hypothesis

4. Data Analysis

Table 3: Results of summary statistics of selected banks listed in Bombay stock exchange bank index during the study period

Descriptive Statistics										
Particular	**Axis bank**	**Federal Bank**	**HDFC**	**ICICI**	**Indusind Bank**	**Kotak Mahindra Bank**	**Yes Bank**	**Bank of Baroda**	**Punjab National Bank**	**State Bank of India**
Mean	-0.999	-0.999	-0.999	-1.000	-0.998	-0.999	-1.000	-0.999	-1.000	-1.000
Median	-0.999	-0.999	-0.999	-1.000	-0.999	-0.999	-1.000	-0.999	-0.999	-0.999
Maximum	-0.814	2.785	0.000	0.000	-0.841	-0.831	-0.768	0.000	-0.882	-0.815
Minimum	-2.613	-4.101	-2.603	-2.600	-1.199	-1.700	-1.203	-1.976	-2.569	-3.282
Std. Dev.	0.042	0.121	0.042	0.046	0.028	0.032	0.030	0.050	0.040	0.0516
Skewness	-22.760	5.843	-16.502	-12.323	0.223	-7.315	-0.034	2.841	-24.149	-34.787
Kurtosis	877.538	561.720	948.517	645.56	8.045	154.572	9.397	174.946	946.645	1539.1
Jarque-Bera	7921324	3225850	924555	4271059	2650.353	2395146	4227.974	3057213	922187	2.44E+
Observations	2479	2479	2479	2479	2479	2479	2479	2479	2479	2479

Source: Data collected from www.bseindia. in and Computed using E-views.

Table 3 shows the results of descriptive statistics for the selected banks listed in Bombay Stock Exchange Bank Index during the study period. Out of all selected Banks, the minimum and maximum value for Federal Bank ranged from -4.101172 to 2.785653. The average return and Standard Deviation for Federal Bank was -0.999185 and 0.12122 respectively, which was the highest among all selected Banks. Skewness was found to be positive for Federal Bank (5.843812), IndusInd Bank (0.223009) and Bank of Baroda (2.841916). For all the other banks, negative skewness was noticed. The Kurtosis which measures, the peakedness of the data distribution was found to be greater than three for all the selected Banks Axis Bank (877.53), Federal Bank (561.72), HDFC (948.51), ICICI (645.5633), IndusInd Bank (8.0457) Kotak Mahindra Bank (154.57), Yes Bank (9.367), Bank of Baroda (174.94), Punjab National Bank (946.64) and State Bank of India (1539.163) which indicated Leptokurtic distribution. The Jarque Bera test (Value >5) of all the selected banks of Bombay stock Exchange revealed that the data distribution were non – normal.

Table 4: Summary Results of Normality Test using Kolmogorov-Smirnov and Shapiro–Wilk Statistic of Selected Banks listed in Bombay Stock Exchange Bank Index during the study period

Tests of Normality				
	Kolmogorov- Smirnov		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
Axis Bank	0.1497	<0.001	0.46136	<0.001
Federal Bank	0.1898	<0.001	0.376382	<0.001
HDFC	0.2297	<0.001	0.271643	<0.001
ICICI	0.1694	<0.001	0.415754	<0.001
IndusInd Bank	0.0721	<0.001	0.939201	<0.001
Kotak Mahindra Bank	0.125	<0.001	0.693199	<0.001
YES Bank	0.0645	<0.001	0.934224	<0.001
Bank of Baroda	0.1187	<0.001	0.629024	<0.001
Punjab National Bank	0.1558	<0.001	0.442967	<0.001
State Bank of India	0.2072	<0.001	0.267305	<0.001

Source: Data collected from www.bseindia.in and Computed using SPSS.

Table 4 shows the results of Normality Test using Kolmogorov – Smirnov and Shapiro Wilk Test for the selected banks listed in Bombay Stock Exchange Bank Index during the study period. Out of all selected Banks the value of Kolmogorov–Smirnov statistic and Shapiro Wilk statistics were Axis bank (0.1497) and (0.46136), Federal bank (0.1898) (0.376382), HDFC (0.2297) (0.271643), ICICI (0.2297) (0.415754), IndusInd bank (0.0721) (0.9392), Kotak Mahindra bank (0.125) (0.693199), Yes Bank (0.0645)(0.934224), Bank of Baroda (0.1187)(0.629024), Punjab National Bank (0.1558) (0.442967) and State Bank of India (0.2072) (0.267305). The sig value was less than 0.05 for the selected Banks namely Axis Bank (0.000), Federal Bank (0.000), HDFC (0.000), ICICI (0.000), Indusind Bank (0.000), Kotak Mahindra Bank (0.000), Yes Bank (0.000), Bank of Baroda (0.000), Punjab National Bank (0.000) and State Bank of India (0.000). The sig value of the entire sample banks were found to be less than 0.05 which indicated the daily share price returns of all banks were normal. Hence H01 "There is no normality in the daily shares price returns of selected banks" is rejected. Therefore all the selected banks confirmed normality.

Table 5: Summary Results of Stationarity test using Augmented Dickey Fuller Statistics for the selected Banks during the study period

Summary Result of Stationarity test using ADF Statistics for the selected Banks during Study Period										
		Augmented Dickey-Fuller test statistic			Test critical values:			Prob		
S. No	Banks	Level	1st Diff	2nd Diff	1%	5%	10%	Level	1st Dif	2nd Diff
1	Axis Bank	-48.965			-3.961	-3.411	-3.127	<0.001		
2	Federal Bank	-21.105			-3.961	-3.411	-3.127	<0.001		
3	HDFC	-43.803			-3.961	-3.411	-3.127	<0.001		
4	ICICI	-43.336			-3.961	-3.411	-3.127	<0.001		
5	Indusind Bank	-47.781			-3.961	-3.411	-3.127	<0.001		
6	Kotak Mahindra Bank	-47.705			-3.961	-3.411	-3.127	<0.001		
7	YES Bank	-35.112			-3.961	-3.411	-3.127	<0.001		
8	Bank of Baroda	-18.246			-3.961	-3.411	-3.127	<0.001		
9	Punjab National Bank	-48.926			-3.961	-3.411	-3.127	<0.001		
10	State Bank of India	-48.987			-3.961	-3.411	-3.127	<0.001		

***Source*:** Data collected from www.bseindia.in and Computed using E-views.

Table 6: Summary Results of Stationarity test using Phillips Perron Test Statistics for the selected Banks during study the period

Summary Result of Stationarity test using Phillips Perron Test Statistics for the selected Banks during Study Period										
		Phillips-Perron test statistic			Test critical values:			Prob		
S. No	Banks	Level	1st Diff	2nd Diff	1%	5%	10%	Level	1st Diff	2nd Diff
1	Axis Bank	-48.964			-3.961	-3.411	-3.127	<0.001		
2	Federal Bank	-143.51			-3.961	-3.411	-3.127	<0.001		
3	HDFC	-43.794			-3.961	-3.411	-3.127	<0.001		
4	ICICI	-43.299			-3.961	-3.411	-3.127	<0.001		
5	Indusind Bank	-47.754			-3.961	-3.411	-3.127	<0.001		
6	Kotak Mahindra Bank	-47.666			-3.961	-3.411	-3.127	<0.001		
7	YES Bank	-43.180			-3.961	-3.411	-3.127	<0.001		
8	Bank of Baroda	-116.84			-3.961	-3.411	-3.127	<0.001		
9	Punjab National Bank	-48.950			-3.961	-3.411	-3.127	<0.001		
10	State Bank of India	-48.996			-3.961	-3.411	-3.127	<0.001		

***Source*:** Data collected from www.bseindia.in and Computed using E-views.

Table 5 shows the results of Stationarity test using Augmented Dickey-Fuller Statistics for the selected banks during the study period. The Augmented Dickey-Fuller Statistics (Ignoring the Sign) was greater than critical values at 1%, 5%, 10 % level for the selected banks namely Axis Bank (48.9656), Federal Bank (21.1052), HDFC (43.803), ICICI (43.3366), Indusind Bank (47.781), Kotak Mahindra Bank (47.705), Yes Bank (35.1124), Bank of Baroda (18.2467), Punjab National Bank(48.9262) and State Bank of India(48.9875) at level range. Further, the Prob value was less than 0.05 for the selected banks namely Axis Bank (0.000), Federal Bank (0.000), HDFC (0.000), ICICI (0.000), Indusind Bank (0.000), Kotak Mahindra Bank (0.000), Yes Bank (0.000), Bank of Baroda (0.000), Punjab National Bank (0.000) and State Bank of India (0.000).

To confirm the results of stationarity using Augmented Dickey Fuller, Phillips-Perron test was used and Table 6 shows the results of Stationarity test using Phillips-Perron test statistic for the selected banks during study period. Phillips-Perron test statistic (Ignoring the Sign) was greater than critical values at 1%, 5%, 10 % level for the selected banks Axis Bank (48.9646), Federal Bank (143.517), HDFC (43.7949), ICICI(43.2991), Indusind Bank (47.7543), Kotak Mahindra Bank (47.666), Yes Bank (43.1809), Bank of Baroda (116.846), Punjab National Bank (48.9508) and State Bank of India (48.996) at level range. Further, the Prob value was less than 0.05 for the selected Banks namely Axis Bank (0.000), Federal Bank (0.000), HDFC (0.000), ICICI (0.000), Indusind Bank (0.000), Kotak Mahindra Bank (0.000), Yes Bank (0.000), Bank of Baroda (0.000), Punjab National Bank (0.000) and State Bank of India (0.000).

Hence the H02: "There is no stationarity in the daily shares price returns of selected sample banks" is rejected. Therefore all the selected banks confirmed stationarity at level difference. As all the banks share price returns attained stationarity at level difference, it is not necessary to go for first level and second level.

Table 7: Summary Results of Runs Test (Median base) for the selected Banks during the Study Period

Runs Test										
	Axis Bank	**Federal Bank**	**HDFC**	**ICICI**	**Indus Ind Bank**	**Kotak Mahindra Bank**	**YES Bank**	**Bank of Baroda**	**Punjab National Bank**	**State Bank of India**
Test Value	-0.999	-0.999	-0.999	-1.000	-0.999	-0.999	-1.000	-0.999	-0.999	-0.999
Cases < Test Value	1239	1239	1239	1239	1239	1239	1239	1239	1239	1239
Cases >= Test Value	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240
Total Cases	2479	2479	2479	2479	2479	2479	2479	2479	2479	2479
Number of Runs	1178	1767	1255	1154	1250	1259	1170	1613	1209	1184
Z	-2.511	21.153	0.582	-3.475	0.381	0.743	-2.832	14.966	-1.265	-2.27
Asymp. Sig. (2-tailed)	0.012	2.6E-99	0.560	0.000	0.702	0.457	0.0046	1.22E-	0.205	0.0232
a. Median										

***Source*:** Data collected from www.bseindia.in and Computed using SPSS.

Table 8: Summary Results of Runs Test (Mean base) for the selected Banks during the Study Period

Runs Test										
	Axis Bank	**Federal Bank**	**HDFC**	**ICICI**	**IndusInd Bank**	**Kotak Mahindra Bank**	**YES Bank**	**Bank of Baroda**	**Punjab National Bank**	**State Bank of India**
Test Value	-0.999	-0.999	-0.999	-1.000	-0.998	-0.999	-1.000	-0.999	-1.000	-1.000
Cases < Test Value	1233	1255	1269	1243	1277	1213	1221	1226	1211	1181
Cases >= Test Value	1246	1224	1210	1236	1202	1266	1258	1253	1268	1298
Total Cases	2479	2479	2479	2479	2479	2479	2479	2479	2479	2479
Number of Runs	1178	1775	1251	1160	1248	1263	1178	1603	1199	1198
Z	-2.509	21.485	0.450	-3.233	0.347	0.927	-2.500	14.571	-1.64	-1.600
Asymp. Sig. (2-tailed)	0.0120	2.1E-10	0.652	0.0012	0.728	0.3538	0.0124	4.24E	0.100	0.1095
a. Mean										

***Source*:** Data collected from www.bseindia.in and Computed using SPSS.

Table 7 shows the results of Runs test using Median Base for the selected banks listed in Bombay Stock Exchange during the study period 1st April 2007 to 31st March 2017. It is to be noted that the selected banks, Federal Bank (1767) recorded the highest number of runs which indicated a lagged response of investors to the market information. The above table shows that the 'Z' Statistic value of Federal Bank (21.532), HDFC (0.5825), IndusInd Bank (0.381), Kotak Mahindra Bank (0.74328) and Bank of Baroda(14.996) were positive which indicated that the actual numbers of runs are good for expected numbers of runs and Axis bank (- 2,511), ICICI (-3.47532), Yes bank (-2.832), Punjab National Bank (-1.26557) and State Bank of India (-2.27) recorded negative Z statistic value which indicated that the actual numbers of runs fell short of expected number of runs. It is to be noted that HDFC (0.5825), IndusInd Bank (0.381) Kotak Mahindra Bank (0.74328), Punjab National Bank (-1.26557), Z value lies in the range of ± 1.96 at 95% of the selected banks, It is found that the share price movements of selected banks were not dependent on each other. Further it was found that 'Z' Statistic

value of Federal Bank (21.532), Bank of Baroda(14.996), Axis Bank(- 2.511), ICICI (-3.47532), Yes bank (-2.832), State Bank of India (-2.27) the test statistic value falls outside the Z value ± 1.96 at 95%.

To confirm the results of Runs Test using Median Base, Mean Base was used and Table 8 shows the results of Runs test using Mean Base for the selected banks listed in Bombay stock exchange during the study period 1st April 2007 to 31st March 2017. It is to be noted that the selected banks, Federal Bank (1775) recorded the highest number of runs which indicated a lagged response of investors to the market information. The above table shows that the 'Z' Statistic value of Federal bank (21.485), HDFC(0.4503), Indusind Bank(0.3722), Kotak Mahindra Bank (0.92717) and Bank of Baroda(14.571) were positive which indicated that the actual numbers of runs are good for expected numbers of runs and Axis bank(- 2.5097), ICICI (-3.2338), Yes Bank (-2.5005), Punjab National Bank (-1.64) and State Bank of India (-1.600) recorded negative Z statistic value which indicated that the actual numbers of runs fell short of expected numbers of runs. From the above it's found that the Z statistic of HDFC, Indusind Bank, Kotak Mahindra Bank, Punjab National Bank and State Bank of India ranged between ± 1.96 and the remaining banks were out of the range of ± 1.96.

Hence H03: "The daily share price returns of the selected banks listed in Bombay Stock Exchange Bankex are not efficient in weak form" is rejected. It was found that the share price movements of selected banks were not dependent on each other.

Table 9: Summary Results of Autocorrelation for the selected Banks during the study Period

Autocorrelations										
Lag	**Axis Bank**	**Federal Bank**	**HDFC**	**ICICI**	**Indusind Bank**	**Kotak Mahindra Bank**	**YES Bank**	**Bank of Baroda**	**Punjab National Bank**	**State Bank of India**
1	-0.489	-0.714	-0.433	-0.425	-0.471	-0.480	-0.393	-0.613	-0.504	-0.488
2	-0.013	0.250	-0.007	-0.026	-0.011	-0.015	-0.146	0.129	0.016	-0.007
3	0.005	-0.036	0.005	0.011	-0.013	0.002	0.077	0.010	-0.011	-0.004
4	0.013	0.013	0.002	-0.003	-0.016	0.003	-0.036	0.024	0.005	-0.001
5	-0.029	-0.015	0.000	-0.003	0.003	-0.012	-0.007	-0.039	-0.007	0.010
6	0.009	0.007	-0.003	-0.017	0.004	-0.009	-0.026	0.018	-0.014	-0.024
7	0.009	0.000	-0.011	0.015	-0.021	-0.004	0.0214	0.007	0.021	0.011
8	-0.000	-0.000	0.021	0.020	0.048	0.015	0.013	-0.009	0.001	0.002
9	-0.005	0.004	-0.020	-0.015	-0.003	0.028	0.012	0.003	-0.005	0.014
10	-0.012	-0.019	0.019	-0.002	-0.020	-0.046	-0.010	-0.020	-0.006	-0.018
11	0.035	0.031	-0.011	-0.002	-0.002	0.010	0.013	0.044	0.000	0.007
12	-0.023	-0.022	0.002	0.003	0.021	0.011	-0.009	-0.036	0.005	-0.002
13	-0.008	0.000	0.003	-0.002	-0.047	0.007	-0.029	0.003	0.015	0.007
14	0.012	0.008	-0.006	-0.003	0.050	-0.033	0.038	0.011	-0.031	-0.010
15	0.002	0.001	0.001	0.009	-0.058	0.018	-0.033	0.002	0.007	-0.001
16	-0.014	-0.010	0.001	-0.001	0.070	0.015	0.005	-0.016	0.001	0.004
17	0.006	0.006	0.001	-0.000	-0.012	0.007	0.013	0.006	0.006	-0.004
18	0.012	0.003	0.014	0.000	-0.028	-0.016	0.006	0.010	0.023	0.017
19	-0.007	-0.002	-0.024	0.011	0.030	0.016	0.010	-0.004	-0.054	-0.010
20	-0.010	-0.007	0.002	-0.024	-0.042	-0.053	-0.025	-0.015	0.034	-0.007

***Source*:** Data collected from www. Base India. In and Computed using SPSS.
Note: 6 months is considered as one lag.

Table 9 shows the results of Autocorrelation for the selected banks listed in Bombay Stock Exchange during the study period from 1st April 2007 to 31st March 2017, to measure the correlation coefficient between a series of returns and lagged return of the selected banks. The table shows that the randomness in the share price movements of selected banks listed in Bombay Stock Exchange Bankex which was analyzed, using Auto Correlation function for the lagged period of 20. Out of all the banks Axis Bank, autocorrelation values indicated that the lag 1 and 2 showed negative value (-0.489), (- 0.013) and next two leg showed positive values (0.050), (0.0134) and 19th, 20th lag revealed negative values (-0.0071),(-0.01052). With respect to Federal Bank autocorrelation, values lag 1 showed negative value (-0.714) and next lag showed positive values (0.2509) and 17th, 18th lag recorded positive values, (0.0060),(0.0034) respectively.. HDFC Bank autocorrelation values, indicated that lag 3, lag 4, lag 5, lag 8, lag 10, lag 12, lag 13, showed positive value (0.00511), (0.00204),(0.0006)(0.02187), (0.01931),(0.00219) and (0.00348). The daily share price returns of other banks namely ICICI Bank, Indusind India Bank, State Bank of India witnessed 12 positive and 8 negative significance values, Out of 20 lags for Kotak Mahindra Bank 11 lags were positive, Yes Bank recorded equal number of positive and negative significance values. From the above analyses, it was found that the selected banks witnessed a mix of both positive and negative significance values. There were no continuous upward and downwards trend noticed. Hence H04: "The daily Share Price returns of sample Banks are not Random" is rejected.

5. Findings

From the above analysis related to Weak Form Efficiency of Selected sample banks listed in Bombay Stock Exchange Bankex for the period from 1st April 2007 to 31st March 2017. It was found that all the selected banks of Bombay stock

Exchange Bankex recorded

1. All banks share price returns were normal during the study period.
2. All the banks share price returns attained stationarity at level difference.
3. The share price movement of selected banks was not dependent on each other.
4. There were no continuous upward and downwards trend of Share price Returns of Selected sample Banks listed in Bombay Stock Exchange bankex.

6. Conclusion & Research Implications

As per the result of the present study, it is concluded that the selected sample banks listed in Bombay Stock Exchange Bankex were Weak Form Efficient. The present Study on Weak Form Efficiency have shown that price changes were random or independent and hence unpredictable, Therefore Investors should look into the current market information before planning to investment in Indian Banking Sector. This provides scope for earnings superior returns.

This study allows the investors to make use of information and to plan for their further investment in banking sector to get more return, generally all investors to follow the daily changes in information about the share market from time to time to actively trade in banking stocks.

The study could be developed related to Banking Sector in the form of Semi strong and Strong form of Market Efficiency.

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