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# SECTORAL INDEX EFFICIENCY ANALYSIS IN INDIAN CAPITAL MARKET: A STUDY ON BANK STOCKS IN NSE BANK INDEX

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## 1.0 INTRODUCTION

Stock Markets refer to a market place where investors buy and sell stocks there are 23 stock exchanges which comprise of two national entities - BSE, NSE and over 21 other regional exchanges. The BSE and NSE are the most influential Stock Exchanges in India. The National Stock Exchange of India was originally established in the City of Mumbai 18 years ago in 1992. NSE is the largest stock exchange in India in terms of daily turnover and trading volume in both equity and derivative trading. NSE is mutually owned by a set of leading financial institutions, banks, insurance companies and other financial intermediaries in India but its ownership and management operate as separate entities.

## 1.1 MARKET EFFICIENCY

An efficient market is one in which the market price of a security is an unbiased estimate of its intrinsic value. Market Efficiency is defined in relation to information that is reflected in the security prices. Eugene Fama suggested that it is useful to distinguish three levels of market efficiency like Weak Form, Semi-Strong Form and Strong Form. In the Weak Form Efficiency, the prices reflect all the information found in the record of past prices and volumes. Under Semi-Strong Form Efficiency, the prices reflect not only all information found in the record of past prices and volumes but also all other publicly available information. In Strong Form Efficiency, the prices reflect all available information, public as well as private.

## 1.2 Sectoral Analysis

Sectoral Analysis is typically employed by investors who plan to select better stocks to invest in. The investors normally identify most promising sectors and review the performance of companies within the sector to determine which individual stock would provide better returns and ultimately they purchase such stocks. The Sectoral Efficiency (market) is an important concept which helps to understand the working of capital markets. In this study, an analysis of stock prices of Sectoral Indices in National Stock Exchange (NSE) was carried out to test the market efficiency of Indian Stock Market. A capital market is deemed to be efficient with respect to an information item if the prices of securities fully

reflect price returns implications. The study may be very useful to the Government, Investors, Stakeholders and Policy Makers to invest their money, and earn more return.

## 2.0 REVIEW OF THE LITERATURE

The existing studies conducted in the sector analysis, in different periods are briefed below.

Anand Pandey (2003) tested the efficiency level of the three popular stock indices of Indian Stock Market using the Runs Test and the Autocorrelation Function of ACF. It is found from the Autocorrelation and Runs Test that the time series of stock indices in the Indian Stock Market were biased random time series.

Tasneem Alam and Muhammad Waheed (2004) investigated the monetary transmission mechanism in Pakistan at the sectoral level. The study assessed whether the reform process achieved notable impact on the monetary transmission mechanism or not.

## 3.0 STATEMENT OF THE PROBLEM

The Capital Market is a vital institution as it facilitates economic development. It is true that so many parties are interested in knowing the efficiency of the Capital Market. The small and medium investors could be motivated to save and invest in the capital market only if their securities in the market are appropriately priced. But more number of peoples do not know how to invest the money in correct indices in Indian Share Market. But in India, few studies have examined the daily values, weekly values and monthly values of the stock market in particular stock indices, like S&P CNX Nifty, BSE 100 Index, and Nifty Junior etc.. So the main problem of the investors is that they do not know how to invest the money in returns- earning indices. Hence, the present study aims to investigate the efficiency of bank stocks in NSE Bank Index using the daily returns.

## 4.0. OBJECTIVES OF THE STUDY

The objectives of the present study are as follows.

To study the Returns of the sample Bank Stocks in NSE Bank Index

1. To analyse the Normality Distribution about the Bank Stocks in NSE Bank Index.

## 5.0. METHODOLOGY OF THE STUDY

### 5.1 Selection of the Sample

The study attempts to test the behavior of Sectoral Analysis in daily bank stocks returns. The sample banks were taken from NSE Bank Index. There are totally 12 banks listed in NSE Bank Index as on December 2011. Out of these 12 banks, five banks are private sector banks and seven banks are public sector banks in NSE Bank Index. This study focuses on both Public Banks and Private Banks in NSE Bank Index. As the required information was available for only 11 bank stocks, the study covered only 11 banks. The details of sample banking stocks are given in Table-1.

The study analyzed the daily Bank Stocks Returns of Efficiency of Sectoral Analysis listed in NSE Bank Index for six years from 1st January 2006 to 31st December 2011.

### 5.2 Tools Used for Analysis

For the purpose of analysis of Sectoral analysis in Indian Stock Market, the following tools were used.

#### (i) Descriptive Statistics

##### (a) Mean

The mean is calculated by using following formula.

$$\bar{X} = \frac{1}{n} \sum_{i=1}^n x_i$$

##### (b) Standard Deviation

The standard deviation of a random variable X is defined as:

$$\sigma = \sqrt{E((X - E(X))^2)} = \sqrt{E(X^2) - (E(X))^2}$$

Where,  $E(X)$  is the expected variable of X, and  $Var(X)$  is the variance of X.

##### (c) Skewness

Skewness is a measure of symmetry, or more precisely, the lack of symmetry. A distribution or data set is symmetric if it looks the same to the left and right of the centre point. The skewness is calculated as follows,

$$skewness = \frac{\sum_{i=1}^N (Y_i - \bar{Y})^3}{(N-1)S^3}$$

Where,  $\bar{Y}$  is the mean | S is the standard deviation | N is the number of data points.

##### (d) Kurtosis

Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. That is data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak. A uniform distribution would be the extreme case. The kurtosis is defined as,

$$kurtosis = \frac{\sum_{i=1}^N (Y_i - \bar{Y})^4}{(N-1)S^4}$$

Where,  $\bar{Y}$  is the mean, S is the standard deviation and N is the number of data points.

(ii) Autocorrelation- It is the statistical tool used for measuring the Indices successive terms given time series and dependence of the successive share price changes.

$$P_k = \frac{\sum_{t=1}^{n-k} (R_t - \bar{R})(R_{t+k} - \bar{R})}{\sum_{t=1}^n (R_t - \bar{R})^2}$$

Where, K is the Number of lags,  $R_t$  represents the real rate of return, n is the total number of observations, and  $P_k$  is the sample Autocorrelation function for the lag K.

## 6.0 ANALYSIS OF BANK STOCKS IN NSE BANK INDEX

For the purpose of this study, the analysis of the Sectoral Market Efficiency was arranged as follows:

### 6.1 SUMMARY STATISTICS FOR BANK STOCKS IN NSE BANK INDEX

Table-2 presents a summary of Descriptive Statistics for daily bank stocks returns of the NSE Bank Index. As stated earlier, the Mean, Standard Deviation, Kurtosis and Skewness were used for the analysis. It is to be noted that among sample bank stocks, the mean average returns were healthy for Indusind Bank (0.1784) compared to all other sample bank stocks. The Indusind Bank has earned a high profit (0.1784). The Standard Deviation of returns ranged from 2.41868 (HDFC Bank) to 3.76086 (Indusind Bank). The Indusind Bank received the Highest Standard Deviation (3.76086), which expressed the highest risk. The HDFC Bank evidenced the Lowest Standard Deviation (2.41868), which revealed the lowest risk during the period of study. The Kurtosis for all bank stocks recorded positive values during the study period. It is to be noted that all banking stocks from NSE Bank Index indicate bullish trends. The Kurtosis of market returns ranged from 2.626 (AXIS Bank) to 5.081 (ICICI Bank) i.e., out of eleven banking stocks, four banks namely, AXIS Bank (2.626), Bank of Baroda (2.927), Canara Bank (2.894) and Punjab National Bank (2.660) earned a value of below 3 (Platykurtic). The remaining seven banks taken for this study, namely, Bank of India (3.490), HDFC Bank (3.324), ICICI Bank (5.081), Indusind Bank (3.200), Kodak Mahindra Bank (4.601), State Bank of India (3.792) and Union Bank of India (4.533) earned a value of above 3 (Leptokurtic). The Skewness of all the banking stocks indicated the positive performance of all the NSE banking stocks i.e., a value of below 3 (Platykurtic).

The study found that the Indusind Bank's mean return was good and Standard Deviation was high. According to the analysis of Mean, Standard Deviation, Kurtosis and Skewness, the Indusind Bank's stock performed well during the study period.

### 6.2 The analysis of Autocorrelation for NSE Bank Index

The results of autocorrelation of sample banking stocks during the study are given in Table-3. It is understood from

Banks	Table - 2 Descriptive Statistics				Table -3 Autocorrelation Test in AXIS Bank in XSE Bank Index									
	Mean	Std Deviation	Kurtosis	Skew newss	Lag1	Lag2	Lag3	Lag4	Lag5	Lag6	Lag7	Lag8	Lag9	Lag10
AXIS Bank	0.15	3.16	2.63	0.3	0.424	0.33	0.33	0.49	0.18	0.13	0.2	0.16	0.15	0.1
Bank of Baroda	0.13	2.75	2.93	0.2	0.003	0.011	0.029	0.035	0.002	0.003	0.004	0.005	0.009	0
Bank of India	0.13	3.28	3.49	0.4	0.002	0.007	0.008	0.016	0.002	0.001	0.002	0.004	0.007	0
Canara Bank	0.10	2.94	2.89	0.1	0.001	0.004	0.012	0.001	0.001	0.001	0.002	0.004	0.005	0
HDFC Bank	0.12	2.42	3.32	0.5	0.014	0.008	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0
ICICI Bank	0.08	3.18	5.08	0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Indusind Bank Kodak	0.18	3.76	3.20	0.1	0.046	0.077	0.016	0.027	0.044	0.066	0.092	0.043	0.059	0.1
Mahindra Bank	0.16	3.40	4.60	0.1	r 0.002	0.007	0.019	0.041	0.040	0.014	0.016	0.027	0.019	0
Punjab National Bank	0.09	2.58	2.66	0.1	0.085	0.132	0.249	0.351	0.263	0.339	0.126	0.122	0.159	0.2
State Bank of India	0.10	2.64	3.79	0.4	0.000	0.001	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0
Union Bank of India	0.10	2.90	4.53	0.5	0.062	0.051	0.038	0.021	0.035	0.014	0.013	0.021	0.013	0

Source: Compute from SPSS 11.5 version Software

the above Table that out of 11 sample banks taken for this study, only seven banks earned significant value in all the 10 lags. Those banks are Bank of Baroda, Bank of India, Canara Bank, HDFC Bank, ICICI Bank, Kotak Mahindra Bank and State Bank of India. The value of Indusind Bank showed zigzag sign in its value from 1st lag to 10th lag. It is noted that in respect of Indusind Bank, the zigzag values showed that out of ten lags, five lags (1st, 3rd, 4th, 5th, 7th and 8th) were significant at 5% level and the remaining five lags (2nd, 6th, 7th, 9th and 10th lag) did not show significant values during the study period. Hence, the Null Hypothesis (NH1), namely, "There is no significant difference in the returns of the Bank Stocks in NSE Bank Index", is rejected for eight banks - Bank of Baroda, Bank of India, Canara Bank, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, State Bank of India and Union Bank of India. For the remaining banks taken for this study, the above Null Hypothesis is accepted.

## 7. FINDINGS OF THE STUDY

The following are the important findings of the study.

1. All the sample banks taken for this study earned positive returns. Especially the Bank of India, HDFC Bank, ICICI Bank, Indusind Bank, Kotak Mahindra Bank, State Bank of India and Union Bank of India earned a value above 3 in Kurtosis but those banks did not perform well as per the study of Descriptive Statistics.
2. The results of Autocorrelation for seven sample banks, namely, Bank of Baroda, Bank of India, Canara Bank, HDFC Bank, ICICI Bank, Kotak Mahindra Bank and State Bank of India revealed significant returns at 5% level.
3. The study found that Public Sector Banks - Bank of Baroda, Bank of India, Canara Bank and State Bank of India- earned better returns during the study period.

4. It is to clear that the Union Bank of India was one of the best performing banks during the study period because except for the first 2 lags, there were significant values in the remaining lags (3 to 10) at 5% level.
5. The returns of the sample banks like AXIS Bank, Indusind Bank and Punjab National Bank were not distributed normally under the Autocorrelation Test during the Study Period.

## 8. CONCLUSION

The study examined the returns of 11 sample banks for studying the sectoral index by using Autocorrelation Function (ACF). The study reveals that the results of Autocorrelation Test for Bank of Baroda, Bank of India, Canara Bank, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, State Bank of India and Union Bank of India in respect of performance, support the normal distribution. This shows that the above eight banks were healthy during the study period and the investors of those banks would have earned maximum returns in the stock market operations. This depicts the growth of Banking Sector Stocks and their Sectoral Efficiency in the Indian Capital Market.

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