Impact of Digitalisation on Indian Banking Sector: An Empirical Study

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Abstract — Increase in smart phone users and availability of digital identity have created wide access to mobile banking. The Bharat Interface for Money (BHIM) is a mobile application, based on Unified Payment Interface (UPI) system, to enable instant money transfers. The banking sectoral indices like Nifty Bank, Nifty Private Bank and Nifty PSU Bank are key indices designed to reflect the performance of stocks of Indian Banking Sector. This study attempts to know the effect of launching of BHIM application on these bank sectoral indices. It is interesting to note that there was significant difference in the volatility of daily prices of the indices, before and after the launching of BHIM application.

Keywords— BHIM, UPI, Nifty Bank Indices, GARCH (1, 1) Model

I. INTRODUCTION

Financial sector plays the most important role in the economic development of a country. Indian banking industry is now using innovative delivery channels, which are accessible to all, with low cost. The Reserve Bank of India (RBI) has set the objective to proactively promote digital payments, leading towards cashless society. The payment and settlement channels like internet banking, e-wallets and mobile banking are now becoming popular. Increase in Smartphone users and availability of online verifiable identity, have created wide access to mobile banking. Bharat Interface for Money (BHIM) is a mobile application, developed by the National Payments Corporation of India (NPCI) and launched by Prime Minister Narendra Modi, on 30th December 2016. BHIM application is based on Unified Payment Interface (UPI) system, to enable instant retail inter-bank transfers. Secured details like account number or IFSC code are not required to make a transfer or receive funds. Virtual Payment Address (VPA) like abc@xyzbank is enough to transfer money. Bank stock prices indicate the perceived impact of new economic initiatives by the Government, on the investors. This paper compares the volatility of the bank stocks indices of National Stock Exchange (NSE) with the launch of BHIM application.

II. REVIEW OF LITERATURE

Somanjoli Mohapatra (2017) analyzed the various mobile and card payment systems, initiated by NPCI. UPI is a payment tool, based on IMPS system. The VPA links the bank account to the mobile application. BHIM application can be used through other platforms like MMID or unique QR code also. Shamsheer Singh (2017) conducted a study on the consumer perception on digital payments. ANOVA and frequency analysis were used to analyze the primary data. The study indicated that there was no significant variance in consumer perception, based on demographic factors, though education was a major influence. Sagar B, Kajal A and Priya C (2017) examined the various mobile applications like Paytm, BHIM, Mobikwik etc and their survey revealed that Paytm reported the maximum number of users. Gochhwal R (2017) studied the technology behind UPI and the value addition of this system towards the digital payments. The study also discussed the features, benefits and the areas to be improved in UPI. Rajamohan S and Muthukannu M (2014) attempted to bring out the influence of banking sector on other sectors, during bull and bear markets, using various NSE indices. Pearsonian Correlation Coefficient was applied and a positive correlation was found between banking and other sectors. Nataraja N.S, Ganesh L, Sunil K (2014) evaluated the relationship between the foreign exchange rates and bank stock prices. J-B test, Granger causality and Unit Root test were the statistical tools used in the study. The paper concluded that the time series were not normally distributed and stationarity was present. A negative correlation was observed between the time series. Abdullah M.B, Ali A.A, Nripendra P.R, Hatice K and Pushp P (2018) recognized the main factors influencing customer satisfaction and loyalty in the use of mobile banking. The SEM model was used to analyse the primary data. The factors performance expectancy, price value, facilitating conditions, hedonic motivation, habit, system quality and service quality were found to have a significant impact on consumer behaviour.

Statement of Problem

Banks have a major role in the country’s economy development. The bank stock prices help in determining the perceived performance of the banking sector. Any new financial initiatives, by the government, impact the risk taking abilities of investors. Therefore, it is important to study the government initiatives influencing the bank stock prices. The present study attempts to know the effect of launching of BHIM application on bank stocks.
Objective of the Study

The study proposes to investigate the risk behavior of Nifty Bank, Nifty Private Bank and Nifty PSU Bank indices towards the launch of BHIM application.

Hypotheses of the Study

NH01: Daily returns of sample Bank Indices are not normally distributed.

NH02: Daily returns of sample Bank Indices are not stationary.

NH03: There is no significant difference in volatility of sample Bank Indices, during the sample period of before and after the launch of BHIM application.

III. METHODOLOGY OF THE STUDY

Sample of the study

Nifty Bank, Nifty Private Bank and Nifty PSU Bank were the sample indices, which indicated the performance of stocks of Indian Banking Sector traded on National Stock Exchange (NSE). New technological developments in banking sector may have short term effects in stock prices of the banks and hence the present study selected these three indices of bank stocks for analyzing the risk behavior, before and after the launch of BHIM application.

Period of the study

The period of study was divided into two. The first period, from 1st April 2015 to 30th December 2016, was considered the Pre Launch Period and the second period, from 1st January 2017 to 31st August 2018, was considered the Post Launch Period.

Source of Data

The performance of Nifty Bank Indices was analysed during the period of before and after the Launch of BHIM application. The daily closing prices of Nifty Bank, Nifty Private Bank and Nifty PSU Bank were collected from NSE (National Stock Exchange of India). The logarithmic returns of the closing prices were used to perform the tests.

Statistical Tools of the Study

The present study used the following tools for analyzing the data.

- Descriptive Statistics – Used for checking the nature/normality of the daily returns of the bank indices.
- Augmented Dickey Fuller Test (ADF) – Used for testing the stationarity of the daily returns of the bank indices.
- GARCH(1,1) – Used for identifying the volatility behaviour of the daily returns of the bank indices.

IV. RESULTS OF THE STUDY

The results of descriptive statistics for daily returns of bank indices are portrayed in Table-1. It clearly reveals that mean return values of sample Indian banking sectoral indices namely, Nifty Bank (-0.000008), Nifty Private Bank (-0.000004) and Nifty PSU Bank (-0.000042) recorded negative return, during the pre launch period. But during the post launch period, the mean values of Nifty Bank (0.001077), Nifty Private Bank (0.001137) and Nifty PSU Bank (0.000305), recorded positive returns. The standard deviation values for Nifty Bank (0.013204, 0.008121), Nifty Private Bank (0.013083, 0.008025) and Nifty PSU Bank (0.021903, 0.021371) it revealed the risk of the indices for before and after the period of the BHIM app launch. Comparing all the three sample indices, Nifty PSU Bank index reported high risk during both the sample period of BHIM app. The daily prices of indices recorded negative skewness (Nifty Bank at -0.320498 and Nifty Private Bank at -0.350581) before the launching period and positive skewness (Nifty Bank at 0.209245 and Nifty Private Bank at 0.064129) after the launching period. All the kurtosis sample values were greater than 3 and hence they were leptokurtic. The values of Jarque-Bera indicated that all the samples were normally distributed. Hence the present study rejected the null hypothesis NH01, “Daily returns of sample Bank Indices are not normally distributed”.

Table-1 Results of Descriptive Statistics for Daily Prices Returns of Nifty Bank Index during the Study Period from April 2015 to August 2018

<table>
<thead>
<tr>
<th>Descriptive Variables</th>
<th>Nifty Bank</th>
<th>Nifty Private Bank</th>
<th>Nifty PSU Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Launch</td>
<td>Post Launch</td>
<td>Pre Launch</td>
</tr>
<tr>
<td>Mean</td>
<td>0.00</td>
<td>0.0010</td>
<td>0.0000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.01</td>
<td>0.0081</td>
<td>0.0009</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.32</td>
<td>0.2092</td>
<td>0.3500</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>5.23</td>
<td>4.0842</td>
<td>5.054</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>19.74</td>
<td>63.298</td>
<td>85.01</td>
</tr>
</tbody>
</table>

Source: Data collected from official website of NSE, computed using E-views.

The results of Augmented Dickey Fuller (ADF) Test, for the bank indices, before and after the launch of BHIM app, between the period of April 2015 to August 2018, are presented in Table - 2. The test critical values for the indices were analyzed at significant levels of 1%, 5%, and 10%. The Table clearly indicates that the statistical values for Nifty Bank (-20.0499), Nifty Private Bank (-20.1876) and Nifty PSU Bank (-19.8984), were higher than the test critical values before the launching of BHIM (Ignoring the sign). Hence the prices for the Nifty Bank, Nifty Private Bank and Nifty PSU
Bank indicated stationarity. Similarly, after the launching, results revealed the statistical values for Nifty Bank (-18.6872), Nifty Private Bank (-18.6906) and Nifty PSU Bank (-19.4908), to be greater than the test critical values, after the launching of BHIM (Ignoring the sign). It is proved that prices of Nifty Bank, Nifty Private Bank and Nifty PSU Bank were found stationary. The ‘p’ value was found to be statistically significant at 5% level. Hence the null hypothesis NH02, “Daily returns of sample Bank Indices are not stationary” was rejected.

### Table – 2 Results of Augmented Dickey-Fuller Test for Daily Return of the Indices During the Study Period from April 2015 to August 2018

<table>
<thead>
<tr>
<th>Index</th>
<th>Period</th>
<th>Augmented Dickey-Fuller Test Statistic</th>
<th>Test critical values</th>
<th>Probl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1% level</td>
<td>5% level</td>
<td>10% level</td>
</tr>
<tr>
<td>Nifty Bank</td>
<td>Pre Launch</td>
<td>-20.0499</td>
<td>-2.57033</td>
<td>-1.94156</td>
</tr>
<tr>
<td></td>
<td>Post Launch</td>
<td>-18.6872</td>
<td>-2.57057</td>
<td>-1.94159</td>
</tr>
<tr>
<td>Nifty Private Bank</td>
<td>Pre Launch</td>
<td>-20.1876</td>
<td>-2.57033</td>
<td>-1.94156</td>
</tr>
<tr>
<td></td>
<td>Post Launch</td>
<td>-18.6906</td>
<td>-2.57057</td>
<td>-1.94159</td>
</tr>
<tr>
<td>Nifty PSU Bank</td>
<td>Pre Launch</td>
<td>-19.8984</td>
<td>-2.57033</td>
<td>-1.94156</td>
</tr>
<tr>
<td></td>
<td>Post Launch</td>
<td>-19.4908</td>
<td>-2.57057</td>
<td>-1.94159</td>
</tr>
</tbody>
</table>

**Source:** Data collected from official website of NSE, computed using E-views

The Table - 3 explores the results of GARCH (1, 1) Model for the daily returns of the bank indices, before and after the launch of BHIM app. The results showed that there was significant volatility, associated with the daily prices of the bank indices, before and after the launch of BHIM app. The values of AR (1) and GARCH (1) for Nifty Bank, Nifty Private Bank and Nifty PSU Bank, before the launch of BHIM app were 0.92078, 0.911489 and 0.943434 and after the launch of BHIM app, they were 0.869217, 0.955072 and 0.767875. These results showed that before the launch of BHIM app, Nifty Private Bank volatility was low, compared to the price after the launch of BHIM app. Nifty Bank and Nifty PSU Bank volatility was low after the launching. These results proved that significant volatility was experienced by both Nifty Bank and Nifty Private Bank, before and after the launching of BHIM. Hence the study rejected the null hypothesis NH03, “There is no significant difference in volatility in daily prices of the indices before and after the launching of BHIM application”.

### Table – 3 Results of Volatility Analysis for the Indices

<table>
<thead>
<tr>
<th>Index</th>
<th>Period</th>
<th>$\alpha$</th>
<th>$\beta$</th>
<th>$\alpha + \beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nifty Bank</td>
<td>Pre Launch</td>
<td>0.059483</td>
<td>0.861297</td>
<td>0.92078</td>
</tr>
<tr>
<td></td>
<td>Post Launch</td>
<td>0.051465</td>
<td>0.817752</td>
<td>0.869217</td>
</tr>
<tr>
<td>Nifty Private Bank</td>
<td>Pre Launch</td>
<td>0.060538</td>
<td>0.850951</td>
<td>0.911489</td>
</tr>
<tr>
<td></td>
<td>Post Launch</td>
<td>0.028373</td>
<td>0.926699</td>
<td>0.955072</td>
</tr>
<tr>
<td>Nifty PSU Bank</td>
<td>Pre Launch</td>
<td>0.109869</td>
<td>0.833565</td>
<td>0.943434</td>
</tr>
<tr>
<td></td>
<td>Post Launch</td>
<td>0.669241</td>
<td>0.098634</td>
<td>0.767875</td>
</tr>
</tbody>
</table>

$\alpha = \text{ARCH (-1)}$; $\beta = \text{GARCH (-1)}$

**Source:** Data collected from official website of NSE, computed using E-views

V. RECOMMENDATIONS AND CONCLUSION

The present study analysed the price behaviour of Nifty Bank, Nifty Private Bank and Nifty PSU Bank, during the period of pre and post launching of Bharat Interface for Money (BHIM) application in India. The study collected the daily prices of the bank indices from the official website of NSE India, for a period of twenty months, before and after the date of BHIM launching. Descriptive Statistics, Augmented Dickey-Fuller Test and GARCH (1, 1) Model were used to test the null hypotheses. The results of the study indicated that the indices experienced positive returns during pre-launch period but during the period of post launch, they recorded negative returns. The values of Jarque-Bera indicated that all
the samples were not normally distributed. The results of Augmented Dickey Fuller (ADF) Test proved that prices of Nifty Bank, Nifty Private Bank and Nifty PSU Bank were found stationary. From the results of GARCH (1, 1) Model, the study found that there was significant difference, in the volatility of daily prices of the sample indices, before and after the launching of BHIM application. Though Nifty PSU Bank recorded a bigger decline in volatility. It is to be noted that the information about economic initiatives affected the bank index prices. Hence investors may consider the economic events before investing their money in these stocks.

REFERENCES