

Pakistan Banking Sector Performance Based on Mobile Personal Devices: Integrated Model of ROA & ROE

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Abstract

This study aimed to explore the influence of transactions executed through mobile banking on performance of Pakistan banking sector over the period of 2004 to 2013. The sample of this study consists of all 46 banks operating in Pakistan during the considered period. Ratios named as Return on Assets and Return on Equity have been used to measure the performance while on the other hand transactions completed through mobile banking are considered as independent variable. To make the model stronger, spread, credit risk, intermediation cost, weighted average lending rate, non-performing loans to total advances as bank specific factors have been incorporated. All the variables have been fitted into regression equation to apply regression analysis. The results enlighten a significant positive impact of mobile banking transactions on overall performance of Pakistan Banking sector in terms of ROA and ROE.

Keywords: Mobile Banking, ROE, ROA, Pakistan

1. Introduction

In the recent decades, payments are developing rapidly by taking advantage of advancements in technologies since they are becoming available which not only enhance the integration of customers with processes of commercial banks even banks' dialogue with customers have become more interactive. Such is happened mostly because of the contribution by internet and mobile banking. There is a significant clear evidence that in future transactions through e-banking will be enhanced not only in developed countries but as well in developing countries (Dag-Inge Flatraaker, 2008), (Pfitzmann, 1999). Pakistan can be considered as an example for this argument. In Pakistan, the E-payments have been increasing along with ups and downs since 2006 enlightened in figure 1. Pakistan is not lagging behind in the competition of communication and information technology (ICT) as technology driven networks are increasing day by day along with the usage of ATMs, Credit Cards, Mobile Banking, Debit Cards, Phone Banking, Internet Banking and other products of E-Banking rapidly. For this purpose, all the banks under the supervision of State Bank of Pakistan are investing huge resources. Thus the objective of this study is an attempt to explore the contribution of mobile banking in the total electronic transactions in Pakistan under the umbrella of this transformation along with finding the integrated mathematical model to educate the impact of transactions done by mobile banking on the performance of whole Pakistan banking sector which has been measured in terms of ROA and ROE. In the other way around, this study will be a significant contribution in the literature for investors and shareholders even the strategic teams of banks to understand the importance of mobile based devices to perform these transactions successfully because now 6 out of 10 people approximately have owned such portable devices mostly in developing countries like Pakistan, Bangladesh and India. So it can lead toward a prediction of expansion in the base of customers of commercial banks. Thus the further research has been organized as follows: section 2 enlightens the related work for developing the logics behind a theory of model. Methodology has been explained in section 3 while data analysis along with results and discussion are incorporated in section 4. The final conclusion has been termed in section 5.

2. Literature Review

Mobile personal devices permit a secure, appropriate and speedy authorization of retail payments, brokerage, e-banking and other types of transactions (Bellare, 2000). The development of mobile based commerce charts the progressively common ownership and use of mobile personal including mobile phones and PDAs (Herzbeti, 2003) (Restorla, 2002). For handling and authorizing payments and banking transactions along with the required security and convenience advantages as compare to e-payments via personal computers, these devices are more efficient (Herr-hetg, 1998). Some of these advantages are also available in these existing devices and many more will be in few years which will be benefitted through the use of mobile devices. Through them, there will be revolutionary changes in all sectors especially banking one indeed there will be many challenges of security, big data along with other risks like operational, financial, and environmental risks (Horn, 1998) (MacGregor, 1997). Security and convenience are the two main reasons because of which, mobile based banking transactions have been increased not only in developed, well infrastructure countries but even in developing countries like India,

Pakistan and Bangladesh (State Bank of Pakistan, 2013). How these two features are fitted in the mechanism of mobile personal based devices is enlightened in figure 2 (Michel, 1999). Hence to find out that whether the investment of huge resources in these advancements have any effect on the financial performance of banking sector so that it can be assured that these investments are generating return to continue further contribution in developing the infrastructure. In this study the main objective is to find out the financial influence of mobile banking on profitability of Pakistan Banking sector in terms of ROA and ROE. Indeed, there are many ways to measure the performance like Gross profit margin, dividend payout, ROE and ROA ratios but in our study we will incorporate ROA and ROE alone not the others which is in accordance with Demirguc and Huizinga (1999), Athanasoglou (2008) and Aburime (2008). As per the best knowledge of researchers, our study is unique on the basis of following characteristics:

- As it is the first effort to develop the integrated mathematical model to search out the relation between profitability of Pakistan banking sector and mobile banking. In the literature, there is no single study is till 2013, which has explored this relation ever which is as a separate topic by itself
- It is accompanied with the future directions of research as well as a motivation for all financial institutes who have to or are in process of transforming from paper based to internet based transactions with customers, that this investment has a positive and significant impact on their profitability along with efficiency, customer satisfaction, speed in services delivery, convenience and many more.

3. Methodology

There are total 46 banks operating in Pakistan banking sector according to list categorized at June 30, 2013 by SBP (State Bank of Pakistan) which are included in the population of the study. As for the concern of sample, to get the appropriate results, total 46 banks along with all Islamic bank branches are incorporated in it. Although, 14 conventional banks are providing Islamic banking services for the period of December 2004 to June 2013 quarterly. Data for all the variables has been collected from statistics department of SBP (State Bank of Pakistan) as annually and quarterly financial reports for each bank and consolidated as well available on the website of SBP (State Bank of Pakistan).

3.1. Independent Variables:

- Mobile Banking: It has been calculated by drawing the portion of transactions done through mobile banking from the total electronic transactions.
- Spread: it is consolidated banks' spread calculated as minus the interest paid on deposits from interest charged on advances.
- Weighted Average Lending Rate: Average lending rate collected quarterly has been weighted along with the risk associated with loans.
- Non-Performing Loans to Total Advances: it has been calculated by dividing the non-performing loans by the total advances mentioned in the quarterly reports of banks as consolidated.
- Credit Risk: it has been calculated as per the standards mentioned by State Bank of Pakistan by dividing loan loss provision with total loans.
- Intermediation Cost: it's a cost which banks are charging to their services providing as being intermediary. The values of its have been collected from the consolidated financial reports for all banks provided by State Bank of Pakistan.

3.2. Dependent Variables

- ROE: Return on Equity which has been calculated by dividing the net income with shareholder's equity.
- ROA: Return on asset has been calculated by dividing the net income with total assets.

3.3. Control Variables:

All non-financial variables as customer satisfaction, efficiency, speed, productivity and others as well have been controlled to measure the appropriate performance in financial terms.

Hence in the study, we follow a practical model based on previous works by Demirguc and Huizinga (1999), Athanasoglou (2008) and Aburime (2008) in which ROA & ROE used a measure of performance in banking sector. On the bases of that model, following regression equation has been derived to apply the regression analysis:

$$Y_t = \beta_0 + X_1\beta_1 + X_2\beta_2 \dots \dots X_t\beta_t + \varepsilon_t$$

Wherein:

- Y_t = ROA & ROE (Return on Assets as well Return on Equity)
- β_0 = X-intercept
- X_t = Independent variables
- $\beta_1, \beta_2, \beta_3, \dots, \beta_t$ are incorporated as beta values
- ε_t = Error term

- t = Time period.

With the help of above mentioned regression equation, following equations have been derived:

$$ROE = \beta_0 + MOB\beta_1 + CR\beta_2 + SD\beta_3 + LR\beta_4 + NPLADV\beta_5 + INTRCST\beta_6 + \varepsilon_t \quad (1)$$

$$ROE = \beta_0 + MOB\beta_1 + CR\beta_2 + SD\beta_3 + NPLADV\beta_4 + LR\beta_5 + INTRCST\beta_6 + \varepsilon_t \quad (2)$$

Wherein:

- MOB is Mobile Banking.
- CD is credit Risk.
- SD is spread.
- LR is weighted average lending rate.
- NPLAD is a ratio of nonperforming loans to total advances.
- INTRCST is intermediation cost.

4. Data Analysis and Results

Table 1 has summarized the important statistics of data as out of total 35 counts, ROE owns the highest mean, median and standard deviation along with the maximum value. While lowest value is with MOB because in the starting years, the MOB was introduced in Pakistan so in the initial quarters from 2004 to 2006, the values remain zero. Table 2 has described the relations among the variables themselves as well the correlation of independent variables with dependent one (ROE, ROA).

Overall results have been abridged in table 3 as that R^2 (0.8615) and adjusted R^2 (0.8062) referred as ROA will be influenced by 86% and as per adjusted analysis it will be effected by 81% reflected by the changes in independent variables (Positive or negative). F-Statistics (15.59) clarifies a direct relationship between all independent variables and ROA of Pakistan banking sector. Prob. (F-statistics) is 0.000011 which defines that general results of the model are significant. Durbin - Watson is 1.95 approximately nearest to 2 indicates that all the independent variables are not correlated to one another. Following equation has been resulting by feeding the values of coefficient stated in table 3 into equation number 1 of regression analysis:

$$ROA = 1.82 + 6.99(MOB) - 0.17(CR) + 1.12(SD) - 0.11(LR) + 0.08(NPLADV) - 1.81(IMTRCST) + \varepsilon_t$$

The above resulted equation has proved that overall the model describing positive and significant at level 1% impact on performance of Pakistan banking sector in form of ROA. The area of our interest is to enlighten the influence of mobile banking on the performance in terms of ROA, which has been proofed from equation as well table 3, that MOB effects ROA with the coefficient of 6.99 and probability of 0.032 as significant at level 5%. The results are in agreement with the research by Onay, Ozsoz and Helvacioğlu (2008) which investigated about the impact of E-Banking on the profitability (Both in the form of ROA and ROE) of 13 banks in Turkey over the period of 1996 to 2005.

Overall results have been abridged in table 3 as that R^2 (0.8716) and adjusted R^2 (0.8202) referred as ROA will be influenced by 88% and as per adjusted analysis it will be effected by 82% reflected by the changes in independent variables (Positive or negative). F-Statistics (16.99) clarifies a direct relationship between all independent variables and ROA of Pakistan banking sector. Prob. (F-statistics) is 0.000007 which defines that general results of the model are significant. Durbin - Watson is 1.86 approximately nearest to 2 indicates that all the independent variables are not correlated to one another.

Following equation has been resulting by feeding the values of coefficient stated in table 4 into equation number 2 of regression analysis:

$$ROA = 18.63 + 93.11(MOB) - 1.73(CR) + 10.67(SD) - 1.05(LR) + 0.82(NPLADV) - 17.57(IMTRCST) + \varepsilon_t$$

The above resulted equation has proved that overall the model describing positive and significant at level 1% impact on performance of Pakistan banking sector in form of ROE. The area of our interest is to enlighten the influence of mobile banking on the performance in terms of ROE, which has been proofed from equation as well table 4, that MOB effects ROE with the coefficient of 93.11 and probability of 0.0088 as significant at level 1%. The results are in agreement with the research by Onay, Ozsoz and Helvacioğlu (2008) which investigated about the impact of E-Banking on the profitability (Both in the form of ROA and ROE) of 13 banks in Turkey over the period of 1996 to 2005.

5. Conclusion

To perform the secure banking as well as payments and other transactions, now recently mobile devices are becoming more important. PDAs, Cell phones and other mobile personal devices are an expedient channels for approving transactions. In the future, it is well predicted and obvious that they are probably to integrate low-cost improvements providing safe, contracted transaction appeals, providing third-party confirmable proof of the customer's agreement to each transaction and it will be supple enough to support multiple requests, situations,

and providers. Mobile personal expedients will play a progressively vital role in investing, payments, banking and other transaction-based and security-sensitive applications. Hence it's an ongoing trend in Pakistan as the transactions through mobile personal devices have been increased tremendously and as the results of this study disclosed an important and significant positive impact on the profitability of whole Pakistan banking sector in terms of ROE and ROA. Which will be a great motivation for the strategic decisions for making investment to get benefits from the upcoming improvements in mobile banking.

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Table 1. Summary of data statistics

Variables	Mean	Median	Standard Deviation	Max	Min	Count
ROA	1.4463	1.38344	0.364265	2.134017	0.900398	35
ROE	16.36833	15.10423	5.614418	28.32056	8.732476	35
CRDRSK	4.53395	4.67332	0.716414	5.454037	3.056211	35
WALR	11.15682	11.54107	1.844319	13.83181	6.081128	35
SPREAD	6.486948	6.65128	0.537622	7.239391	4.787933	35
NPLADV	3.541165	3.731832	1.59067	6.424623	0.681511	35
INTRCST	3.250696	3.367559	0.323319	3.709457	2.648559	35
MOB	0.011865	8.83E-05	0.018548	0.060018	0	35

Table 2. Correlation among variables

	<i>ROA</i>	<i>ROE</i>	<i>CRDRSK</i>	<i>WALR</i>	<i>SPREAD</i>	<i>NPLADV</i>	<i>INTRCST</i>	<i>MOB</i>
ROA	1.00							
ROE	0.85	1.00						
CRDRSK	-0.73	-0.51	1.00					
WALR	-0.38	-0.74	0.27	1.00				
SPREAD	-0.02	-0.39	-0.04	0.82	1.00			
NPLADV	-0.52	-0.46	0.82	0.44	0.06	1.00		
INTRCST	-0.63	-0.85	0.52	0.92	0.71	0.53	1.00	
MOB	-0.22	-0.27	0.43	0.24	-0.21	0.71	0.20	1.00

Table 3. Ordinary Least Square: Regression Analysis of ROA and Mobile Banking

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.815317	0.892246	2.034547	0.0600
CRDRSK	-0.172650	0.166909	-1.034393	0.3173
SPREAD	1.120481	0.146305	7.658534	0.0000*
WALR	-0.112289	0.092766	-1.210455	0.2448
NPLADV	0.075925	0.064698	1.173527	0.2589
MOB	6.999767	2.925219	2.392904	0.0302**
INTRCST	-1.807500	0.639002	-2.828628	0.0127**
R-squared				0.861572
Adjusted R-squared				0.806201
F-statistic				15.55995
Prob.(F-statistic)				0.000011
Durbin-Watson stat				1.948121

* Significant at level 1%

** Significant at level 5%

Table 4. Ordinary Least Square: Regression Analysis of ROE and Mobile Banking

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.63058	9.443574	1.972831	0.0672
CRDRSK	-1.734467	1.766573	-0.981826	0.3418
SPREAD	10.67248	1.548498	6.892149	0.0000*
WALR	-1.053687	0.981834	-1.073182	0.3002
NPLADV	0.823660	0.684770	1.202827	0.2477
MOBB	93.11115	30.96065	3.007403	0.0088*
INTRCST	-17.56663	6.763227	-2.597374	0.0202**
R-squared				0.871588
Adjusted R-squared				0.820223
F-statistic				16.96860
Prob(F-statistic)				0.000007
Durbin-Watson stat				1.885344

* Significant at level 1%

** Significant at level 5%

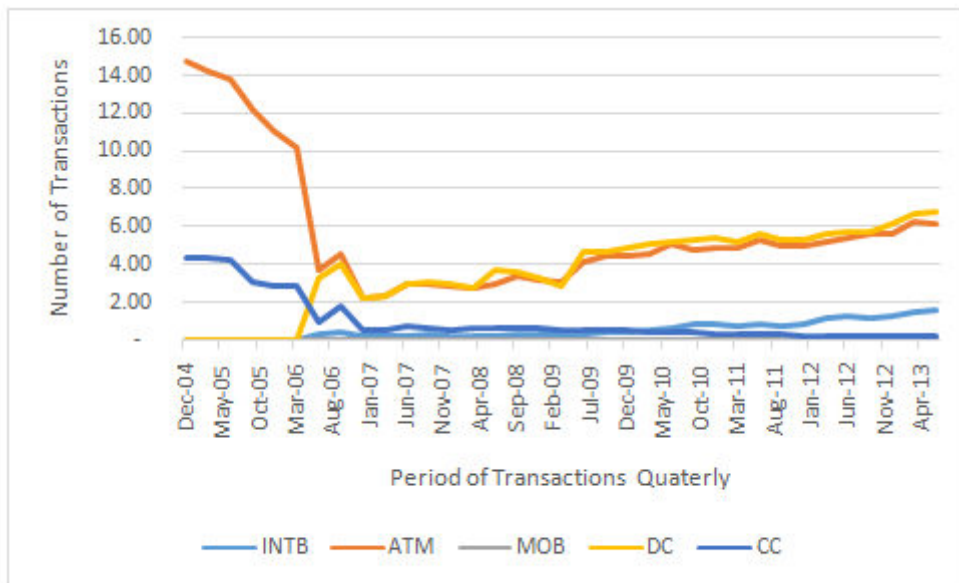


Figure 1. E-Payments in Pakistan

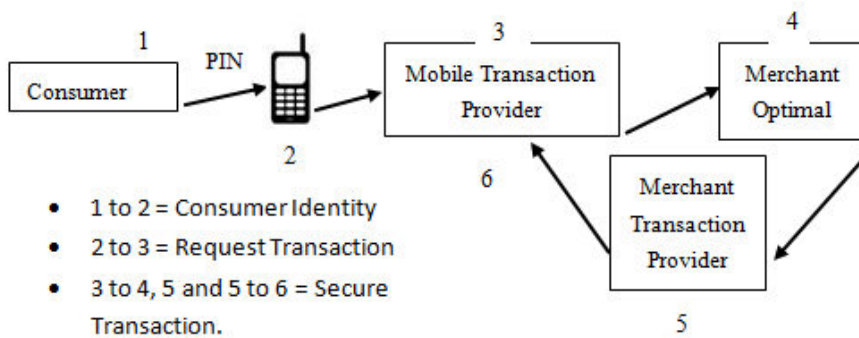


Figure 2. Using Mobile Personal Device, Modular of Secure Transaction Architecture