Integrated Model to measure the Impact of E-Banking Services on Commercial banks' ROE: Empirical Study of Pakistan

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Abstract - In this study, an integrated model has been developed to measure the impact of E-banking services on the profitability of commercial banks in Pakistan over the period 2002 to 2012. The study sample encompasses of 3 major commercial banks of Pakistan named as National Bank of Pakistan (NBP), Habib Metropolitan Bank (HMB) and Askari Bank Limited. Dependent variable is ROE while independent variables (Market Share, Overhead, Deposits/ Assets and Loans/Assets ratios) are incorporated in the model by applying the regression analysis. The results educated that E-Banking has significant impact on profitability of recent adopters of E-banking services in term of ROE.

Index Terms - E-Banking, Pakistan, Sustainable Strategy, Competitive Advantage, ROE

1. Introduction

Banking sector is considered as the most important gear for engine of any economy. The recent recession of European banks is the almost example of its importance. Indeed a new flavor in the cuisine of banking sector has restructured the operating style of banks. Hence that flavor is E-Banking. In many aspects, E-banking is alike to the traditional payment, inquiry systems and information processing but variance is only in the sense of using different delivery channels [1]. E-banking has been defined as by Georgescu, (2005): "it includes the provision of retail and small value banking products and services through electronic channels as well as large value electronic payments and other wholesale banking services delivered electronically" [2]. In this study, we are developing an integrated model to measure the impact of E-banking services on the ROE (Profitability) of commercial banks in Pakistan over the period of 2002 to 2012. Indeed over this period, E-banking has been developed a lot under the supervision of State Bank of Pakistan and because of advancements in ICT (Information and communication technology). Resent progress in E-banking is such as during the financial year 2013 (3rd quarter), 217 more ATMs were installed by various banks, which increased the total number of ATMs in the country to 6,449. Fifty more bank branches have been added to the online branch network which makes a total of 9,946, total number of plastic cards issued is 21.77 million, increased by 5.06%, and E-banking transactions have been increased by 3.47 %, in volume is equal to 82.21 million transactions and an upsurge of 4.37 % in value (equal to Rs. 7.9 trillion). Such type of robust development has been observed mostly in all other developing countries like India, china [3]. This study is a distinguished one because it is developing an integrated mathematical model to check out the influence of E-banking services on the profitability of commercial banks of Pakistan. As per the best knowledge of researcher, even a single study to develop quantitative model to measure this aspect has not been developed in Pakistan. The model will not only support the banking sectors, but even the FDIs and other companies can also use it to check out the additional contribution of the E-payments on their financial performance. Because in the model ROE has been used, which can be derived from financial statements of any institute in Pakistan but depends upon that to which extend they are depending on E-payments. To apply this exclusive integrated mathematical model in banking sector of Pakistan during period 2002 to 2012, the rest of the study has been structured as follows: section 2 educates the related work about the impact E-banking services on the profitability of banking sector. Methodology qualifications and data description has been clarified in section 3. In this section, the economic justification, sample, data design, proxies, initial test have been enlightened as well. The purpose of section 4 is to present the estimated results of this integrated mathematical model. The concluded empirical test along with a summary of the results and its further implications have been drawn in section 5.

2. Literature Review

In the past, there are many studies, which examined the relationship between the E-banking services and their impact on the profitability of banks in different countries.

One of these studies, Merenzi et al. (2000) is an important effort. This study forecast the relationship between the profitability of institutions which are implementing DI's Internet banking applications [3]. The results of this study showing that it is not possible to state blindly that internet banking is always profitable. Because it is concluded that those institutions with fewer than 15,000 customers only propose a restricted set of internet banking services are not probably to get profit until they are capable to convince a very substantial share of their customers to online banking. Though, above the size, the signs for gainful internet banking are appreciated [4]. Carvalho and Siegel (2002) has investigated the return on investment which has been done for online banking services [5]. The results of this study are following:

- "Account Aggregation Services" will bring losses for the financial institutions if it will be without cross selling.
- "Account Aggregation" is a convincing technology that should be a product in the sense that most significant banks will deliver it, and it will signify no more a distinguished competitive advantage.

Yibin (2003), has judged the society's perspective of E-banking. The purpose of this study was to identify the trends, challenges, status and the policy issues related to E-banking. In the results of this study, it's mentioned that E-banking can not only progress the access to finance, but also allow the assessment to finance with better and more modest rates. It also resulted that using E-banking, also alleviate the restrictions associated with the financial system [6].

Lustsik (2003) discovers the implementation methods of "Activity-Based Costing (ABC)" in the banking sector on the example of an "Estonian bank" in order to examine the cost structure for traditional and electronic based transactions [7]. This study publicized that there is a portion of additional profit which had been derived via electronic channels as compare to traditional channels of working by bank. As per the results of this study, it can also be assumed that adopting E-banking has the extraordinary profitability effects for banks. Indeed profitability transactions are not primacy for banks. As per the concluded results of this study, it can also be presumed that between different services groups, cross-substitution has been used, for example, profits from depositing and lending transactions recompense for meagre profitability from transaction facilities.

Siam (2006) observed the effect of E-banking on profitability banks in Jordan. All working banks in Jordan which have sites on the internet for the period of 1999-2004 are included in the population of the study [8]. The results of the study determined that there is a significance relationship between the adoption of E-banking services and profitability of banks but along with the following conclusions:

- In the short run, there will be negative effects.
- In the long run, there will be positive effects on the profitability.

Further the study also demonstrated that the employees of banks and managers also preferred to enlarge their electronic processes in servicing the consumers but along with a suggestion that should not convert the banks into totally electronic banks because there are many risks associated with it. Indeed, the technological transformation is at its early stages in Jordan and still needs of a lot of improvements especially in the field of internet. So this study also encouraged the public trust in E-banking as well as the public and private sector along with government to invest in the projects related to it.

Hernando and Nieto (2007) endeavored to identify and estimate the impact of the implementation of a transactional web site on financial performance. In this study, sample of 72 commercial banks of Spain over the period 1994-2002 has been used [9].

The results of this study demonstrate that its take time to get the appearance of impact on bank's performance by the adoption of transactional web. As its adoption, cause a gradual reduction in the overhead expenses especially of staff, marketing and IT which gradually leads toward an increase in profit mostly in terms of ROA .Significance of results in term of ROA occurs after the passing of one and half year after adoption and after three years, in terms of ROE.

Onay et al. (2008) examined the effect of internet banking on bank's performance in sense of profitability. Their examination enclosed 13 banks that have accepted online banking in Turkey for the period 1996 to 2005 [10]. The findings of this studies confirmed the work of "Hernando and Nieto" that adoption of internet banking subsidizing to banks' ROE with a time interval of two years. On the other hand, a negative effect is experienced for 1 year lagged dummy.

Haider Sumra et al. (2011) conduct a study to find out the influence of E-banking on the profitability of banks in Pakistan and the sample of this study included 12 banks of Pakistan. This study is qualitative based on the determinants of profitability for banks. Till 2011, this was the first study which was conducted in this perspective and still there was no mathematical model has been used [11].

Although in the past, and as above explained studies, many countries checked out the impact of E-banking, or internet banking on the profitability of its most important sector of banking. Concerning to our research work, our study is different from the other studies, which have been held in the field of finding the effect of E-banking on the profitability of banks in Pakistan. Where as to the researcher best knowledge, there is no single study which discuss the profitability, added by E-banking in Pakistan in this way. Because in this study we tried our best to develop an integrated mathematical model to check out the influence of E-banking on the profitability (ROE) of commercial banks of Pakistan.

3. Methodology and Data Description

A. Population & Sample of study

All the scheduled banks operating in the Pakistan, are considered as the part of population in our study. As per the "Circular Letter No. 06" date 30th May, 2002: a complete list of scheduled banks had been issued, which will be considered under the regulation of the SBP (State Bank of Pakistan). In sample of the study, three banks have been included named as National Bank of Pakistan (NBP), Habib Metropolitan Bank (HMB), Askari Bank and their starting date of E-banking services are 2011, 2010 & 2009 respectively. So in our study, we are developing the model for those banks who are new in this field like who adopted E-banking services for less than 4 years.

B. Time Period of Study:

Time period of 2002 to 2012 has been incorporated because the E-Banking was introduced in Pakistan and also get a growth over this period to till now

C. Methodology of Data collection:

Primary data (Theoretically) - Based on articles, websites and books, which are related to the subject of study.

Secondary data (Practically) – it's based on the financial and operating data of the banks of Pakistan, extracted from their annual reports for the period of 11 years (2002 to 2012)

D. Specifications of Model:

$$ROE = \beta_0 + \beta_1 OHR + \beta_2 Mshare + \beta_3 D/A + \beta_4 L/A + \beta_5 LR$$

E. Description of Variables:

- ROE = Net income / Total Equity.
- L/A = Loan to Asset Ratio for each selected bank.
- Mshare = Market Share of each selected bank to measure the performance and piece of cake, a bank is holding as compare to the competitor.
- OHR = Overhead Ratio for each selected bank to measure operating proficiency of the targeted bank.
- D/A = Total Deposits to total assets for each selected bank.
- LR = Lending Rate to measure the effects of macroeconomic variables of the economy.

F. Data Description:

In table 1, it's presenting the descriptive statistics of recent adopter banks. The highest mean of Loans/Assets is 10.86, as well the lowest standard deviation is 0.01 of Deposits/Assets. Table 2, enlightens that ROE is negatively related with Lending Rate, Overhead, deposits/assets while positively related with market shares and loans/assets.

Table 1: Descriptive Statistics

Variables	**Mean**	**St. Deviation**	**Variables**	**Mean**	**St. Deviation**
ROA	1.31	0.10	Mshare	0.78	0.06
ROE	1.25	0.04	D/A	1.88	0.01
Margin	3.15	0.13	OHR	2.35	0.08
L/A	10.86	1.39	LR	0.89	0.05

Table 2: Correlation between Dependent variable (ROE) and Independent Variables (L/A, D/A, LR, Mshare, OHR) of Banks

	ROA	*ROE*	*Margin*	*L/A*	*Mshare*	*D/A*	*OHR*	*LR*
ROA	1							
ROE	0.72917	1						
Margin	0.4624	-0.0096	1					
L/A	-0.1332	0.0405	-0.6495	1				
Mshare	0.3321	0.1708	0.6403	-0.7997	1			
D/A	-0.1417	-0.1220	0.4203	-0.9154	0.6059	1		
OHR	-0.7461	-0.9258	0.1434	-0.2421	0.0186	0.3442	1	
LR	0.03452	-0.4224	0.4662	-0.1541	0.1602	0.0135	0.4339	1

Table 3: Effect of E-Banking Services on Banks's profitability (ROE)

Dependent Variable: ROE		Method: Panel Least Squares	Date: 21/11/13 Time: 20:22	
Sample: 2002 2012		Periods included: 11	Cross-sections included: 3	
Total panel (balanced) observations: 33				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.355771	2.153902	-1.093723	0.2837
DEPASSET	2.454664	1.101736	2.227998	0.0344
LOANASSETS	0.010825	0.006803	1.591151	0.1232
LR	0.023223	0.064692	0.358977	0.7224
MSHARE	0.146108	0.072178	2.024263	0.0529
OVERHEADR	-0.533499	0.040157	-13.28523	0.0000
R-squared	0.914225	Mean dependent var.		1.254592
Adjusted R-squared	0.898341	S.D. dependent var.		0.231354
S.E. of regression	0.073765	Akaike info criterion		-2.212895
Sum squared resid	0.146915	Schwarz criterion		-1.940802
Log likelihood	42.51276	Hannan-Quinn criter.		-2.121344
F-statistic	57.55539	Durbin-Watson stat		1.717838
Prob(F-statistic)	0.000000			

4. Results

Table 3 demonstrating the estimated outcomes of integrated model as expected that adjusted R2 = 0.898314 which is nearest to 1, depicts that the regression fits successfully to the variance of dependent variable (ROE) explained by independent variables (L/A, D/A, LR, Mshare, OHR) at 89.8%. At the significance level of 5%, Prob. (F-Statistics) = 0.000000 means Sig. at 0.000000, hence 0.00000 < 0.05 describing the overall significance of E-banking services on ROE (Profitability). Durbin-Watson = 1.717838 which is close to 2 leading toward the deduction that there is positive serial correlation, nonexistence of auto correlation as well the accuracy of the mathematical equation.

5. Conclusion

Though, due to loan and economic loss along with negative growth of income in such a stern competitive environment and globalization, there is a terrific pressure on worldwide banks. To solve the budget problem, most of the banks are increasing investments and share profit along with decreasing in the staff which contributing to the unemployment all over the globe. This strategy is seemed as not a sustainable one. The goal of our study is to introduce a sustainable strategy by measuring the impact of E-banking services on ROE (a measurement of banks' profitability) as expected, the results of regression model enlightens that adopting of E-banking services recently (less than 4 years) has a significant positive impact on ROE. Indeed, advancements in ICT (Information and Communication Technology) provided a lot of opportunities to cope with such global issues and to be sustainable over the globe. Hence, adoption of E-banking reduces the costs of banking operations like decrease in transactional charges, time wasting and increase in convenience, security, variety of choices, speedy payment systems and accessibility, which leads toward the enhancement of customer satisfaction, through which the number of consumers are increasing thus it is impacting on profitability positively. Through the results of our study, this phenomenon that adopting E-banking services can be a cost reduction strategy has been proved significantly accurate which leading toward the strength and capability of Pakistani banks to meet the competitive conditions in this global market.

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