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Electronic Debit Card Usage and their Impact on Profitability of Pakistan Banking Sector: ROA, Model

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Abstract

Advancements in ICT (Information and Communication Technology) have become the heart of banking sector and indeed banking sector is a root cause of success for each economy. Its importance is absolutely evidenced from the current recession in European banks crisis. The influences of innovation, globalization and competition in the banking sector by its providers to offer their services make essential the understanding of how various aspect of advancements in technology especially in sense of debit card, credit cards, mobile banking, internet banking, ATM and much more can affect the profitability in both form of assets and equity belongs to shareholders. In this study we have endeavored to develop an integrated mathematical model to testify the impact of debit card usage on ROA of Pakistan banking industry by implying the regression analysis. The results have enlightened that increased in debit card usage enhance the profitability of banking industry in form of ROA over the period of 2004 to 2013 quarterly. Hence, this study along with limitations can be recommended further in the process of transforming paper based transactions to electronic based to reduce the cost and enhance the customer satisfaction through high quality of service delivery.

Keywords: Debit Card, ICT, ROA, Pakistan

1. Introduction & Objectives

Information and communication technology (ICT) has in specific brought a strong paradigm move on the performance of banking sector to catch up the global development by improving the quality of services delivered to the customers and through the reduction in cost (Aliyu&Tasmin, 2012) Hence, because of the advancements in ICT, a wide range of value added products have been introduced in this sector like debit card, credit card, mobile banking, internet banking, ATM and many more which not only reduce the cost of transactions as compare to paper based transactions but also increased the piece of cake in the competitive market by providing following pillars of efficiency:

- ***Convenience:*** E-banking is attracted because of the factor of convenience. As define by Birch and Young (1997), "convenience in transactions provides access to competitive returns and prices."
- ***Choices variety:*** As defined by Tan &Teo (2000), "Internet banking permits customers with wide variety of choices to execute different banking transactions on the Internet via bank's web site" so the success of E-banking mostly depends on it.
- ***Cost reduction:*** According to Evans and Schmalensee (2005), "Banks' profitability depends on various factors and one of them is cost reduction. For example the shift from checks to debit cards has lowered the transaction costs of processing and accelerated the clearing process".
- ***Speedy payment:*** One of the foremost welfares of the electronic payment contrivance is to improve the rapidity of transporting payment between parties who are undertaking business.
- ***Security:*** Whitman &Mattord (2005) has defined security for online financial transactions as; "Security means protecting information and its vital components, including the electronic systems and hardware that are used, for storing and transmitting information." In online transactions, security is remained the appealing criteria for the customers to prefer it.
- ***Accessibility:*** customers can pay bills, transfer the funds from one account to other and make purchases 24/7.

Though the objective of our research is to testify mathematically the above described benefits associated with e-payments especially specified with a product of debit cards by developing the integrated mathematical model. As the increase in transactions by debit card, will bring an increase in ROA of Pakistan banking industry along with

other factors which effecting the ROA of banking sector such as Spread, Weighted averaged lending rate, Operating Performance, ratio of nonperforming loans to total advances and credit risk as well. To imply the integrated model over the period of 2004 to 2013 quarterly, the rest of study has been organized as follows: section 2 educates the literature review, section 3 will describe about the characteristics of the data in form of correlation among the variables and the summary of data statistics along with developing of an regression equation for the integrated model of ROA. Section 4 will enlighten the results and discussion about the findings while conclusion along with further recommendations under the shadow of limitations will be illustrated in section 5.

2. Related Work

Indeed it is true that in this world of advanced information and communication technology (ICT) along with the globalization, the concept of E-Payments is not new. Transferring of money among various parties in the form of electronic transactions are in practice for a quite long time however it's different from countries to countries and even different as per types of businesses. As a part of e-commerce, simple definition of the e-payments according to American Education E-Payment Definition (2008) is that a transaction of buying and selling via internet is considered as e-payment transaction. According to a formal definition of e-payments that "e-payment is one in which monetary value is transferred electronically or digitally between two entities as compensation for the receipt of goods and services." Here the entity has been referred to a business, individual customer or can be a bank. Although if the payment is not occurred through a paper based instrument then it is e-payment transaction (Aliaskariet.al, 2010). Mostly for the electronic payments debit cards and credit cards are remained the crucial part of the system along with internet and ATM services and similar to it much more. "Electronic Credit Transfers" (ECT) or "Electronic Funds Transfers" (EFT) is a process where an entity instruct the bank to pay on its behalf in the account of another entity. On the other hand, in case of debit cards, a customer instructs its bank to allow the payment to be charged to its bank account (Aliaskariet.al, 2010). Debit card also recognized as "Bank Card" or "Check Card", it is a plastic card through which its holder can access electronically to his/her account of bank. These cards are the substitute for holding cash which remained insecure in most of the countries especially in Pakistan where the social disorder remained on the front line of news. Over the globe, mostly countries are replacing cash based system to debit card based substantially (Adeoti, 2013).

As compare to credit cards, debit card because of its different customized implementing systems, cannot be compatible for country to country. Indeed, debit card guarantees instant payment to the customer whereas credit cards recompense the merchant at a later date (Demoulin, 2013). Moreover, debit card allow the use of ATM as referring the debit card an ATM card and at any time (24/7) withdraw the money from ATM but the condition is associated with the availability of cash into the account of debit card holder. Mostly there are three ways through which this transaction can be proceeded such as:

- "EFTPPOS" online as instant debit
- "Offline Debit" as signature debit
- " Electronic Purse Card System"

Indeed, there are many studies conducted in the field of examining the impact of e-banking and e- payment on bank profitability. Merenzi, Hichman and Dehler (2000) have described in their study about the forecast as the impact of electronic payments on the profitability of financial institutions along with the banks. Siam (2006) has examined the impact of electronic banking on the profitability of banks in Jordan by using the secondary data from the financial statements of banks along with the regression analysis for the period of 1994 to 2004. In our study, we have focused on the usage of debit card and its impact on the profitability of banks overall, a special case of Pakistan. So in this section firstly we explained about the e-payments along with e-banking and then the most important area of our interest (debit card) has been illustrated. Now after the clearance of it, our focus is that how to measure the consolidated profit of all banks located in Pakistan as well included foreign banks. Susan V. et al. (2008) have used ROA, as a measure of profitability, whereas ROA is return on assets (Net income/total Assets). It is also known as productivity ratio, because as per its combination, it describes the performance of management of an entity to generate income while using the assets. Definitely, ROA is the most widely used measure of profitability but it can be affected because of inflation (Armesh et al, 2010). But on the other hand Schneier. B, (2003) described that its relation to inflation is positively linked. There is a common thinking that IT (Information Technology) has improved the performance of financial institutes in sense of reduction of operational cost. Furst et al. (2002) had examined the effect of advancement in information technology on the profitability leads by cost efficiency of the US banking sector over the period of 1992-2003. This study indicates the positive correlation between different level of advancements in IT and cost efficiency.

The paradigm of whether the profitability of banking sector influenced by the IT advancements or not is still not clear because of the difference in econometrics methodologies and measurement (Shirley and Mallick, 2006 cited Berger 2003, Tom 1998). Although, the competition in the industry also influences the profitability on the other side provide a healthy environment for the business to get more opportunities for increasing of profitability, because of the e-payments related to a specific product also come in consideration mostly in those countries where IT or e-payments are at its initial stages of development (Furst et al, 2002)

In our study as per the best knowledge of the researchers, analysing the impact of debit card usage on profitability of Pakistan banking sector is unique on the basis of providing the answer on product specific (debit card) criteria. In this study we have developed an integrated mathematical model based on regression equation to testified the product specific relation and along with the influence of weighted average lending rate has been incorporated which will also assist to include the effects of macroeconomic factors as well. As per the concern of literature in Pakistan, there is no study which discussed profitability of whole banking industry related to a specific product (debit card).

3. Data Description & Methodology

3.1. Population of the Study:

For the purpose of this study, banking sector of Pakistan has been incorporated, which included all operating banks, during the period under consideration. As at June 30 2013, category wise number of banks has been tabulated in table 1 (Sate Bank of Pakistan, 2013):

3.2. Sample of Study:

Sample of this study includes all 46 banks operating in Pakistan. All Islamic bank branches functioning by conventional banks are also integrated in the sample. Across Pakistan, 14 conventional banks have their out-and-out Islamic Banking branches.

3.3 Time period of Study:

From December 2004 to June 2013, has been covered in this study. To make the results representative and more comprehensive, statistics of the Debit Card transactions and other variables of the study have been perceived quarterly.

3.4. Data Collection:

3.4.1. Primary Data

Relevant studies, articles published in renowned research journals, websites, books and periodic reports of State Bank of Pakistan (SBP) have been taken for the theoretical aspect of this study.

3.4.2. Secondary Data:

As per practical aspect, data for the electronic payments has been taken from PSD (Payments Systems Department) of State Bank of Pakistan (SBP) while for measuring the bank performance; quarterly data has been issued from Statistics of the Banking System issued by "Off-site Supervision & Enforcement Department, State Bank of Pakistan".

3.5. Model Specification:

For the measure performance of banking sector, commonly and empirically financial ratios have been used such as (Demirgüç-Kunt & Huizinga, 1999).

- ROA (Return on Assets)
- ROE (Return on Equity)
- Gross Profit Margin
- Dividend Payout Ratio

These ratios have been interpreted in relation to total assets, total income, and equity, dividend paid to shareholders and operating expenses to picture the final outlook of the performance of a bank (Demirgüç-Kunt& Huizinga, 1999). In the light of earlier work as by Demirguc and Huizinga (1999) and Aburime (2008), ROA has been taken to measure the performance of banks in banking sector of Pakistan along with the following regression equation:

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

Wherein:

- Y_t = ROA (Return on Assets) as dependent variable to measure the performance of all banks included in

sample as applied on the consolidated data to predict for banking sector of Pakistan.

- β_0 = x-intercept (Fixed effect term)
- X_t = Independent variables
- $\beta_1, \beta_2, \beta_3 \ldots \beta_t$ are incorporated as beta values to reflect proportionate change in dependent variables
- ε_t = error term as "t" in the whole equation is time period.

Above mentioned equation has enlightened the following equation hence the short codes and signs have been elaborated in table 2:

$$ROA = \beta_0 + DC\beta_1 + CR\beta_2 + SD\beta_3 + OP\beta 4 + LR\beta_5 + NPLAD\beta_5 + \varepsilon_t$$

3.6. Identification of variables

The variable of interest in the study is Debit card which has been defined as all the payments which has been done through debit card will be covered under this head. The dependent variable is performance of banks. Though some other variables have been incorporated in the study like Capital Adequacy (CA), Operating Performance (OP), Lending Rate (LR) and Non-performing loans to total advances and Spread. The sketch has been done in figure 1.

3.7. Data Description:

3.7.1. Summary of data Statistics

In the table 3, WALR has the highest mean while OPINST contains the value of lowest median. On the other hand, highest standard deviation is holding by DC while lowest one is of ROA.

3.7.2. Correlation among the Variables of Interest

Table 4 is enlightening the correlation of dependent variable (ROA) with all other independent variables and among the variables themselves as well.

5. Results and Discussion

Table 5 is clarifying the association between ROA and the selected variables. As the results illustrate that the overall power of the model developed on the base of regression equation is high as R-squared is about 82% (0.821727). Durban-Watson statistic (1.847782) is interpreting that the model is free of autocorrelation problem. However, F-statistic = 0.000000 which has inferred that the overall model fits properly. Akaike info criterion and Schwarz criterion are below less than zero, showing the fitness of model in the market is appropriate. Credit risk and weighted average lending rate are negatively related with ROA and are significant at level of 1%. While spread, operating performance are related positively with ROA though they are significant at level 1% and 10% respectively. But on the other hand NPLADV is showing positive and significant impact at level 1%. In the practical lenses, it should show negative coefficient but in the depicted results, its relation with ROA is positive means if non-performing loans ratio to advances will increase, the ROA will also increase on the other hand. But financially as per the financial statements of banks, due to double entry system the effect will be cross out as because of NPL assets will decrease and the provision for them will decrease the income from the profit and loss account of banks, hence in the model adjusted R-square is about 78% which has been adjusted by this effect. The Debit Card usage (DC) is the main focus of our discussion in the depicted results. DC is positively related to the ROA and significant at level of 5%, which ensuring out main hint of the study that if transactions through the usage of debit card have been increased then the overall performance of banking sector in form of return on assets will be increased. Indeed enhancing transactions by using the E-Payments especially debit cards increase the customer satisfaction by better customer service delivery, security, variety of choices, accessibility and speedy transactions which will lead toward the expansion of customers as well a guarantee of considerable reduction in the cost of personnel and paper work as per the condition of well control over strategic risk, operational risk, legal risk and reputational risk (Tan & Teo, 2000), (Evans and Schmalensee, 2005), (Whitman &Mattord,2005). So mostly as per this assumption, it's serving as the cost saving policy and in the above tested results; it's proved that if the debit card usage has been increased than overall profitability of Pakistan banking industry will be enhanced.

6. Conclusion

Various challenges such as globalization, competition, and deregulation, significant cost of installing ICT (Information and Communication Technology) and its maintenance have been confronted by the banking sector which is considered as back bone of any economy. Especially the economy of Pakistan which is facing downfall from years because of social, political, environmental and legal factors over the period of 2004 to 2013 and still going on. In such a country affording the high cost of R&D and advancements in ICT is thorny. Each investment requires an optimal return, same as investing in ICT (Information and Communication Technology) in banking

sector whether enhancing the profitability of the economy or not? Along with the limitations of vast ICT advancements and competition, to get accurate impact of technology on profitability of an entity, the purpose of our study has remained product specific as to find out the influence of increase in debit card usage on ROA of Pakistan banking industry by developing an integrated mathematical model along with regression analysis. The results testify the hypothesis that 1% increase in the debit card transaction will increase the profitability in form of ROA of Pakistan banking sector by 1% or more than that if the cost reduction will be accurately. The results will be a contribution for those banks who invested a lot of resources in developing e-payment system specially debit card in developing countries and also will be source of motivation for those who are on the way to introduce debit card and further advancements but along with the consideration that our study has controlled the possibility of ICT influences which have been arisen as a consequence of continuous demand of skilled people, trustworthiness of the information system along with the competition in financial service sector.

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Table 1. Categories of Banks in Pakistan

S.N	Category	No.
1	Private Banks	17
2	Development Finance Institutions	8
3	Foreign Banks	7
4	Public Sector Banks	5
5	Islamic Banks	5
6	Specialized Banks	4
Total		46

Table 2. Short Codes and their Descriptions

Variables	Short Codes	Descriptions
Return on Assets	ROA	Net Income/ Total Assets
Debit Card	DC	Share of Debit card transactions in total Transactions of banking sector in Pakistan
Credit Risk	CR/CRDRSK	Credit risk (Loan loss provision/Total loan)
Spread	SD	Interest charged on advances-interest paid on deposits
Operating Performance	OP/OPINAST	Operating Performance (Operating income/Total Assets)
Weighted Average Lending Rate	LR/WALR	Weighted Average Lending Rate
Non-Performing Loan to total Advances	NPLADV	Weighted Average Lending Rate

Table 3. Summary of Data Statistics

Variables	Mean	Median	Standard Deviation
ROA	1.4463	1.3834	0.3643
CRDRSK	4.5340	4.6733	0.7164
OPINAST	1.0084	0.9679	0.5044
WALR	11.1568	11.5411	1.8443
SPREAD	6.4869	6.6513	0.5376
NPLADV	3.5412	3.7318	1.5907
DC	3.7664	4.1188	2.0976

Table 4. Correlation among Dependent and Independent Variables

	ROA	*CRDRSK*	*OPINAST*	*WALR*	*SPREAD*	*NPLADV*	*DC*
ROA	1						
CRDRSK	-0.72601	1					
OPINAST	0.101993	0.016147	1				
WALR	-0.38219	0.270448	-0.09581	1			
SPREAD	-0.01687	-0.03563	-0.01444	0.822212	1		
NPLADV	-0.52078	0.818754	-0.19344	0.43522	0.055321	1	
DC	-0.40825	0.414048	-0.10594	0.751409	0.331539	0.633772	1

Table 4. Results

Dependent Variable: ROA		Method: Least Squares		
Included observations: 35		Sample: 12/01/2004 6/01/2013		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.331452	0.601719	2.212746	0.0352
CRDRSK	-0.507946	0.077935	-6.517540	0.0000
SPREAD	0.822624	0.158904	5.176857	0.0000
OPINAST	0.113200	0.062354	1.815447	0.0802
WALR	-0.354076	0.064932	-5.453011	0.0000
NPLADV	0.163974	0.041402	3.960550	0.0005
DC	0.089292	0.033819	2.640320	0.0134
R-squared	0.821727	Mean dependent var.		1.445714
Adjusted R-squared	0.783526	S.D. dependent var.		0.363838
S.E. of regression	0.169282	Akaike info criterion		-0.537642
Sum squared resid	0.802382	Schwarz criterion		-0.226572
Log likelihood	16.40874	Hannan-Quinn criter.		-0.430261
F-statistic	21.51041	Durbin-Watson stat		1.847782
Prob.(F-statistic)	0.000000			

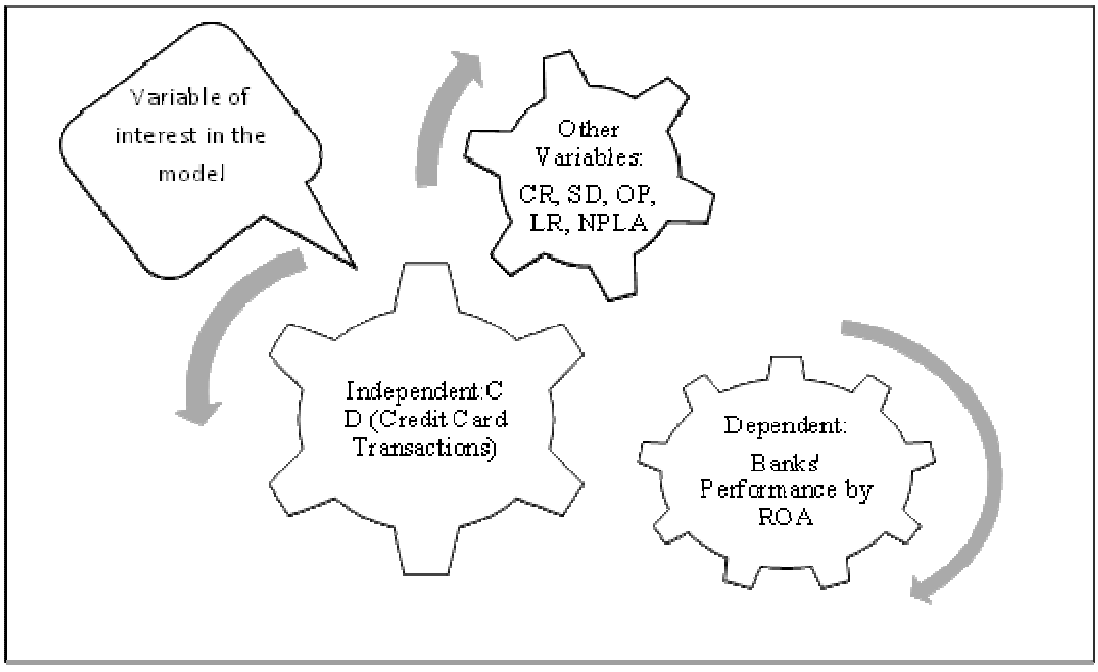

Figure 1. Variables: Incorporated in Model