

The Relation between Electronic Banking and Banks Profitability (Member Banks of Tehran Stock Exchange as Case Study)

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Abstract: This paper aims at investigating the relation between electronic banking and banks profitability in member banks of Tehran Stock Exchange during 2006-2010. The related data has been gathered by using financial reports of Tehran Stock Exchange and Rahavard Novin software. Profitability indices comprise return on assets, return on equity, and net profit margin. Panel regression method has been applied in this paper. Model estimation results revealed that the amount of granted loans, loan asset rates, operational costs, banks market share, the ratio of total deposits to total assets, and electronic services in estimating return on assets are significant. Also the results of estimating return on equity model indicated that electronic services and the ratio of total deposits to total assets influence return on equity. The results of net profit margin model depicted that operational costs, the ratio of total deposits to total assets, and electronic services are significant in the model. Comparison of determination coefficients in profitability models has specified that return on assets with determination coefficient 0.56 has had the most explanatory power in estimating the model of electronic services growth. Then return on equity with determination coefficient 0.36 and net profit margin with determination coefficient 0.24 had the next positions in this regard.

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1. Introduction

In the last decade, information technology has had remarkable effects on banking industry. It has allowed banks to provide their customers with distinct products and services. It is more than 200 years that banks provide services to the customers by their branches system. Yet by emergence of different types of technology, the nature of providing customers with financial services has been changed. For example, ATMs (Automatic Teller Machines) and credit cards have respectively taken the place of operators and bank transactions. Banks receive various benefits from providing electronic banking services including less transaction costs, providing 24 hours services, efficiency increase in banking process, etc. (Suoranta & Mattila, 2007; Dandapani, 2008).

Electronic banking means using advanced software and hardware technologies based on network and telecommunication for exchanging financial resources and information electronically, and there is no need to physical presence of customers in the bank branches (Aghaei, Saeed, 2007).

With respect to the profitability importance in banking operations, the present paper focuses on the role of new banking services in absorbing capital and improving bank profitability. In the other words, this paper aims at answering this question that to what extent new banking services such as ATM card, telephone banking, internet banking, etc. have brought about banks profitability in terms of costs?

Theoretical Principles

One of the systems that have gained a big share in the commercial transactions within the recent years is "electronic payment" system (Jalal-Karim and Hamdan, 2010).

In fact, electronic banking consists of all electronic channels that are used by customers to access their accounts and to transmit money or pay their bills. These channels are namely telephone, internet, cell phone, and digital phone (*Dandapani*, 2008). Electronic banking is defined as an electronic link between bank and customer in order to prepare management and control financial transactions. In many cases electronic banking is called virtual banking due to doing financial affairs virtually and far from bank branches. In the other words, virtual banking means providing banking services through new different technological tools distinct from traditional banking tools which are carried out by different methods including ATMs, telephone banking, home banking, and internet banking (Damar, H.E, 2004).

On one hand, using electronic commerce simplifies business and reduces costs of economic enterprises and on the other hand, it increases customers and consequently their satisfaction (Khravish, Al-Sa'di, 2010). Electronic commerce includes various activities such as electronic commerce of goods and services, online deliverance,

transmission of electronic money for internet sales, etc. (Sana Haider Sumra, 2011). As the motto of big companies in electronic commerce is thinking globally and acting locally, Iran has many companies that are dependent upon internet for market development. Electronic commerce and banking are newly emerged issues which warrant research, and studying the impact of electronic banking on profitability particularly in the current competitive banking atmosphere is a matter of great magnitude which is the objective of the present paper.

So with regard to the enormous economic advantages of banking electronic systems in terms of decreasing costs, increasing banks profitability, increasing quality in providing services to the customers, removing time and location constraints, and developing the area of banking and marketing activities, one can state that in many advanced countries, in addition to new banks, old banks develop their operations along with their current activities or by founding independent banks electronically (Gudarzi, Zibandi, 2007). It is evident that applying electronic banking in banking industry is useful when banks investments increase their profitability (Aghaei, 2007).

With respect to profitability importance in banking operations, this paper focuses on the role of new banking services within the framework of electronic banking in absorbing investment and improving bank profitability. In the other words, considering banks accepted in Tehran Stock Exchange during 2006 to 2011, this paper seeks to answer this question that whether there is a significant difference

between profitability of banks providing new electronic banking services and banks that do not provide these services? And to what extent banks profitability is influenced by electronic banking services?

Research Background

Development of information technology and communications throughout the world and necessity of banking operations mechanization in the last years of 1960s made banks to commence extensive activities in using computer systems. The first bank card in Iran was issued by Tejarat Bank in 1991 and was known as Tejarat Bank Cheque. Then Sepah Bank issued bank cards by installing seven ATMs. Iran membership in SWIFT international network in 1992 can be regarded as the first serious measure in electronic banking area. On the other hand, ratification of Banking Automation Plan in 1993 can be deemed as the foundations of new banking services and movement towards electronic banking in Iran. Among other measures, setting up banking telecommunication satellite network in the form of VSAT, bank information exchange network (SHETAB) by Central Bank of Islamic Republic Iran in 2002 in order to launch national SWICH for connection of banks payment network and providing the stage for inter banks transactions can be pointed out.

Some researches carried out in the fields of electronic banking and bank performance (efficiency, profitability and productivity) outside Iran are briefly presented in the below table (Table 1).

Table 1- Summary of Research Background outside the country

Author	Time	Results
Khrawish and Al-Sa'di	2011	They divided sample banks into three groups namely banks that do not provide internet banking services, banks that have recently provided services, and banks that have provided internet banking services for long; and they have applied ROA and ROE indices to assess and compare profitability of these three groups. The results indicate that there is no significant relation between internet banking and profitability in the first and second groups, and there is a strong significant relation between internet banking and profitability in the third group.
Sana Haider Sumra et al	2011	The results show the positive impact of internet banking on profitability, and bank size influences the relation between internet banking and profitability as a control variable, and medium banks receive more impact.
Akram Jalal-Karim Allam M. Hamdan	2010	They have measured IT by different levels of investment in software and hardware infrastructures, internet banking, telephone banking, ATMs, mobile branches, and SMS banking. The results indicate that there is a significant relation among management information systems (MIS) and IT in Jordanian banks and indices of market added value, dividends, return on assets, and net profit.
Hisar Campus	2008	They stated that profitability in electronic banking has a gradual trend and that by adding distribution channel, internet and electronic banking make banks enter into the international community and bring about banks profitability.
Klaus et.al	2007	They classified electronic banking development into soft and hard groups and measured their impacts.

Siam a.z	2006	Electronic banking services have a negative impact on banks profitability in short term which is due to banks investments in the infrastructures and personnel training, yet these services have positive impact on banks profitability in long term.
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The researches carried out in the local banks are presented in the following table.

Table 2- Summary of Research Background inside the Country

Author	Time	Results
Yasir Ali	2009	He stated that internet banking is effective on banks and considered it as services that are converted into customers' daily lives. The ease of application has caused more customers to refer it.
Mahmud Alahyari Fard	2005	He concluded in a paper titled as "costs of banking services in traditional and new banking" that the average cost of each transaction in traditional and semi- mechanized banking is 100 times more than cost of any transaction in electronic banking.
Mahmud Babazadeh	2005	The main obstacles in developing electronic banking in Iran consist of legal structure weakness in entering electronic environment, governmental structure of commercial and technical banks, infrastructures weakness, low demands in electronic banking, etc.

Research Method:

The research model is as below:

$$Y_{it} = \alpha_0 + \alpha_i MACRO_t + \sum_{l=1}^n \beta_l X_{it} + \alpha_{it} INTERNET^j_{it} + \epsilon_{it}$$

Y_{it} is the dependent variable and bank profitability index which is explained by ROA, ROE, and net profit margin indices. So the above equation is converted into three below equations:

$$ROA = \alpha_0 + \alpha_i MACRO_t + \sum_{l=1}^n \beta_l X_{it} + \alpha_{it} INTERNET^j_{it} + \epsilon_{it}$$

$$ROE = \alpha_0 + \alpha_i MACRO_t + \sum_{l=1}^n \beta_l X_{it} + \alpha_{it} INTERNET^j_{it} + \epsilon_{it}$$

$$MARGIN = \alpha_0 + \alpha_i MACRO_t + \sum_{l=1}^n \beta_l X_{it} + \alpha_{it} INTERNET^j_{it} + \epsilon_{it}$$

The variables in the right side of equation are independent and control variables of the research: MACRO is banking macro economic variables which are regarded as the amount of loans granted. X_{it} denotes control variables, four indices of which are defined as below:

- Rate of loan asset equaling total facilities to total bank assets
- Bank market share equaling total deposits of bank i to deposits absorbed in all banks

- Breakeven rate equaling operational costs of each bank
- Total deposits to total assets of each bank
INTERNET^j is virtual variable which is entered into the model in two below states:
 - For banks that have provided electronic services for more than 2 years, number 1 and otherwise number zero are entered
 - For banks that have provided electronic services within recent 2 years, number one and otherwise number zero are entered

The statistical universe comprises all banks of Tehran Stock Exchange during 2006- 2010 (data pertaining to each bank is entered into the model from the year it becomes the member of Tehran Stock Exchange). Since the related universe is limited, volume of the related sample is derived by census method.

Table 3- Banks accepted in Tehran Stock Exchange

Row No.	Bank Name
1	Eghtesad Novin Bank
2	Ansar Bank
3	Parsian Bank
4	Pasargad Bank
5	Tejarat Bank
6	Sina Bank
7	Saderat Iran Bank
8	Mellat Bank
9	Karafarin Bank

Model Estimation Results:

The results of model estimation are presented for each index:

Return on assets Profitability Index

The results of model estimation indicate that:

- R² (R-squared) statistic value, model determination coefficient, reveals that 56 percent of changes in dependent variable (return on assets) is explainable by explanatory variables (amount of granted loans, loan asset rate, operational costs, bank market share, total deposits to total asset, and electronic services).
- With regard to the results of estimating amount of granted loans, loan asset rate, operational cost, bank market share, total deposits to total assets, electronic services, and that significance level is less than 0.1, it can be concluded that at confidence level 0.90 there is a significant relation between these variables and return on assets.
- By one unit increase in the amount of granted loans, return on assets increases 0.000105 units.

- By one unit increase in loan asset rate, return on assets increases 3.222446 units.
- By one unit increase in bank market share, return on assets increases 2.94E-09 units.
- By one unit increase in total deposits to total assets, return on assets increases 4.871537 units.
- By one unit increase in operational cost, return on assets decreases 1.33E-07 units.
- By one unit increase in electronic services, asset return increases 5.415118 units.

Return on equity Profitability Index

The results of model estimation by synthetic method and considering fixed effects through Eviews software are as below:

$$ROE = \alpha_0 + \alpha_1 MACRO_t + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \alpha_{2t} INTERNET_t + \varepsilon$$

Table 4.8- The results of estimating return on equity model by considering fixed effects

Dependent Variable: ROE?				
Method: Pooled EGLS (Period weights)				
Sample: 1385 1389				
Linear estimation after one-step weighting matrix				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Fixed value	-0.001457	0.036220	-0.815710	0.1825
Amount of loans granted	-0.000193	0.000220	-0.877106	0.3872
Loan asset rate	-11.45538	7.443102	-1.539060	0.1339
Bank market share	6.60E-09	6.60E-09	0.999472	0.3253
Operational cost	-1.67E-07	2.62E-07	-0.638589	0.5278
Total deposits to assets	3.69925	3.212348	4.264559	0.0002
Electronic services	3.212672	1.028452	2.151458	0.0393
Fixed Effects (Period)				
1385—C	-0.156366			
1386—C	0.819187			
1387—C	0.194753			
1388—C	0.157440			
1389—C	0.310627			
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.359247	Mean dependent var		6.627422
Adjusted R-squared	0.273940	S.D. dependent var		3.907890
S.E. of regression	2.388631	Sum squared resid		375.3653
F-statistic	3.887088	Durbin-Watson stat		1.937972
Prob(F-statistic)	0.003325			
Unweighted Statistics				
R-squared	0.457632	Mean dependent var		6.225333
Sum squared resid	390.9576	Durbin-Watson stat		2.000945

The results of model estimation indicate that:

- R² (R-squared) statistic value, model determination coefficient, shows that 36 percent of changes in dependent variable (return on equity) are explainable by explanatory variables (total deposits to total assets, electronic services).
- With regard to the results of estimating coefficients of electronic services and total deposits to total assets and that significance level is less than 0.05, it can be concluded that at confidence level 95% there is a significant relation between these variables and return on equity.
- By one increase in total deposits to total assets, return on equities increase 3.69925 units.

- By one increase in electronic services, return on equities increase 3.212672 units.
- With regard to the results of estimating coefficients of model variables and that significance levels of bank market share, amount of granted loans, loan asset rate, and operational cost are more than 0.05, it can be concluded that at confidence level 95% there is a significant level between these variables and return on equity.

Net Profit Margin Profitability Index

The results of model estimation by synthetic method and considering fixed effects through Eviews software are presented as below:

$$MARGIN = \alpha_0 + \alpha_1 MACRO_t + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \alpha_{2t} INTERNET_t + \epsilon$$

Table 4.9- The results of estimating net profit margin by considering fixed effects

Dependent Variable: MARGIN?				
Method: Pooled EGLS (Period weights)				
Sample: 1385 1389				
Linear estimation after one-step weighting matrix				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Fixed value	-0.012167	0.279320	-0.043559	0.9655
Amount of loans granted	4.31E-06	1.73E-05	0.249375	0.8046
Loan asset rate	0.176212	0.518049	0.340145	0.7360
Bank market share	2.04E-10	4.60E-10	0.443721	0.6603
Operational cost	-1.87E-08	1.82E-08	-2.025622	0.0985
Total deposits to assets	2478800.	0.223583	2.794433	0.0088
Electronic services	3237920.	0.071581	2.452336	0.0057
Fixed Effects (Period)				
1385—C	0.001802			
1386—C	-0.009586			
1387—C	0.011773			
1388—C	-0.064658			
1389—C	0.060669			
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.238733	Mean dependent var	0.286798	
Adjusted R-squared	0.191391	S.D. dependent var	0.187739	
S.E. of regression	0.166252	Sum squared resid	1.328595	
F-statistic	3.529479	Durbin-Watson stat	1.968116	
Prob(F-statistic)	0.003654			
Unweighted Statistics				
R-squared	0.255075	Mean dependent var	0.282222	
Sum squared resid	1.346961	Durbin-Watson stat	1.847191	

The results of model estimation indicate that:

- R^2 (R-squared) statistic value, model determination coefficient, shows that 24 percent of changes in dependent variable (net profit margin) are explainable by explanatory variables (operational costs, total deposits to total assets, electronic services).
- With regard to the results of estimating coefficients of variables namely electronic services, total deposits to total assets, and operational costs, and that significance level is less than 0.1, it can be concluded that at confidence level 95% there is a significant relation between these variables and net profit margin.
- By one increase in operational costs, net profit margin decreases $-1.87E-08$ units.
- By one increase in total deposits to total assets, net profit margin increases 0.024788 units.
- By one increase in electronic services, net profit margin increases 0.232379 units.
- With regard to the results of estimating coefficients of model variables and since significance levels of bank market share, amount of granted loans, loan asset rate are more than 0.1, it can be concluded that at confidence level 95% there is a significant level between these variables and net profit margin.

To compare three fitted models, R^2 value presented in the below table is applied:

Table 4- Comparison of three fitted profitability models

Model	R^2
Return on equity	0.36
Return on assets	0.56
Net profit margin	0.24

With respect to the determination coefficient value of each model, return on assets index with determination coefficient 0.56 has the most explanatory power in estimating model of electronic services growth. Then return on equity model with determination coefficient 0.36 and net profit margin with determination coefficient 0.24 have the next positions in this regard.

Finally to assess the model, a diagram in which actual, fitted and residual values of the return on assets model have been drawn is used.

As shown in figures 5, 6, and 7, actual and fitted values are coincident which indicates that the fitted model is a proper model for estimating regression relation.

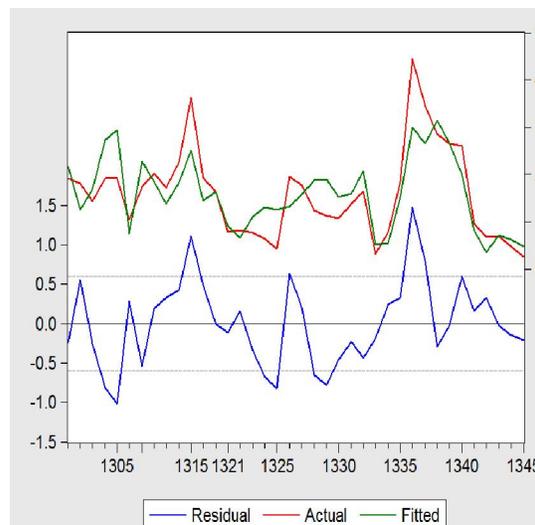


Figure 5- Diagram of actual, fitted and residual values of the return on assets model

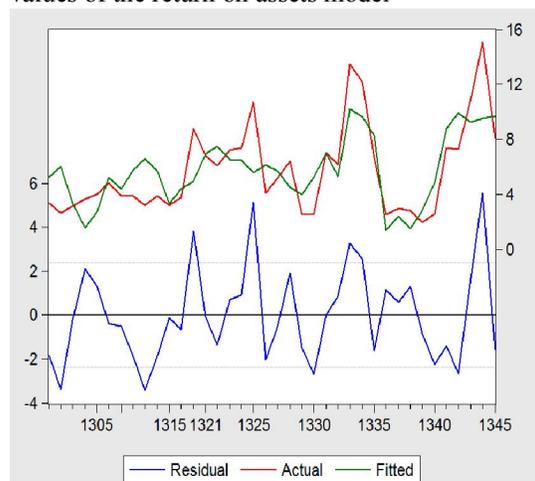


Figure 6- Diagram of actual, fitted and residual values of return on equity model

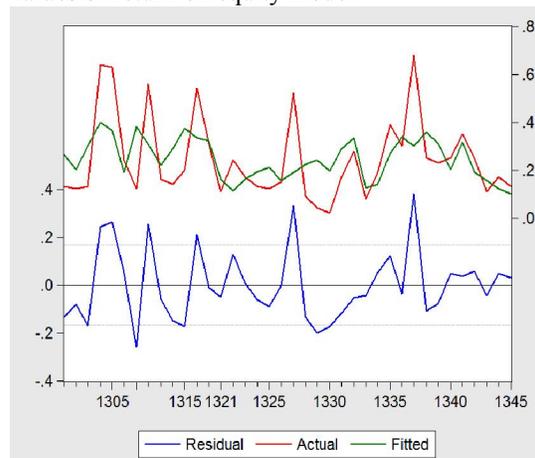


Figure 7- Diagram of actual, fitted and residual values of net profit margin model

Conclusions

With respect to the determination coefficient value of each model, return on assets index with determination coefficient 0.56 has had the most explanatory power in estimating the model of electronic services growth. Then return on equity model with determination coefficient 0.36 and net profit margin with determination coefficient 0.24 have the next positions. Since loan asset rate, amount of granted loans, and bank market share influence return on assets increase, banks are suggested to consider these measures to raise profitability and also increase granting loans to the customers. Also total bank deposits may influence bank profitability considerably. Operational costs have negative effect on banks profitability. So managers of banks and financial institutions must reduce operational costs in order to increase profitability. Electronic services growth has a remarkable impact on banks profitability increase. This impact has the most value in return on assets and the least value in net profit margin. Banks must update banking electronic services and provide customers with easier access to these services.

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