Impact of Bankruptcy Risk and Competition on Profitability in the Iranian Banking System Using BOONE Indicator: Generalized Method of Moments

Impacto del riesgo de bancarrota y la competencia en la rentabilidad del sistema bancario iraní utilizando el indicador BOONE: método generalizado de momentos

Reza Badirkhani*
University of Tehran - Iran
rezabadirkhani@ut.ac.ir
Vahid Majed**
University of Tehran - Iran
majed@ut.ac.ir
Sajad Faraji Dizaji**
University of Tehran - Iran
mehdinaji@gmail.com
Seyed Mehdi Naji Esfahani**
University of Tehran - Iran
faraji_dizaji@yahoo.com

ABSTRACT

The purpose of this study is to investigate the question that how is the impact of bankruptcy risk and improving competitive conditions on the profitability of commercial banks. We have studied the balance sheet information of 30 commercial banks, which include all Iranian banks, during the period 2006-2017. In this paper, the BOONE indicator is used to estimate competition, and to estimate profitability, two methods of rate of return on asset (ROTAB) and net interest margin (NIM) are used. The data analysis method in this study was based on the generalized least squares (GMM). The results showed that in the rate of return method, the impact of competition on the profitability of commercial banks, both in the deposit market and in the non-interest income market, was inverse and significant, and in the facility market, it has a positive and significant impact on the profitability of the banks.

Keywords: Profitability of Banks, Competition, Bankruptcy Risk, Panel Data, Stata.

RESUMEN

El propósito de este estudio es investigar la cuestión de cómo es el impacto del riesgo de bancarrota y mejorar las condiciones competitivas en la rentabilidad de los bancos comerciales. Hemos estudiado la información del balance de 30 bancos comerciales, que incluyen todos los bancos iraníes, durante el período 2006-2017. En este documento, el indicador BOONE se utiliza para estimar la competencia, y para estimar la rentabilidad, se utilizan dos métodos de tasa de rendimiento del activo (ROTAB) y margen de interés neto (NIM). El método de análisis de datos en este estudio se basó en los mínimos cuadrados generalizados (GMM). Los resultados mostraron que en el método de la tasa de rendimiento, el impacto de la competencia en la rentabilidad de los bancos comerciales, tanto en el mercado de depósitos como en el mercado de ingresos sin intereses, fue inverso y significativo, y en el mercado de instalaciones, tiene un Impacto positivo y significativo en la rentabilidad de los bancos.

Palabras clave: Rentabilidad de los bancos, Competencia, Riesgo de quiebra, Datos del panel, Stata.

*Corresponding author. PhD student in Economic Sciences at Aras International Compus, University of Tehran
** Aras International Compus, University of Tehran

Recibido: 14/03/2019 Aceptado: 08/07/2019

INTRODUCTION

Since the economic growth and development of any society requires the organization of financial markets to increase the competitiveness of banks and to expand capital markets and to attract people's liquidity and to direct them to productive activities and to create the necessary facilities for public participation, therefore, measures should be taken so that the banking system, as one of the most important and fundamental part of the economy of society, can play its role and place in economic activities (Gholi Begloo, 2008) in order to prevent the transfer of banking system risks by applying hedging strategies to other economic sectors and the devastating impacts on the macroeconomics of countries (Nagahi, Nagahisarchoghaei, Soleimani & Jaradat, 2018). The purpose of this paper is to answer the question whether it is possible to prevent increase in the credit risk of banks, which reduces their profitability and ultimately leads to their bankruptcy, by applying certain rules in order to create and improve healthy competitive conditions. It is also worth asking whether the indicators of competition and bankruptcy risk have the same impacts in different banking markets. There have been many studies on the impacts of bankruptcy risk or competition on banks 'performance, but unfortunately, no new studies have been conducted to estimate the impacts of these variables on banks' profitability in various banking markets such as facility, deposit and non-interest income. The facility market mainly refers to the bank's interest and shared income with customer. Whereas the non-interest income market is focused on non-shared income. Finally, the deposit market refers to the methods used by banks to attract resources and deposits (transfer it to the findings section). In this study, we attempt to show that, unlike the expectations, the impacts of competition and bankruptcy risk are different in the banking markets.

This paper consists of the following sections:

Section One: Introduction

Section Two: Literature Review

Section Three: Research Methodology

Section Four: Findings and Results Analysis

Section 5: Discussion and Conclusion

Literature Review

In the theoretical literature, banks' performance model is examined from two perspectives:

A- The section of efficiency- which measures the efficiency of banks in terms of bank financial performance by determining the input and output variables (Eslami et al., 2011).

B- The section of performance indicators, which assesses the bank by determining criteria in both financial and non-financial sectors. The non-financial sector includes the areas of customers, employees, and branches, and the financial sector examines profitability and risk indicators.

In the financial sector of profitability indicators, several indicators have been used in Iran and around the world, such as methods of Return On Assets (ROA), Net Interest Margin (NIM), Return On Investment (ROI), Return On Equity (ROE), and Economic Value Added (EVA). But there are many studies that their used methods to estimate profitability are based on two profitability indicators: 1) rate of return on assets and 2) net interest margin. These two indicators have in many cases been used to estimate banks' profitability (Tan, 2014 and 2016; Tan & Anchor, 2016; Nagahisarchoghaei, Nagahi & Soleimani, 2018). The rate of return on assets reflects the power of banks to make a profit through real and financial capital resources. The net interest margin method (Tan & Floros, 2012), which is slightly different from the method of return on assets, previously focused on banks 'profitability through profit-making activities, but later in the functions of banks' profitability it changed to return on income producing assets method. The net interest margin method is obtained by dividing the net interest margin by income producing assets and shows to what extent the management has been able to use income producing assets to make interest income. The ratio of return on assets also reflects the profit from each currency unit of assets, and on the other hand, shows the ability of management to make good use of the bank's real capital and financial resources in creating profit. The ratio of total return on assets is obtained by dividing the net interest by total assets.

Since competition is one of the main components for evaluation of the banking system performance. Therefore, one of the most important indicators of evaluation of the banking system performance has been the measurement of competition factor. Although in theoretical models, using the interbank competition indicators seems easy, empirical estimates show that it is very difficult to find a suitable indicator to measure the level of competition between banks. In the empirical literature, three different groups of indicators have been used to estimate the degree of competition between banks (Beck, 2008):

1) Structural market estimators, such as concentration ratio, number of banks, and Herfindahl-Hirschman index.

2) Competition estimators; including the most commonly used competition estimators, the H-statistic, the Lerner index, and the BOONE indicator.

3) Regulatory estimators: In these indicators, market competition depends on both the competing banks and the different types of barriers to market entry and exit. Due to the difficulty of quantifying some of these variables (such as country-

specific information and contractual characteristics), and the lack of access to needed information, especially in Iran, it is less commonly used. But in comparison of the model of estimated variables with the BOONE indicator, not only can it estimate competitive conditions in different banking markets, but also less data is required to estimate it (leuvensteijn, Bikker, Rixtel, & Sorensen, 2007).

In general, research on competition and profitability can be categorized into the following categories: The first category believes in liberalizing interest rates to improve competitive conditions and increase banks' profitability. For example, the positive impact of interest rate liberalization on bank profitability as an indicator of competition is strongly corroborated by Ding et al.[1] (2017). The second group, such as Shelvin and Wu (2015), assess the interest rate liberalization factor in the short run in increasing the level of competition and profitability of banks to be positive, but on the other hand, they believe that interest rate liberalization in the long run will increase uncertainty, risk and instability in the market. The third category, such as Salatin and Zahedi (2017), believe that economic liberalization, or the transfer of a large part of the economy to the free market, if appropriate laws and regulations are implemented, can play an important role in laying the groundwork and proper function of institutions, markets and the performance of banks. The fourth category, such as Googerdchian et al. (2010), found no significant relationship between economic liberalization and improved bank performance in Iran. They also stated that bank interest rate had no significant role in explaining banks' profitability due to the specific conditions of the Iranian banking system. Findings of the fifth category, such as Shahikiatash et al. (2015), show that the greater the market share of banks as a result of competition, the greater the profitability of banks.

Seyyed Abadi (2016), in a study entitled "Competition, Efficiency and Growth in Banking", investigated the relationship among competition, efficiency and growth in the banking industry and provided a model for it. For this purpose, data of eight sample banks between 2006 and 2015 has been investigated, in which the variables are used as follows: competition as an independent variable, efficiency initially as a dependent variable in a model probability and as an independent variable in the second model, and eventually, growth as a dependent variable. The simultaneous equations model has been used to analyze the data. The results indicate that there is a direct and significant relationship between competition and efficiency in the banking industry, also there is a direct and significant relationship between efficiency and growth of banks.

Poostinchi (2013), in his research, has focused on "the impact of competition in the banking industry on overdue claims of banks". In this paper, he considers overdue claims of banks as one of the main sources of their risk and assumes competition in the banking industry as one the factors affecting overdue claims of banks. For this purpose, a panel data model consisting of 18 banks operating throughout the period (2005-2011) is used. The results show that there is an inverse relationship between competition in the banking industry and overdue claims. Loan-to-asset ratio, profitability-to-asset ratio, total assets, and economic freedom also have a direct and significant impact on these claims.

Berger, Alan ؛ Klapper, Laura, and Turc Alice, Rima (2008), in a study entitled "Banking Competition and Financial Stability", propose that, according to the traditional "competition-precision" view, banks with high market power totally have less risk. By examining the statistical data of the research, they have found that market power increases credit risk (facility) and this risk may be partly offset by the high proportion of capital of equity holders.

Marques lbanez, David, and Leuvensteijn, Michael (2017), examining the crisis of the 2007-2009 period, banks that benefit from high levels of stock exchange activities in highly competitive markets are expected to also have high levels of risk in their portfolio of facilities, and these banks will have little incentive to monitor the quality of giving the facilities (Anne and Burton, 2014). And this study considers the role of central banks to be very important in the use of various supervisory tools to control banking behaviors.

In summary, the current study complements the scientific gap and empirical literature in three cases: 1) It tests the impact of competition in different markets of the banking system in Iran. 2) It also examines the concurrent impacts of competition and bankruptcy risk on profitability in different banking markets. 3) It also uses the BOONE indicator for the first time in Iran to estimate the competition index in the banking markets.

METHODOLOGY

In this research, in order to estimate the impact of bankruptcy risk and competition on banks' profitability, we used balance sheet information of 30 commercial banks including all Iranian banks over the period 2006-2017. The independent and dependent variables of the model used in the bank profitability equation and their collection method are as follows:

A) Banking variables

1) Rate of return on asset; ratio of pre-tax profit to total assets

2) Net interest margin; ratio of net income to income producing assets

3) Bank size; natural logarithm of total assets

4) Diversity of banking services; ratio of non-interest income to net income

1 Ding, N., Fung, H., & Jia).2017)

5) Liquidity; ratio of cash assets to total assets

6) Public expenses of banks; ratio of public expenses to total assets

7) Capital; capital adequacy ratio

8) Credit risk; ratio of overdue facilities to total facilities

9) Bankruptcy risk; standard deviation of ROTAB / [Assets / Capital + ROTAB]

B) Banking system variables:

1) Competition; BOONE indicator

2) Banking sector development; the ratio of banking sector assets to gross domestic product (GDP)

3) Capital market development; the ratio of banks' capital to GDP

C) Macroeconomics variables

1) Inflation rate; annual inflation rate

2) GDP growth rate; GDP annual growth rate at current price

It should be noted that the method used to estimate these variables is based on the research of Tan (2017). The reasons for using the BOONE competition indicator in this study are as follows:

1) This indicator is based on the assumption that more efficient banks have more power in increasing market share and expanding the size of the bank, and will lead to more profitability for that bank,

2) The main issue of this indicator is the efficiency-structure hypothesis, which states that competition improves the performance of efficient banks against inefficient banks. Therefore, this method was used to estimate the competition indicator which has not been used in Iran so far.

In this study, we used two methods for estimating profitability, one of which is the net interest margin, which has been used in many researches in Iran, and the other one is the rate of return on asset (ROTAB), which has been used in a limited number of studies in Iran. We won. The reason for this choice is that, in similar methods, such as ROA, net income after taxes is used, whereas profit before tax seems to be used, because in cases such as penalties or tax incentives, or because of transitional losses from prior periods, the amount of profit may be greatly affected, which may have nothing to do with current performance of the company. Therefore, in this study we used profit before tax to obtain right and accurate information of companies. The method of estimating competition indicator in this research is by using BOONE indicator and according to simple equation (1).

$$(MC_{ki})\,LN\,\beta + \alpha = (MS_{ki})LN \qquad (1)$$

Where;

MS_{ki}: market share of bank i in market k

MC_{ki}: final cost of bank i in market k

C: constant

B: coefficient of equation, or BOONE competition indicator

It is worth noting that firstly the final cost is estimated using the cost function logarithm and three product types (total loans, total deposits and non-interest income), and two types of intra-data prices (money price, capital price). Their market share is then calculated in each market. Using the cost function logarithm is shown below:

$$Ln(C/W2) = \delta 0 + \sum_j LnY_{jit} + 2/1 \sum_j \sum_k \delta_{jk} LnY_{jit} LnY_{kit} + \beta_1 Ln\,(W1/W2) + 2/1\,\beta_{11} Ln(W1/W2)_{it}\,Ln(W1/W2)_{it} + \sum_j \Theta LnY_{jit}\,Ln(W1/W2) + \varepsilon_{it} \qquad (2)$$

Where;

C: total cost of bank

Y: Indicates three types of banking products: total deposits, total loans and non-interest income.

W: Includes two prices as follows:

W1: The price of money, which is obtained by the ratio of interest costs to total deposits.

W2: The price of capital, which is obtained by the ratio of non-interest costs to fixed assets.

These two prices are borne out by the fact that non-interest costs also include workforce costs (Hasan & Morton, 2003). In other words, the price of capital considers factors related to the physical price of capital, such as the price of human capital. This linear uniformity is obtained by standardizing the dependent variables of W1 and W2.

In the following, the final cost of loans, deposits and non-interest income is obtained by the first derivative of Equation (2) relative to the dependent variable (Y_{ilt}, Y_{idt}, Y_{int}) and in relation to the loan product, according to Equations 3 to 5.

$$MC_{ilt} = [(C_{it} / W_2) / Y_{ilt}] * (0/29) / Y_{ilt} \quad (3)$$

$$MC_{idt} = [(C_{it} / W_2) / Y_{idt}] * (0/24) / Y_{idt} \quad (4)$$

$$MC_{int} = [(C_{it} / W_2) / Y_{int}] * (0/34) / Y_{int} \quad (5)$$

Where; MC_{ilt}, MC_{idt}, MC_{int}, respectively, are final cost of bank i in the facility market, deposit and non-interest income in year t.

And Y_{ilt}, Y_{idt}, and Y_{int}, respectively, are the symbols of the total facilities of bank i, the total deposits of bank i, and the total non-interest income of bank i in year t.

C_{it}: Total cost of bank i in year t

W2: The price of capital, which is obtained by the ratio of non-interest costs to fixed assets.

And finally, using the general equation of profitability function (Tan, 2017) as Equation 4-1, we estimated the impact of competition and bankruptcy risk on the Iranian banking system:

$$\pi_{it} = C + \sum_{j=1}^{j} \beta j X_{it}^{j} + \sum_{l=1}^{l} \beta l X_{it}^{l} + \sum_{m=1}^{m} \beta m X_{it}^{m} + \upsilon_{it} + \mu_{it} \quad (6)$$

Where;

i: symbol of year

t: symbol of a particular bank

π_{it}: Indicates the profitability index for a particular bank in a particular year.

C: constant

X_{it}: symbol of the independent variables of the model that fall into three categories;

$\overline{X_{it}^{j}}$: Intra-bank variables, including credit risk, liquidity, capital stock, bankruptcy risk, bank size, non-operating costs and diversity of banking services.

$\overline{X_{it}^{l}}$: Banking industry variables, including: competition in different banking markets, capital market development, banking sector development.

$\overline{X_{it}^{m}}$: Macroeconomic variables include inflation rate and GDP growth rate. The unobservable impact of each bank and their specific features are also shown by υit and μit.

Also, βi, βj *and* βm are estimated coefficients of the model.

Research findings:

This study, using balance sheet information of all Iranian banks during the period 2006 - 2017, has investigated the impact of competition and bankruptcy risk on the profitability of commercial banks. According to Table 1, there are a total of three different types of banks in terms of ownership in Iran, namely, eight state-owned banks, 17 private banks, and finally six privatized banks (which initially were state-owned banks but they have become private banks as the result of the implementation of Article 44 of the Constitution).

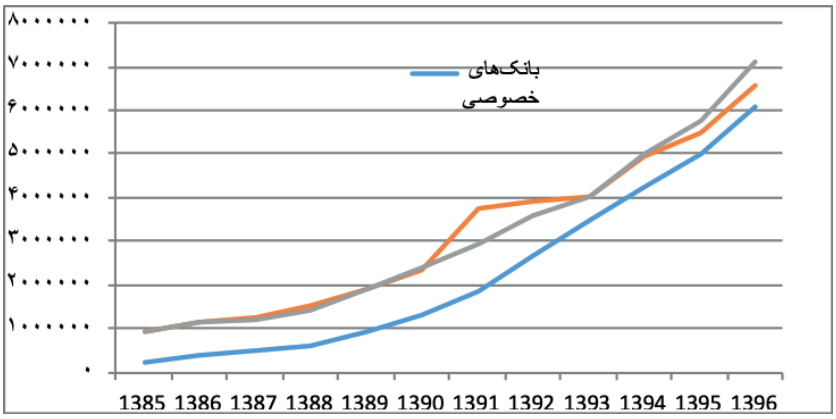
Table 1. Names of banks separately sorted by their type of ownership, Source: Website of Central Bank of Islamic Republic of Iran

Privatized banks [2]	Private banks		State-owned banks
Tejarat	Iran Zamin	Eghtesad Novin	Melli
Refah	Hekmat Iranian	Ansar	Sepah
Sina	Tourism	Parsian	Keshavarzi
Saderat	Day	Pasargad	Maskan
Qarz Al-Hasaneh Mehr Iran	Middle East	Ayandeh	Tose'e Ta'avon
Mellat	Qarz Al-Hasaneh Resalat	Day	Sanat Va Madan
	Ghavamin	Saman	Export Development
	Shahr	Sarmayeh	Post bank
		Karafarin	

Source: Central Bank

Figure 1 shows the growth trend of the assets of different types of banks during the period 2006-2017. According to Figure 1, the assets of all banks, whether state-owned, private, or privatized, have been growing at relatively similar trends over the period under study.

Figure 1. Growth trend of the assets of different types of banks during the period 2006-2017



Source: Found by the researcher

Table 2. Banks' share of Iranian banking system assets separately sorted by type of ownership

Percentage of shares			The amount of assets in billion rials			
State-owned banks	Private banks	Privatized banks	State-owned banks	Private banks	Privatized banks	Total assets of the banking system
0.45	0.17	0.44	946,400	231,047	929,289	2,106,737
0.43	0.20	0.43	1,166,098	375,213	1,163,231	2,704,542
0.41	0.17	0.42	1,221,492	516,582	1,275,310	3,013,384
0.40	0.20	0.43	1,431,895	612,542	1,538,997	3,583,433
0.40	0.22	0.40	1,912,495	923,111	1,892,318	4,727,924
0.39	0.22	0.39	2,391,708	1,326,656	2,358,671	6,077,035
0.35	0.11	0.44	2,960,322	1,846,814	3,765,920	8,573,056
0.35	0.26	0.39	3,596,365	2,662,842	3,920,185	10,179,393
0.35	0.30	0.35	4,015,514	3,453,970	4,010,216	11,479,700
0.35	0.30	0.35	5,009,566	4,257,884	4,949,437	14,216,887
0.35	0.31	0.34	5,735,821	4,988,260	5,482,391	16,206,472

2 . According to the Central Bank, Qarz Al-Hasaneh Mehr Iran Bank in 2013 was excluded from the specialized banks group and included in the non-state banks group. Also in 2013, the statistics of 6 banks of Iran Zamin, Qarz Al-Hasaneh Resalat, Middle East, Ghavamin were added to the monetary and banking statistics of the country. Also Shahr Bank and Tourism Bank since September 2011, and Hekmat Iranian Bank since September 2012, have joined private banks and Iran Zamin Banks, Qarz Al-Hasaneh Resalat, Middle East, Ghavamin, Ayandeh have been private from the beginning. Sina Bank announced its foundation on the last work day of 2008. Shahr Bank is one of the private banks in Iran, which opened on March 7th, 2009. Iran Zamin Bank is one of the private banks in Iran that received its operating license from the Central Bank in May, 2011. These banks became private on these dates: Tourism Bank in December 2010, Ansar Bank in June 2010, Qarz Al-Hasaneh Mehr Iran Bank in 2009. Saderat Bank on June 9, 2009, for 51%, Tejarat Bank in 2009. In 2008, the government, by law, transferred 6 percent of its shares of Refah Bank to Social Security Insurance (Tamin Ejtemaeei) for paying debts. 5% of Bank Mellat was handed over to the private sector in February 2008.

0.36	0.31	0.33	7,090,234	6,088,480	6,540,921	19,719,635

Source: Balance Sheet of banks

Table 2 shows the amount of assets and the share of assets of each type of bank, including state-owned, private and privatized banks versus total assets of the banking system. It is noteworthy in this table that given the competitive conditions prevailing in the Iranian banking system, statistics show that the share of assets of all banks, including state-owned, private or privatized, during the period under study, was increasing at a similar rate. But their market share difference is noticeable. So that, the market share of state-owned banks from the banking system's asset market declined from 45% to 36% during the period under study and the share of privatized banks declined from 44% to 33%. Only the share of private banks' assets rose from 17% to 31%.

Table 4. Explanation of sections and periods

Number of sections	30
Number of years under study	12
Number of periods under study for each section	12
Absolute frequency	30
Relative frequency in percentage	100
Cumulative frequency	100

In this research, after estimating the variables, the data of different banks are entered into the model using panel data method, and then using the dynamic panel method (GMM), while solving the problems related to autocorrelation and variance heterogeneity, we will investigate the impact of competition and bankruptcy risk on bank profitability. In this paper, since the competition indicator is estimated in all three markets, including the facility market, the deposit market and the non-interest income market, and because the banks' profitability function is obtained in two ways; one is the rate of return on asset method and the other is the net interest margin method; therefore, in general, this research has six models as follows:

Model One: Profitability through the rate of return on assets in the facility market

Model Two: Profitability through the rate of return on assets in the deposit market

Model Three: Profitability through the rate of return on assets in the non-profit market

Model Four: Profitability through the net interest margin in the facility market

Model Five: Profitability through the net interest margin in the deposit market

Model Five: Profitability through the net interest margin in the non-profit market

Panel data analysis is one of the new and applicable issues in econometrics because panel data provides a highly information-rich environment for the development of estimation techniques and theoretical results. Also, because fixed and random impact estimators are not able to present a subject entitled stability, introspection and autoregressive profit when estimating bank profitability is considered. Therefore, in this study we use the generalized method of moments to estimate the profitability function equation.

According to the results of Table 13, the null hypothesis of the test cannot be rejected and, consequently, the validity of the instruments is confirmed. Therefore, using the generalized method of moments to eliminate the autocorrelation and variance heterogeneity will not cause any problem in analyzing the results of the models.

Table 13: Sargan test results to verify the validity of the instrument of generalized method of moments data

	Statistic	Value	p_value	Result
Model one	Sargan	1	19.92	Validity of instrument
Model two	Sargan	1	16.54	Validity of instrument
Model three	Sargan	1	17.87	Validity of instrument
Model four	Sargan	1	17.06	Validity of instrument
Model five	Sargan	1	17.2	Validity of instrument
Model six	Sargan	1	18.25	Validity of instrument

According to the results of Table 13, the null hypothesis of the test cannot be rejected and, consequently, the validity of the instruments is confirmed. Therefore, using the generalized method of moments to eliminate the autocorrelation and variance heterogeneity will not cause any problem in analyzing the results of the models.

Table 14: Autocorrelation test results for the data of generalized method of moments

	Statistic	Value	P-value	Result
Model one	Autocorrelation	0.2	0.2	Lack of autocorrelation
Model two	Autocorrelation	0.2	-1.17	Lack of autocorrelation
Model three	Autocorrelation	0.3	-1	Lack of autocorrelation
Model four	Autocorrelation	0.18	-1.33	Lack of autocorrelation
Model five	Autocorrelation	0.2	-1.18	Lack of autocorrelation
Model six	Autocorrelation	0.18	-1.31	Lack of autocorrelation

According to the results in Table 14, no first- or second-order autocorrelation is confirmed in the models. But because all six research models have variance heterogeneity, we use the generalized method of moments to solve the variance heterogeneity problem.

Table 12 - Value and direction of impact of variables on profitability (ROTAB) in different banking markets

ROTAB profitability function	**p-value of facility market**	**Impact factor**	**p-value of deposit market**	**Impact factor**	**p-value of non-interest income market**	**Impact factor**
ROTAB_L1	0.000	0.24	0.000	0.14	0.2	Insignificant
Bank size	0.002	0.004	0.003	0.004	0.06	0.0057
Liquidity	0.2	Insignificant	0.018	-0.029	0.03	-0.03
Capital adequacy rate	0.06	0.0001	0.6	-0.00002	0.1	Insignificant
Credit risk	0.2	Insignificant	0.4	Insignificant	0.002	-0.00014
Bankruptcy risk	0.000	0.0004	0.000	0.0005	0.000	0.0006
Banking sector development		Insignificant		Insignificant	0.003	0.08
Capital market development	0.009	-1.7	0.000	-2.22	0.1	Insignificant
Inflation rate	0.000	0.0002	0.03	0.00007	0.09	0.0001
GDP growth rate		Insignificant	0.2	Insignificant	0.6	Insignificant
Competition indicator	0.000	0.16	0.000	-0.1	0.000	-0.022

The results of Table 12 show that in the method of profitability of the rate of return on assets, the impact of variable with distributed lag of profitability on the facility and deposit markets is quite significant. As a result, it indicates that the profitability of banks in these markets is strongly related with profitability in the previous period of banks. While this relationship, unlike expectations, is not significant in the non-interest income market. Also, contrary to the research hypothesis, profitability of banks has a significant relationship with bank size, bankruptcy risk, inflation rate, competition indicator in all three markets. The results of this model, while confirming the theories of Pozzar et al. (2010), confirm the significant relationship of competition indicator on bank profitability in all three markets. But it shows the positive relationship between competition in the facility market and its negative relationship with profitability in the other two markets.

Table 15 - Value and direction of impact of variables on profitability (NIM) in different banking markets

NIM profitability function	**p-value of facility market**	**Impact factor**	**p-value of deposit market**	**Impact factor**	**p-value of non-interest income market**	**Impact factor**
NIM_L1	0.000	0.19	0.000	0.14	0.000	0.19
Bank size	0.006	-0.019	0.8	Insignificant	0.004	-0.018
Liquidity	0.000	0.97	0.000	0.81	0.000	0.94
Capital adequacy rate	0.000	-0.04	0.000	-0.04	0.000	-0.04
Credit risk	0.37	Insignificant	0.5	Insignificant	0.4	Insignificant
Bankruptcy risk	0.000	-0.001	0.000	-0.0005	0.000	-0.001
Banking sector development	0.2	Insignificant	0.000	-0.0008	0.04	0.00017
Capital market development	0.07	0.39	0.03	0.41	0.1	Insignificant
Inflation rate	0.6	Insignificant	0.002	-13.14	0.97	Insignificant

GDP growth rate	0.01	-0.0004	0.04	-0.0004	0.004	-0.0005
Competition indicator	0.002	0.0005	0.04	0.0003	0.003	0.0005
Bank size	0.7	Insignificant	0.000	-0.47	0.2	Insignificant

The results of Table 15 show that in the NIM profitability method, the variable with distributed lag of profitability, liquidity, GDP growth rate has a positive and significant relationship with profitability of banks in all three markets. The results of this research are consistent with the findings of Shahchera and Jawzadani (2012), who believed in a positive and significant relationship between economic growth rate and bank profitability. It is also consistent with the results of Tan's research (2017), in which the relationship between bank size and profitability was negative and significant. The relationship of the variables with distributed lag of the dependent variable in both methods, and the bankruptcy risk variable with the profitability completely indicate the findings of Tan (2017) and the same results are established in the US banking system. Also, public expenses, credit risk, and inflation rate in all three markets have a significant and negative relationship with profitability. Therefore, according to the results, profitability in this method depends on the profit of the previous period, the liquidity of each bank and the economic growth rate. The results of these studies are similar to those of Chavoshi Rad et al. (2014) and Khoshtinat et al. (2016), which showed the positive relationship of bank size, liquidity, and the inverse relationship of bank costs with profitability measures (net interest incomes and return on bank assets).

CONCLUSION AND SUGGESTIONS

As can be seen in the circulars of Iran's central bank, there has been no attempt to improve the competitive conditions in any of the facility and deposit markets and even non-interest income market. As a result, it is recommended that they follow the same policy. Because, according to the results of this study, competition has no significant impact on banks' profitability in the net interest margin method. In addition, in the rate of return on assets method, it has a positive and significant relationship with bank profitability only in the facility market, and even in the other two markets, the relationship is negative. Therefore, it seems that the requirement of the banking system to comply with banking rules and regulations in banking activities, to create and improve the competitive conditions of banks, is a priority. In terms of traditional income producing activities, this part of incomes still holds a larger share of bank incomes. However, different ways of making income in Iranian banks have been partly affected by business cycles such as inflation and recession. As a result, methods of making income in Iran seem to require a shift from traditional methods to non-interest incomes, which not only reduces bank risk but also increases the profitability of banks. The findings of this study provide a great deal of information to the Central Bank of Iran and other legislative authorities, so that they can adopt appropriate policies on the Iranian banking system as follows.

1) Because the relationship between bankruptcy risk and bank profitability is positive and significant in both methods, as a result, legislative authorities should delegate the necessary powers to bank managers, so that they can increase bankruptcy risk when necessary. For example, bank managers are encouraged to invest in other companies, or to buy bonds, or to use central bank reserves.

2) Since the impact of banks' credit risk on profitability is inverse, therefore, it is recommended that policies be adopted so that banks become serious in identifying and validating applicants of facilities, and that they refuse to increase credit risk by giving facilities to persons without competence and credit. It is also recommended that bank officials be more subject to banking law and regulations in this regard.

3) Also, due to the positive impact of the banking sector development on the profitability of banks, the more the commercial banking sector develops, the more profitability of commercial banks will be. Therefore, it is recommended that the legislative authorities adopt appropriate policies to develop the banking sector.

4) The capital market development also has an adverse effect on the profitability of banks, and policies should be adopted so that the capital market operates alongside the banking system rather than against it.

5) Also, according to the suggestion of Tan (2017), the remuneration of the banking staff should be increased in order to teach the banking knowledge and experience to the public and make them eager to participate in banking activities.

6) Due to the small share of non-interest incomes compared to the other two markets, the methods of making income in Iran, in order to reduce bank risk and increase the profitability of banks, need to change from traditional methods to non-interest incomes.

BIBLIOGRAPHIC REFERENCES

Beck, T. (2008). *Bank competition and financial stability: friends or foes?*. The World Bank.

Berger, A. N., Klapper, L. F., & Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, *35*(2), 99-118.

Davodi, H., Iravani, H., Fami, H. S., & Ameri, Z. D. (2017). Affecting Factors on Water Resources' Sustainability in case of small holding farmers. *Alborz province, Islamic Republic of Iran*.

DAVODI, H., SHABANALI, F. H., & KALANTARI, K. (2012). An investigation of technology development barriers in Agricultural Science and Technology Parks of Tehran University.

Ding, N., Fung, H., Jia, J. (2017). Comparison of bank profitability in China and the USA. *China and World Economy, 25*(1), 90-108.

Eslami, Z.et al. (1390). Necessity of formulating banks' ratings model and providing of the proposed model, Risk Control and Research Department of Sepah Bank.

Gholi B. (2008). Inflation, Inflation Uncertainty and Dispersion of Relative Prices in Iran. *Economic Research Series of Central Bank of Iran, 31*.

Googerdchian, A., Tayyebi, S. K., & Sadeghi Amroabadi, B. (2010). The Effect of Developing Interbank Financial Relations on Profitability and Credit Allocation in the Country. *Journal of Money and Economics, 5*.

Hasan, I., & Morton, K. (2003). Development and efficiency of the banking sector in a ransitional economy: Hungarian experience. *Journal of Banking and Finance, 27*(12), 2249–2271.

Leuvensteijn, M. V., Bikker, J. C., Rixtel, A. A. J. M. V., & Sorensen, C. K. (2011). A new approach to measuring competition in the loan markets of the euro area. *Applied Economics, 43*(23), 3155-3167.

Marques-lbanez,M., & Leuvensteijn, M. V. (2017). Bank competition and financial stability: The role of financial innovation.

Nagahi, M., Nagahisarchoghaei, M., Soleimani, N., & Jaradat, R. M. (2018). Hedge strategies of corporate houses. *Journal of Business Administration Research, 7*(1), 6..

Nagahisarchoghaei, M., Nagahi, M., & Soleimani, N. (2018). Impact of Exchange Rate Movements on Indian Firm Performance. *Mohammad Nagahisarchoghaei, Morteza Nagahi, Nadia Soleimani, Impact of Exchange Rate Movements on Indian Firm Performance, International Journal of Finance and Accounting*, *7*(4), 108-121.

Nazarian, R., Farhadiipour, M. R., & Faraji, A. (2013). The Impact of Competition in the Banking Industry on the Effectiveness of Monetary Policy Transfer through the Bank Loaning Channel. Ravand Quarterly.

Poostinchi, M. (2013). The Impact of Competition in the Banking Industry on Banks' Overdue Claims. *Economic Journal*, 5-18.

Salatin, P., & Zahedi, M. (2017). The impact of economic liberalization on the performance of banks in the group of selected countries. *Journal of Fiscal and Economic Policies, 19*, 191-212.

Seyyed Abadi, A. (2016). *Competition, Efficiency and Growth in Banking*. Master's thesis.

Shahikiatash, M. N., Mahmoodpour, K., & Naiini, M. (2015). Investigating the Relationship between Market Structure and Profitability Factor in Iranian Banking System (SCP Approach). *Ravand Quarterly, Twenty-Second Year, 72*, 13-37.

Shelvin, A., & Wu, L. (2015). China: The path to interest rate liberalization. J.p Morgan Asset Management.

Tan, A. Y., & Anchor, J. R. (2016). Stability and profitability in the Chinese banking industry: evidence from an auto-regressive-distributed linear specification. *Investment Management and Financial Innovations*, *13*(4), 120-128.

Tan, Y. (2014). *Performance, risk and competition in the Chinese banking industry*. Chandos Publishing.

Tan, Y. (2016). The impacts of risk and competition on bank profitability in China. *Journal of International Financial Markets, Institutions and Money*, *40*, 85-110.

Tan, y., & Floros, c. (2012). Bank profitability and inflation: The case of china. *Journal of Economic Studies, 39*(6), 675-696.