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Determinants of Profitability in Banking Network of Iran

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Abstract

This paper seeks to investigate the determinants of banking network profitability in Iran from 2007 to 2012. The results of our study indicate that both bank-specific factors and macroeconomic factors influence banks' profitability in Iran. Results confirm that bank profitability is significantly influenced by investment to total assets ratio, non-performing loans to total assets ratio, and time deposit to total assets ratio. Among external factors, it turns out that economic growth rate has a significant positive impact on bank profitability.

***Keywords**: Banking network, Profitability, Bank specific determinants, Macroeconomic variables*

***JEL Classifications**: C23, G21, M20*

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1.Introduction

Analyzing the determinants of bank profitability has drawn policy makers' and researchers' attentions to banking systems as a vital tool for evaluating national economies and measuring the financial stability.

Moreover, the serious implications of the recent international financial crisis on the banking sector brought back the evaluation of the bank profitability determinants to the center of attention. Knowing them represents an interest not only to the regulatory and supervisory authorities and bank managers, but also to their clients (Roman and Danuletiu, 2013).

Financial system in Iran is focused on banks and financial and credit institutions, which have a crucial role in financing the real economy and ensuring the financial stability. Therefore, what is of major importance to deal with economic growth and financial stability would guarantee a stable and highly effective banking sector.

Although progress has kept pace slowly since 2001, liberalizing the banking sector was one of the main objectives of the Government of Iran. In 1994, the creation of private credit institutions was approved by the central bank of Islamic Republic of Iran, and in 1998 foreign banks were authorized to provide banking services in Iran's free-trade zones. The central bank moved toward this with the recapitalization and partial privatization of the existing commercial banks to inspire the development of a more competitive and efficient industry. State-owned banks are considered by many to be poorly functioning as financial intermediaries. Extensive regulations are in place, including controls on rates of return and subsidized credit for specific regions. The banking sector in Iran is viewed as a potential hedge against the removal of subsidies.

According to performance and productivity, private banks are significantly higher than state-owned banks. Nonetheless, they are constantly subject to anti-competitive interference by the government and the central bank of I.R.I. to prevent their fast market share growth. Moreover, state-owned banks can slash the private banks' profitability, since they tend to care less about profits (Dehghannezhad, 2010).

Following highly generated loans, especially to households, a diversity of banking operations, a range of banking products and services, the banks have recorded a growing income, with positive and significant impact upon the profitability indicators. In the whole period, during which the current world economy met crisis, significant structural, institutional and legislative transformations caused banking sector of Iran to register a rapid growth of bank profitability and efficiency.

In this framework, by using balance sheets of Iran's banking network, the objective of our research is to emphasize the impact that bank-specific, industry-specific and macroeconomic factors have upon the profitability of the commercial banks that operate in Iran.

Our paper is organized according to the studies of Acaravci and Calim (2013), Hoffman (2011), Athanasoglou (2008), and Naceur (2003). We used an econometric model based on an analysis of multiple linear regressions of unbalanced dynamic panel data that allowed us to investigate the relationship between bank profitability and some internal and external determinants.

The paper uses unbalanced panel data approach and is structured as follows: section two focuses on literature review; section three briefly describes the data and variables included in our analysis; section four reflects the methodology and model; section five highlights the empirical results of our investigation, and section six reflects the conclusions.

2. Literature Review

A number of studies (Hester & Zoellner, 1966; Berger et al., 1987; Kwast & Rose, 1982; Vasiliou, 1996; Naceur and Goaied, 2001; Kosmidou et al., 2004; Asiri, 2007; and Aburime, 2008) have been carried out about the determinants of profitability in banking systems around the world. Mainly, those studies can be grouped in two: studies focusing on an individual country (Kosmidou et al., 2006; Naceur & Goaied, 2008) or a geographical region (Olson & Zoubi, 2008; Bonin et al., 2005) that have examined bank-specific factors of profitability, while studies encompassing multiple countries (Hassan & Bashir, 2003; Valverde & Fernandez, 2007) have considered external factors in addition to a few internal factors of profitability. The main conclusion emerging from this numerous studies is that internal factors explain a great portion of profitability.

Studies attributed to internal determinants employ variables such as size, capital, risk management and expenses management. Size is introduced to account for existing economies or diseconomies of scale in the market. Akhavein et al. (1997) and Smirlock (1985) find a positive and significant relationship between size and bank profitability. Demirguc-Kunt and Maksimovic (1998) suggest that the extent to which various financial, legal and other factors (e.g. corruption) affect bank profitability is closely linked to firm size. In addition, as Short (1979) argues, size is closely related to the capital adequacy of a bank since relatively large banks tend to raise less expensive capital and, hence, appear more profitable. Using similar arguments, Haslem (1968), Short (1979), Bourke (1989), Molyneux and Thornton (1992) Bikker and Hu (2002) and Goddard *et al.* (2004), all link bank size to capital ratios, which they claim to be positively related to size, meaning that as size increases – especially in the case of small to medium-sized banks-, profitability rises. However, many other researchers suggest that little cost saving can be achieved by increasing the size of a banking firm (Berger *et al.*, 1987), which suggests that eventually very large banks could face scale inefficiencies (Athanasoglou et al., 2005).

Dietrich and Wanzenried (2010) focus their attention on investigating the main determinants of the profitability for the Swiss banking market. The empirical analysis performed on a sample of 453 commercial banks in Switzerland, from 1999 to 2008, highlights the existence of some significant differences in the banks' profitability. The results of the study show that the banks which are more capitalized are also more profitable (Roman & Danuletiu, 2013).

Sufian (2010) analyzes the determinants of the bank profitability in Korea during 1994-2008, and the results of his study show that the banks with a lower credit risk have the tendency to register a higher profitability. Regarding the impact of the macroeconomic and banking industry specific factors, the study shows that the inflation and GDP have, respectively, a significant pro-cyclical and counter-cyclical influence, and the banking sector concentration has a negative impact upon the profitability of banks.

Athanasoglou et al. (2008) analyze the determinants of the bank profitability by the impact of the bank-specific, industry-specific and macroeconomic, for a sample of Greek banks from 1985 to 2001. The results show that the industry-specific factors would not significantly influence the Greek banks' profitability although there have been considerable evolutions in the Greek banking sector in the given period.

Asiri (2007) has also applied SCA[1] method on eight Kuwaiti banks where their study finds that assets are positively and liabilities are negatively related to the profitability of the Kuwaiti banks.

These findings contrast with the findings of Kosmidou et al. (2004) who find that liability management contributes more in creating the profitability differences among the banks. Moreover, a number of other bank specific or macroeconomic factors such as market structure, etc. do impact bank's net earnings which were ignored by these authors.

Kwast & Rose (1982) provide the most comprehensive study on the impact of bank's asset portfolio composition on its earnings. This study expands the traditional SCA model by including a firm's income to its asset and liability. The authors focused on the large US banks and used data from

1. Sales comparison approach

1970 to 1977 for their estimation. Their model find no evidence that differential returns and costs on different categories of assets and liabilities exist between high and low profit banks.

Hester & Zoellner (1966), for the first time, employed statistical cost accounting (SCA) method on US banks. Their study examines whether a significant relationship exists between assets/liabilities standardized with total assets with return on assets of individual banks. They find statistically significant coefficients for most of the categories of assets and liabilities and reject the null hypothesis that there is no relationship between them.

Vasiliou (1996) investigates portfolio of assets and liabilities between high-profit and low-profit Greek banks by employing SCA method. His regression results suggest that it is the asset management rather than liability management that play a more prominent role in explaining interbank differences in profitability. This study implies that high profit banks earn higher return on their assets than that of low profit banks. At the same time high profit banks enjoy lower expenses for their liabilities.

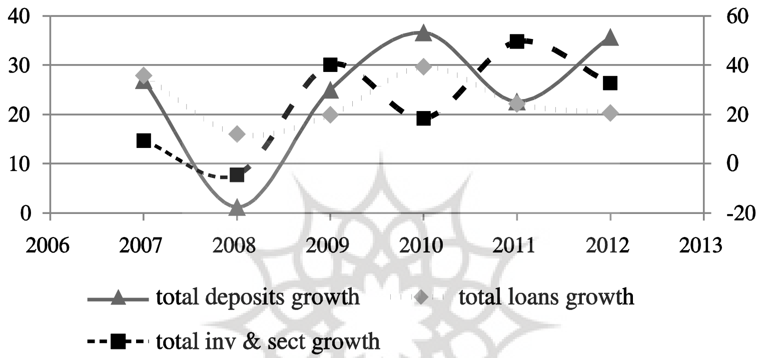
The literature review reflects the existence of some gaps in knowing the determinants of the bank profitability for the banks that operate in Iran. Therefore, our paper contributes to the literature by providing empirical evidence regarding some key factors that influence the profitability of the commercial banks in Iran.

3. Balance Sheet Changes and Profitability

Figure 1 depicts growth rate of loans, deposits, and investment of total banks in Iran in the course of 2007 through 2012. As we can see in the figure, the trend of total banks by average shows that total deposits and loans are increasing through the period. However, total investment and securities are increasing with this fact that their growth rate was above loan and deposit rates in 2009 and 2011 but lower in 2008 and 2010.

According to the figure, during 2008-2011 when macroeconomic atmosphere confronted with recession, banks pursued a risk-averse approach and changed their assets portfolio from loans to investment which would absolutely influence their profitability.

Figure 1: Loans, deposits and investment and securities growth of total banks in Iran



Profitability and assets growth rate of total banks show the same movement direction in the period but with one period lag for assets growth rate (Figure 2). As assets growth rate increases in banks, it is expected that profitability growth rate increases simultaneously. As we can see in the figure, assets growth after 2008 and profitability growth rate after 2009 have increasing trends before which banks experienced approximately a 100 percent growth rate compared to 2007. However, the inverse movement of banks' profitability and assets growth in 2007-2009 and 2011-2012 would be due to a decrease in costs specially cost of financing the resources and doubtful non-performing loans for banks. As it is also obvious in figure 1, in these two periods growth rate of resources are lower than assets growth rate.

Figure 2: Profitability and sassets growth of total banks in Iran

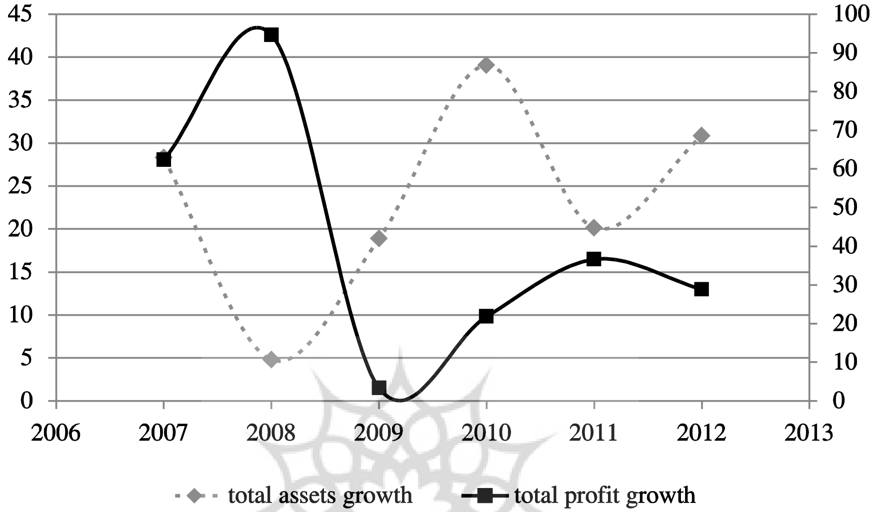
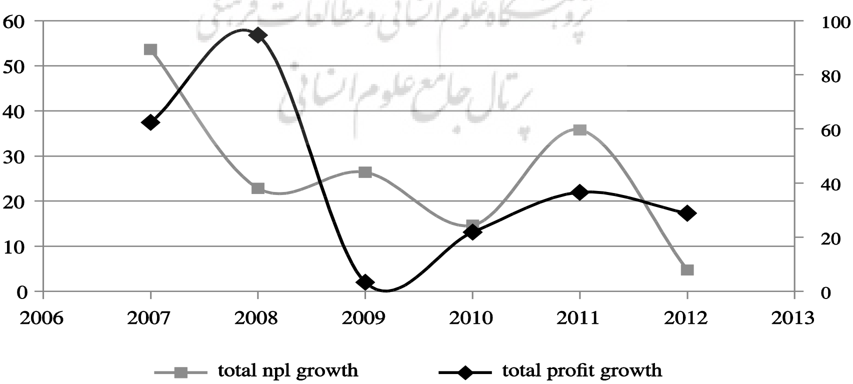


Figure 3: Profitability and non-performing loans growth of total banks in Iran



We expect that non-performing loan and profitability growth rate have opposite trends during the period since non-performing loans are costs for banks. Therefore, when costs increase, profit will decrease afterwards. Figure 3 shows the trends of profitability and non-performing loans growth rate where the rate of profitability is higher before 2009 and except for this period, the trend confirms that after 2009 profitability growth was increasing by average whereas non-performing loans growth have been decreasing, except for 2011, from more than 50 percent in 2007 to 5 percent in 2012 in the whole period.

When banks experience positive growth of non-performing loans, they have to increase their doubtful provisions. This causes a part of resources, which could be allocated to earning income, to be excluded from the resource allocation cycle and in the end a dip in profitability would be inevitable.

4. Data and Variables

The profitability measure used as a dependent variable in our study is profit margin (PMAR: profit margin or net profit to earning assets).

According to the literature, the independent variables are represented by the bank-specific factors and by the external ones (macroeconomic and financial sector specific) that can influence bank profitability.

Based on the empirical studies which concentrate on evaluating banks' profitability, the determinants of bank profitability can be divided in two groups; internal determinants or bank specific (namely capital adequacy, asset quality, deposits, liquidity and bank size) and external determinants, or macroeconomic factors (especially GDP growth and inflation).

In our study, we have used the following variables as determinants:

Investment to assets ratio explains the risk-averse approach of a bank. Investment against credits and loans hold lower return and risk. Furthermore, the earning from investment is available in the short term. Therefore, an increase in investment results in an improvement in profitability. Regarding the relationship between investment and bank profitability, the results of the empirical studies are expected to approve the positive relationship between investment and profitability.

The ratio of non-performing loans to total assets (NPLA) along with a lag period of non-performing loan to assets ratio (NPLA1) as a proxy variable for the credit risk which reflects the banks' asset quality shows the soundness of credit portfolio. A high level of this indicator meaning a significant deterioration of the banks' assets leads to a decrease in bank profitability. When non-performing loans increase, it means that banks' resources are blocked in the economy and it prevents banks from having access to the profit from loans. On the other hand, loans reimbursement as resources to banks are used as giving repeated loans. Thus, an increase in non-performing loans, decreases lending power of banks and this will lead to a diminishing profitability of banks.

Deposits in banks are an item of liabilities side of the balance sheet which causes cost for banks. Therefore, different kinds of deposits' changes have negative relationships with banks' profitability.

The ratio of time deposits to total assets (TDA) indicates which percentage of banking assets are matched with short term and long term deposits on the liability side. The relationship between this variable and bank profitability is expected to be negative since deposits are regarded as interest cost for a banking network. Therefore, an increase in the level of this indicator can state a negative impact on profitability.

Saving deposits to total deposits (STD) is of minor importance for a bank and constitutes only less than 2 percent of the total deposits in Iran's banking network. Regarding the connection with profitability, we expect a negative relationship since saving deposits are considered as interest cost of banks.

Bank size is evaluated in our analysis by the total assets growth rate of bank (SIZE). The majority of empirical studies reflect mixed results regarding the relationship with the profitability; therefore, the impact of bank size is not clear.

Regarding the macroeconomic variables, in our study we use the annual real GDP growth rate (GDP). The relationship between this variable and profitability is positive since an increase in the economic activity leads to an amplification of loan demand that leads to an increase in bank's profitability.

The data used in our study were obtained from Iran Banking Institute database and macroecnomic information from the Central Bank of I.R. of Iran. The model is run using unbalanced panel data for 29 banks(total banking network) in the course of 2007-2012. Descriptive statisics for the variables are illustrated in table 1 and according to the table, the mean and standard deviation of profit margin are 0.06 and 0.05 respectively and the average of investment to total assets is around 3 percent in the sample period. The results of table 1 also shows that banks' profit margin, non-performing loans and banks assets size growth rate experience strong instability because the amount of standard deviation is more than one in these variables.

Table 1: Summary of Statistics

Variables	Min	Max	Mean	Std. Dev.
PMAR	-0.02	0.58	0.06	0.05
ITA	0	0.56	0.03	0.07
DDA	0	0.67	0.13	0.11
TDA	0	7.32	0.47	0.75
NPLA(-1)	0	94.02	15.18	14.57
GDPPER	-6.78	6.48	1.18	4.52
ITA(-1)	0	0.56	0.03	0.07
SIZEPER	-100	925.2	46.2	99.13
STD(-1)	0	0.99	0.6	0.27

Source: Authors' calculations

The matrix of correlation among the variables used in the econometric analysis is depicted in table 2. The relationship among profit margin which corresponds to the dependent variable in the estimations, investment to total assets ratio, GDP growth as well as assets size is positive whereas demand deposit to total assets ratio, time deposit to total assets ratio in line with saving to deposits ratio as interest cost of banks are negatively correlated with profit margin.

Table 2: Correlation Coefficients Matrix of Dependent and Explanatory Variables

	PMAR	ITA	DDA	TDA	NPLA(-1)	GDPPER	ITA(-1)	SIZEPER	STD(-1)
PMAR	1								
ITA	0.63	1							
DDA	-0.01	-0.1	1						
TDA	-0.08	0.06	-0.22	1					
NPLA (-1)	0.01	0.04	-0.03	-0.01	1				
GDPPER	0.05	-0.16	0.02	-0.18	0.09	1			
ITA(-1)	0.13	0.31	-0.16	0.03	0.33	0.02	1		
SIZEPER	0.17	0.14	-0.11	0.07	-0.21	-0.02	0.11	1	
STD(-1)	-0.06	0.22	-0.48	0.45	0.24	-0.07	0.14	-0.1	1

Source: Authors' calculations

5. Methodology and Model

Our paper uses unbalanced panel data to study the behavior of banks over time and across space (Baltagi, 2005; Gujarati, 2003). A multiple linear regression model is used to determine the relative importance (sensitivity) of each explanatory variable in affecting the profitability of banks.

The general linear regression model is:

$$Yit = C + \beta iXit + \varepsilon it \qquad (1)$$

Where Yit- is the dependent variable observed for i[th] bank at time t; X is independent variable; β is the coefficient for explanatory variables; i= 1….29; c is a constant term; $\boldsymbol{\varepsilon}$ is error term of the model.

Starting from the general model and considering the selected variables, the empirical model used in our study is:

(2)

$$PMAR_{it} = C + \beta_1 ITA_{it} + \beta_2 DDA_{it} + \beta_3 TDA_{it} + \beta_4 NPLA\,(-1)_{it} + \beta_5 GDPPER_{it} + \beta_6 ITA\,(-1)_{it} + \beta_7 SIZEPER_{it} + \beta_8 STD\,(-1)_{it} + \varepsilon_{it}$$

Where the major determinants of profit margin (PMAR) in equation (2) are ITA (Investment to Total Assets), DDA (Demand Deposit to Total Assets), TDA (Time Deposit to Total Assets), NPLA (-1) (Non-performing Loans to Total Assets with one year lag), GDPPER (Growth Rate of Gross Demostic Products), ITA (-1) (Investment to Total Assets with one year lag), SIZEPER (Growth Rate of banks assets size), and STD(-1) (Saving Deposit to Total Deposits).

6. Empirical Results

The empirical results of estimations using profit margin (PMAR) as the profitability variable are shown in table 3. We use the multiple linear regression model with unbalanced panel data to find the determinants of profitabiltiy in Iran's banking network. We use investment to total assets, demand deposit to total assets , time deposits to total assets, and non-performing loans to total assets (NPLA) ratios as bank specific variables and GDP growth rate as macroeconomic variable in our study.

The model seems to fit the panel data fixed effect estimation and has significant coefficients in which Hausman test decides between fixed and random-effect models. According to table 4, in order to assure which one to choose between Fixed-effect and Random-effect estimations, we use Hausman test and the results show that we are allowed to use Fixed-effect estimation in our model because result for PMAR, Hausman statistics is 264.26 in the regression.

Table 3: Empirical results of panel regression for PMAR

Variables	(1) PMAR	(2) PMAR
	Fixed Effect Estimation	**Random Effect Estimation**
ITA	1.002*** (0.07)	0.71*** (0.06)
DDA	-0.10 (0.07)	-0.03 (0.07)
TDA	-0.12*** (0.04)	-0.0004 (0.01)
NPLA(-1)	-0.001*** (0.00)	-0.0006 (0.00)
GDPPER	0.001** (0.00)	0.001*** (0.00)
ITA(-1)	0.14** (0.06)	0.01 (0.07)
SIZEPER	-0.0001*** (0.00)	-0.00004 (0.00)
STD(-1)	-0.19*** (0.03)	-0.11*** (0.03)
constant	0.23*** (0.02)	0.12*** (0.02)
F-statistics	44.74	157
No. Obs.	117	117
R-squared	0.81	0.75
Number of banks	29	29

Note: Standard errors in parentheses; the significant parameters are indicated as such with ***, **, * indicate significance at 1%, 5% and 10% levels.
Source: Authors' calculations

Table 4: Hausman test for PMAR

	---- Coefficients ----			
	(b)	**(B)**	**(b-B)**	**sq.rt[diag (V_b-V_B)]**
	FE	**RE**	**Difference**	**S.E.**
ITA	1.002177	.7160367	.2861404	.04439385
DDA	-.1072351	-.03647674	-.07075833	.03063387
TDA	-.1291354	.000479068	-.1296145	.0448846
NPLA (-1)	-.0011521	-.0006386	-.0005134	.0001018
GDPPER	.001254	.0019634	-.0007084	.
ITA(-1)	.1499747	.014524	.1354507	.
SIZEPER	-.0001103	-.0000442	-.0000661	.
STD (-1)	-.19871	-.11763	-.081079	.022868

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)

264.26

Prob>chi2 = 0.0000

(V_b-V_B is not positive definite)

The coefficients of the ratio of investment over total asset (ITA) and its one year lag ITA(-1) are positive, expressing a direct relationship with the bank's profitability. Furthermore, the results of our study show that the relationship is statistically significant.

The demand deposit to total assets expressed by DDA is an important determinant of the banking profitability. The coefficient is not statistically significant even at 10% significance level and, not as it was expected, indicates a negative rapport to the banking profitability. This shows that banks with a high demand deposits present lower profitability levels. On the other hand, the effect of time deposits over total assets ratio expressed in our model by the TDA is statistically significant at 1% significance level and reflects a negative rapport with the profitability as expected. Furthermore, it is expected that the ratio of saving to total deposit with one year lag denoted by STD(-1) has a negative effect on profitability and the result confirms the negative coefficient which is statistically significant.

The coefficient of the bank asset size growth rate indicates a negative impact upon the profitability. Although the rapport is statistically significant at 1%, the sign of coefficient is not as expected in the profitability equation. The negative coefficient indicates the fact that the banks recorded a decreasing level of diversification of the banking services in favor of their profitability.

The GDPper variable showing the growth rate of Gross Domestic Product is an important determinant of the profitability and the coefficient being statistically significant at 5% significance level and is in line with the expectations which indicate a positive rapport with the banking profitability. Our findings are in line with the conclusions of Mendes and Abreu (2003), Pasiouras and Kosmidou (2007), Sufian and Noor (2012), Trujillo-Ponce (2013).

The coefficient of non-performing loans over total assets ratio with one period lag NPLA(-1) depicts the quality of the assets which is regarded as an important determinant of the banking profitability. The coefficient is statistically significant at 1% significance level and, as it was expected, indicates a negative rapport to the banking profitability. This shows that banks with a high credit risk present more reduced profitability levels (Roman & Danuletiu, 2013). However, it is noted that banks in Iran are well capitalized and can absorb potential losses resulting from the activity.

7. Conclusion

Investigating the bank–specific and macroeconomic determinants of profitability for 29 banks in Iran, the empirical results of our study highlight the fact that investment over total assets ratio, and GDP growth rate are positively influencing the profitability.

The ratios of non-performing loans and time deposits to total deposits have statistically significant negative impacts upon the banking profitability.

On the contrary, other factors such as the ratio of demand deposits to total assets do not have an important effect on the profitability whereas growth rate of banks assets size has strong significant impact upon profitability although the coefficient sign is not as expected.

Regarding the external macroeconomic independent variable used in our study, only GDP growth rate has a significant impact upon the banking profitability.

Most of the results of our study are in line with the ones obtained in other studies that focused on banking profitability.

Based on the obtained results, we consider that the profitability of banking network of Iran can be improved especially by increasing the investment in assets portfolio, improving the banks' portfolio diversification, and increasing the interest income and increasing the bank dimension in favor of investment and securities.

As for further research, we intend to further the results of our study by taking more explanatory variables into consideration for the banking profitability in two states of boom and recession.

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Appendix

Variable	Obs	Man	Std. Dev.	Min	Max
prmar	147	.0645748	.0596236	-.0241	.5866
ita	147	.0351701	.0769393	0	.56
dda	147	.135102	. 1178539	0	.67
tda	147	.4772109	.7546148	0	7.32
np 1a1	146	15.18582	14.57074	0	94.02
gdpbaseper	145	1.182	4.520851	-6.78	6.48
ital	146	.0353425	.0771757	0	.56
sizeper	119	46.20412	99.13335	-100	925.2
std1	144	.6022222	.2776108	0	.99

	prmar	ita	dda	tda	np 1a1	Gdpbas-r	ital	sizeper	std1
prmar	1.0000								
ita	0.6357	1.0000							
dda	-0.0178	-0.1001	1.0000						
tda	-0.0816	0.0617	-0.2246	1.0000					
np 1a1	0.0127	0.0419	-0.0366	-0.0157	1.0000				
gdpbaseper	0.0526	-0.1655	0.0210	-0.1797	0.0944	1.0000			
ital.	0.1303	0.3116	-0.1663	0.0309	0.3307	0.0283	1.0000		
sizeper	0.1794	0.1441	-0.1100	0.0776	-0.2130	-0.0220	0.1127	1.0000	
std1	-0.0642	0.2210	-0.4861	0.4533	0.2464	-0.0748	0.1463	-0.1023	1.0000

Fixed-effects (within) regression	Number of obs = 117
Group Variable: code	Number of groups = 29
R-sq: within=0.8173	Obs per group:min = 1
between = 0.2617	Avg = 4.0
Overal=0.2286	Max = 5
	F(8.80) = 44.74
Corr (u-i,xb) = -0.8720	Prob>F = 0.0000

prmar	Coef.	Std.Err.	t	$p > \|t\|$	[95% Conf. Intervall	
ita	1.0022177	.0780135	12.85	0.000	.8469253	1.157429
dda	-.1072351	.0778021	-1.38	0.172	-.2620662	.0475961
tda	-.1291354	.0462155	-2.79	0.007	-.2211072	-.0371636
np1a1	-.0011521	.000437	-2.64	0.010	-.0020217	-.0002825
gdopbaseper	.001255	.0005298	2.37	0.020	.0002007	.0023092
ital	.1499747	.063967	2.34	0.022	.02267762	.2772732
sizeper	-.0001103	.000039	-2.83	0.006	-.000188	-.0000327
std1	-.1987177	.0379306	-5.24	0.000	-.274202	-.1232335
-cons	.2380307	.0253827	9.38	0.000	.1875175	.2885438
sigma-u	.16330038					
sigma-e	.02416812					
rho	.97856609	(fraction of variance due to u-i)				

F test that all u-i=0: F(28,80)=11.78 Prob>F=0.0000

random-effects GLS regression	Number of obs = 117
Group Variable: code	Number of groups = 29
R-sq: within=0.7507	Obs per group:min = 1
between = 0.4463	Avg = 4.0
Overal-0.4119	Max = 5
	Wald chi2 (8) = 157.20
Corr (u-i.x) = -0 (assumed)	Prob>chi2 = 0.0000

prmar	Coef.	Std.Err.	t	$p > \|t\|$	[95% Conf. Interval]	
ita	.7160367	.0641505	11.16	0.000	.590304	0.8417695
dda	-.0364767	.0715174	-0.51	0.610	-.1766482	.1036948
tda	.0004761	.0110113	0.04	0.965	-.0211027	-.0220608
np1a1	-.0006386	.0004249	-1.50	0.133	-.00114715	-.0001942
gdopbaseper	.0019634	.0006941	2.83	0.005	.000603	.0033238
ital	.014524	.0712319	0.20	0.838	-.125088	.154136
sizeper	-.0000442	.000045	-0.98	0.325	-.0001324	-.0000439
std1	-.1176385	.0302617	-3.89	0.000	-.1769504	-.583266
-cons	.1258122	.024018	5.24	0.000	.0787377	.1728866
sigma-u	.02859711					
sigma-e	.02416812					
rho	.58335055	(fraction of variance due to u-i)				

	____ Coefficients ____			
	(b)	(B)	(b-g)	Sprt(diag(v-b-v-B))
	fe	re	Difference	S.E.
ita	1.002177	.7160367	.2861404	.0443938
dda	-.1072351	-.0364767	-.0707583	.0306339
tda	-.1291354	.0004791	-.1296145	.448846
np1a1	-.0011521	-.0006386	-.0005135	.0001019
gdopbaseper	.001255	.0019634	-.0007085	.
ital	.1499747	.014524	.1354507	.
sizeper	-.00011.3	-.0000442	-.0000661	.
std1	-.1987177	-.1176385	-.0810792	.0228682

b = consistent under Ho and Ha; obtained from xtreg

B = in inconsistent under Ha. efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-s)[(v-b-v-B)^(-1)](b-B)

= 264.26

prob>chi2 = 0.0000

(v-b-v-B is not positive definite)