



Original Article

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The micro and macro factors associated with the profitability in the Iranian banking industry: An approach to panel data

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ABSTRACT: The profitability of banks is generally influenced by micro (bank-specific) and macro (external) factors. The micro factors are basically a function of the bank management policies and decision making, while the macro (external) factors represent the forces at work in the bank's economic and legal environment, outside the bank management's sphere of influence. This paper examines the effect of micro (bank-specific) and macro (external) factors on the profitability of the banking industry in Iran (per private and state banks) for the period 2008 to 2014 using the panel data method. In this study, the bank profitability is measured by return on assets (ROA). The results indicate that among the micro factors, the bank size and its deposit volume, and among the macro factors, economic growth and inflation, have a significant impact on the bank profitability. In the case of private banks, capital adequacy, deposit volume, and liquidity volume among the micro factors, and economic growth and inflation among the macro factors, have a significant effect on the bank profitability.

KEYWORDS: profitability; private and state banks; micro factors; macro factors; panel data

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1. INTRODUCTION

The factors affecting the profitability of banks have been extensively explored, both theoretically and empirically. The studies classify these factors into two general groups of micro and macro factors. The first group, micro factors, also referred to as bank-specific or intra-bank factors, which are controllable by the bank's management, in fact, reflect the differences in the bank's management policies and decision-making regarding the allocation of resources, the use of asset and debt, portfolio management, capital adequacy, liquidity, and cost management. High managerial motivation may also have an optimizing effect on the bank performance in terms of profitability, which can be examined and analyzed by the balance sheet and profit and loss statements (Almazari, 2014). The second category of variables affecting the bank profitability are macro factors which occur beyond the bank management's sphere of influence. The macro factors are further divided into two categories: factors that have more to do with the bank's characteristics such as ownership structure and scale of operation and factors that depend on the economic (and legal) conditions of the country such as inflation, money supply, the GDP growth rate, and regulatory and modificatory policies of the government and the central bank (Hasan et al, 2013). In addition, given the important role of banks as commercial intermediaries, the knowledge of the financial markets in the countries of origin and destination and timely and accurate knowledge of exchange rate changes in different countries by banks can be very conducive to the profitability of these financial institutions. In banks that have foreign exchange activity, currency risk occurs because of exchange rate fluctuations. Exchange rate fluctuations are an important source of economic uncertainty that affects profitability and value of engagement in international activities. Exchange rate fluctuations can affect the forecast of the value of assets, liabilities and income derived from assets and costs of debt, and the lack of control over these fluctuations, next to the low liquidity level of banks and financial institutions, would result in transformation of the foreign currency resources into Rial. This may eventually lead to the bank loss and, in an acute case, its bankruptcy (Nadeem & Kanwal, 2013).

Today, a profitable banking system plays an important role in resisting the negative shocks of the economy and thereby preserving the stability of the financial system. Therefore, the bank's managers, in order to generate the maximum benefits, are keen to identify the factors contributing to the bank profitability. In order to survive in the fast growing and highly competitive banking environment, banks have to cope with several factors at the national and international level and expand their activities by new investments. Meanwhile, in view of the fact that the bank's sources and expenses are affected by a variety of factors that constitute the profit and loss statement, attention must be paid to these factors in order to control their effects and reduce their associated systematic and unsystematic risks and make a more accurate forecast of the developments both in the intra-bank environment controlled by management and the external macroeconomic environment.



Therefore, considering the importance of profitability in the country's banking system and its implications for the national economy, in this study, an inquiry is made into the factors affecting the bank profitability. This issue is investigated separately for the selected groups of the private- and public-sector banks in Iran.

This article is organized as follows. The introduction gives a general background of the issue at hand, that justifies the present research on profitability in the banking system. Next, comes the research theoretical framework, including definitions, measures (indicators), and determinants of profitability, followed by a brief review of the empirical research conducted so far hereon. In section 3, the model specification, the proposed model and its variables are introduced. In section 4, the model is estimated using multivariate regression analysis and panel data and the results thereof are presented. In the final section, discussion and conclusion, the results are discussed based on which a number of suggestions are made.

2. LITERATURE REVIEW

Profitability is the firm's ability to generate enough income so that after paying the current expenses, an additional amount called profit (net margin) remains for the bank (Soyemi et al, 2013). To measure profitability in banks, profitability ratios are used, which measure the bank's success rate in generating profit (net return) relative to its revenues (sales) or investment. Among the banks' profitability ratios, it can be referred to return on assets (ROA), return on equity (ROE), and net interest margin (NIM).

Return on assets (ROA) measures the way the bank's assets are used by the management to generate revenue and sales. It is the best ratio to evaluate the management performance, as it assesses the net income generated from the use of all the bank's assets. Therefore, it is subject to deviation less than the ROE ratio (Gull et al, 2011). Two formulas are widely in use to calculate the rate of return on assets. In some studies (e.g. Gull et al, 2011; Khrawish & Khrawish, 2011; Soyemi et al, 2013), this ratio is calculated as net income (net profit after tax) to total assets, while in some others (e.g. Roman and Dănuleşiu, 2013; Sufian, 2011), it is defined as the ratio of net income to average total assets. Hence, according to the latter definition, the ROA ratio, in one case, may represent one Rial of profit (generated) for every hundred Riyals of assets (invested).

On the other hand, economic growth and its expansion in various areas have led to a rise in the demand for banking facilities and financial services, which is likely to boost banks' profitability (Dickinson and Troutman, 1996). The results found by Berger & Hunter (1993) also indicate that economic and market growth, by affecting the money supply, total deposits and total assets of the banking system, cause fluctuations in the bank's profitability (profit generating possibility). Most studies support the positive effect of economic growth on the bank profitability, yet, in a number of studies, it is noted that in economic growth, the competition between banks tends to increase, which may erode their profits (Liu and Wilson, 2010; Khrawish & Khrawish, 2011).

Davydenko (2010) investigated the determinants of bank profitability in Ukraine and noted that Ukrainian banks were not making significant profits from their core activities (growing deposits), they were making a lot of profits from the currency devaluation. In addition, he showed that the profitability pattern in fully domestic banks differed from that in banks that used foreign capital.

Nadeem & Kanwal (2013) found that the real interest rate had a strong positive relationship with all three profitability indicators, i.e. return on assets (ROA), return on equity (ROE), and the rise of equity ratio. They also found that real GDP had a positive effect on asset return and a negative effect on the other two indicators, while inflation rate was negatively linked with all profitability indicators.

Almazari (2014), in a paper titled Impact of Internal Factors on Bank Profitability: Comparative Study between Saudi Arabia and Jordan, examined the profitability of banks in the two countries. The results indicated a positive and significant relationship between the ROA and the variables liquidity risk, the equity ratio (equity to total assets) and the ratio of total investment to total assets in Saudi Arabian banks, and a negative relationship between the above mentioned ratio and the variables bank size, cost-to-income ratio, the ratio of net credit facilities to total deposits, as well as the ratio of net credit facilities to total assets.

3. METHODOLOGY

3. The model specification

In this study, the impact of micro and macro factors on the profitability of private and state-owned banks in Iran is investigated using multivariable regression model and panel data methodology. The model specification is derived from the approach adopted by Alper and Anbar (2011) as follows:

$$(1) \quad \text{Profitability}_{it} = \beta_0 + \beta_1 \sum_{i=1}^N \text{Internat Factor}_{it} + \beta_2 \sum_{j=1}^K \text{External Factor}_{it} + \varepsilon_{it}$$

$i = 1, 2, \dots, N \quad j = 1, 2, \dots, K$

Where,

$\text{Profitability}_{it}$

is profitability of bank i in time t

$\sum_{j=1}^K \text{External Factor}_{it}$

a vector of macro factors in time t , and

the error term.

The extended form of model (1) for private and public banks is as follows:



(2)

$$ROA_{it} = \beta_0 + \beta_1 A_{it} + \beta_2 CA_{it} + \beta_3 QD_{it} + \beta_4 DP_{it} + \beta_5 GDP_{it} + \beta_6 INF_{it} + \beta_7 R_{it} + \varepsilon_{it}$$

In which, ROA (return on assets) is the dependent variable and a proxy for the bank profitability, which is calculated for each bank as a ratio of net profit to total assets. The explanatory variables

$$A_{it}, CA_{it}, QD_{it}, DP_{it}$$

are the micro factors *bank size* (natural logarithm of total assets), *capital adequacy* (the ratio of equity to total assets), *liquidity* (the ratio of current assets to total assets), and deposit volume (the ratio of deposits to total assets) of bank i in time t, respectively, and the explanatory variables

$$GDP, INF, R$$

are the macro factors representing economic activity (GDP growth rate), inflation rate (consumer price index), and interest rate, respectively, and ε^t is the error term.

In addition, the subscript i in the mentioned model, takes on values 1 to 12, when the model is estimated for each of the 12 private-sector banks (i.e. Mellat Bank, Refah Bank, Bank Saderat Iran, Tejarat Bank, Parsian Bank, Pasargad Bank, Shahr Bank, Karafarin Bank, Sarmayeh Bank, Sina Bank, Saman Bank, and Eghtesad Novin (EN) Bank), and takes on values 1 to 5, when the model is estimated for each of the 5 public-sector banks (i.e. Bank Melli, Bank Sepeh, Bank Kashwarsi Iran, Bank Maskan, and Post Bank). And the subscript t denotes a year in the period 2008 to 2014.

4. FINDINGS

The model estimation and the results

4.1. The choice of the model estimation method

According to the panel data methodology, first, the method by which the theoretical model is to be estimated is determined. That is to say, it is decided whether the model is to be estimated by the pooled data (mixed effects) or by the panel data method. For this purpose, the F test is used. In this test, first, the model specified in relation (2) is estimated once by the fixed effects method and once by the mixed effects (pooled data) method, using two sets of information on private and state banks. After estimating the two models using the fixed and fixed effects methods, the sum of the squared residuals in both cases is extracted and the F test statistic is calculated (Gujarati, 2013). In EViews 8, it is possible to perform the test directly.

Given the F test statistic for private banks ($F = 16.5$, $p\text{-value} = 0.0073$) and state banks ($F = 18.1$, $p\text{-value} = 0.0093$) in table 1, with 95% confidence, the null hypothesis that the intercepts of the cross sections are equal cannot be accepted. Therefore, the panel data method is chosen over the pooled data method.

Table 1. The results of F-tests for private and state banks

	Private banks	State banks
F statistic	16.51	18.10
p-value	0.0073	0.0093

Source: research findings

Having chosen the panel data method based on the F-test, in the next step, it is decided whether the panel data should be used by fixed effects (FE) method or random effects (RE) method. The appropriate test at this stage is the Hausman test (Wooldridge, 2002). To perform this test in EViews 8, first, model (2) is estimated by RE method and then, the Hausman test is performed by which the corresponding fixed effects estimator is estimated. Given the obtained Chi-square (χ^2) statistic from the Hausman test, 7.9 for private and 8.4 for state banks, both with a p-value less than 0.05, at 5 percent significance, the null hypothesis (H_0) is rejected, that is, the fixed effects model will be used for the panel data.

Table 2. Chi-square (χ^2) (Hausman test) for private and state banks

Model	Private banks	State banks
χ^2	7.9	8.4
p-value	0.0047	0.0066

Source: research findings

4.2. The estimation results

The F test and Hausman test suggested the use of the fixed effects model (panel data) for the model estimation. Therefore, using the fixed effects method, model (2) in this paper was estimated once with the data of 12 private banks and once with the data of 5 state banks in the period 2017 to 2013. The results of model estimation for private and state banks are presented in table 3. It should be noted that when estimating the variance model, the heterogeneity (heteroscedasticity) of variance was resolved using the GLS method.

Table 3. Model (2) estimation using fixed effects method

Variables	Private banks			State banks		
	Coefficients	Statistic	p-value	Coefficients	Statistic	p-value
Intercept	0.075	1.84	0.0738	-0.063	-1.69	0.1006
A_{it}	-0.004	-1.53	0.1355	0.001	7.36	0.000
CA_{it}	0.080	6.65	0.000	-0.038	-0.83	0.4134



QD _{it}	-0.013	-2.46	0.0188	0.011	1.04	0.3065
DP _{it}	0.024	3.52	0.0012	0.005	3.33	0.0022
GDP _{it}	0.001	2.51	0.0165	0.00325	2.491	0.0183
INF _{it}	-0.002	-3.47	0.0014	-0.002	-2.265	0.0307
R _{it}	-0.0007	-1.42	0.1628	0.0070	1.758	0.1006
	$R^2 = 0.82$			$R^2 = 0.89$		

Based on the results of the model estimation in table 3, the following inferences are made:

- > the model's coefficients of determination (R^2) for the private banks (0.82) and the state banks (0.89) indicate the high explanatory power of the predictor variables in the model.
- > Among the variables representing the bank's micro (internal) factors, only deposit volume (DP) has a significant and positive effect on profitability in both groups of banks, but this positive effect is stronger in the private banks. This means that profitability in the private banks is more dependent on the bank's internal resources.
- > Bank size has a significant and positive effect on profitability in the state banks. This result supports the theoretical expectations and the results documented by Smirlak (1985), Pasioras and Kasmidos (2007), Burke (1989), Molyneux and Thornton (1992), Baker and Ho (2002), and Goddard (2004). However, in the private banks, the effect of bank size on the profitability is not significant.
- > Capital adequacy has a significant and positive effect on the profitability of the private banks, which is in line with the theoretical predictions and the results found by Demirgüç-Kunt and Huizinga (1998) and Dietrich (2009), but contradicts the finding of Achena et al (2012). In the state banks, this variable has no significant effect on the profitability.
- > Liquidity volume has a significant and negative effect on the profitability of private banks, which is in line with the findings of Molyneux and Sorrenton (1992). It is because excess liquidity in the Iranian private banks means inefficient allocation of resources and a loss of market share, negatively influencing the bank profitability. In contrast, this variable in the state banks does not have a significant effect on profitability.
- > In neither group of banks, the interest rate, a macro indicator, has a significant effect on profitability. This result is at odds with the findings of Demirgüç-Kunt and Huizinga (1999), Stekirus and Wood (2003), Ching (2004) and Behriaz and Mehra (2013).
- > The economic growth rate (GDP) has a significant and positive effect on the profitability of both groups of banks, with the difference that this effect is greater in the case of state banks.
- > In both groups of banks, the inflation rate has an equally negative and significant effect on profitability.



5. DISCUSSION AND CONCLUSION

As one of the key financial institutions, banks are charged with important tasks in the economy, including processing deposits, mediating and facilitating payment flows, allocating credits, etc. Therefore, the efficiency and profitability of the banking system has always been of interest, because just as bank profitability and efficiency is conducive and instrumental to economic growth and development, its inefficiency and loss-giving can bring about financial and economic crises. In our country, where the capital market has not sufficiently developed, banks play a more important role, because in addition to mediating funds in the money market, they provide financial support for the country's medium-term and long-term economic plans.

Given the significance of the banking system and its profitability for economic growth and development, this study explores the factors contributing to the profitability in the Iranian banking industry. The theory proposes two groups of micro and macro factors with a likely effect on the bank profitability. In this study, bank size, liquidity, capital volume, deposit volume, etc belong to the micro (internal) factors, while economic growth, interest rate, inflation, etc constitute the macro (external) factors. This study was conducted to assess the effects of these factors on the profitability in a selected number of private- and public-sector banks in the time period 2008-2014, using the panel data method.

The results indicated that in the state banks and among the macro (external) factors, inflation rate had a significant and negative effect, and economic growth (GDP) had a positive and significant effect on profitability, but interest rate had no significant effect on profitability. On the other hand, among the variables representing the micro, bank-specific factors, the bank size and deposit volume had a significant and positive effect on the profitability of the state banks while the capital adequacy and the liquidity had no significant effect on the profitability of the state-owned banks.

Considering the obtained results in this study, the following suggestions are made:

- > Paying attention to the interrelationship of interest rate and inflation rate in the economy, if inflation is fully predicted and interest rates are adjusted accordingly, the income growth is most of the time faster than the expenses which positively affects the bank profitability.
- > Deposit volume has a positive effect on the profitability of the selected banks. Therefore, banks should build up and enlarge the culture of savings in society through advertising and diversifying services, especially through extensive use of electronic and mobile services, etc.
- > Liquidity has a negative effect on the profitability of the selected private banks. Therefore, the banks need to appropriately manage their liquidity in order to avoid its negative impact on the profitability.
- > Bank size has a positive effect on the profitability of the state banks. Therefore, the right combination of the bank assets by which the percentage of profitable assets to total assets at the bank level is increased can enhance the asset overall productivity. In this regard, the implementation of an asset and debt management system can be helpful.



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Authenticity of the texts, honesty and fidelity has been observed.

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CONFLICT OF INTEREST

Author/s confirmed no conflict of interest.

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