

DETERMINANTS OF BANK PROFITABILITY: AN INVESTIGATION ON TURKISH BANKING SECTOR

Halil Emre AKBA

Yıldız Teknik Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Öğretim Görevlisi Dr.

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Abstract: This paper aims to examine how bank-specific, industry-specific and macroeconomic factors affect the profitability of 26 commercial banks in Turkey over the period from 2005 to 2010. Return on Assets (ROA) and Return on Equity (ROE) are used as the profitability measures of banks in the study. The results of the study indicate that the ratio of loan loss provisions to gross loans, the ratio of total costs to total income, Herfindahl–Hirschman Index (HHI) for deposits and inflation have a statistically significant and negative relationship with ROA. When the ROE is taken as the measure of profitability; it was found that the ratio of equity to total assets, the ratio of loan loss provisions to gross loans, the ratio of total costs to total income, logarithm of total assets, and finally, HHI for assets are negatively and significantly related to profitability.

Keywords: Turkish Banking Sector, Bank Profitability, Panel Data Analysis

I. INTRODUCTION

The banking sector plays a vital role in the financial systems of developing countries in which the financial markets are undersized and sometimes even do not exist. In such countries the tasks of bridging the gap between savers and borrowers and providing financial intermediation by converting deposits to productive investments are undertaken by the banking sector [1]. Particularly in Turkish economy, banking sector is one of the leading industries with 32 deposit banks and 13 development and investment banks which serve with more than 9.000 branches and more than 173.000 employees. It is possible to say that the deposit banks group plays the dominant role in Turkish banking sector. According to the statistics of The Banks Association of Turkey, the deposit banks' total assets reached nearly \$ 607 billion at the end of the year 2010 [2].

It wouldn't be wrong to define January 1980 and May 2001 as two important break points in the history of Turkish banking sector. Until the 1980s, Turkish banking

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Özet: Bu çalışmada; bankaya özgü, sektöre özgü ve makroekonomik faktörlerin Türkiye'deki 26 bankanın 2005-2010 dönemi boyunca karlılıklarını nasıl etkilediğini incelemeyi amaçlamaktadır. Çalışmada Aktif Karlılık ve Özsermaye Karlılık, banka karlılığının ölçüleri olarak kullanılmıştır. Çalışmanın sonuçları; kredi kayıpları karlılıklarının brüt kredilere oranının, toplam giderlerin toplam gelirlere oranının, mevduat türünden Herfindahl–Hirschman Endeksinin ve enflasyonun Aktif Karlılık ile istatistiksel olarak anlamlı ve ters yönlü ilişkileri bulunduğunu göstermektedir. Karlılık ölçüsü olarak Özsermaye Karlılık alındığında ise özkaynakların aktife oranının, kredi kayıpları karlılıklarının brüt kredilere oranının, toplam giderlerin toplam gelirlere oranının, toplam varlıkların logaritmasının ve aktif türünden Herfindahl–Hirschman Endeksinin, karlılıkla istatistiksel olarak anlamlı ve ters yönlü ilişkileri oldukları görülmektedir.

Anahtar Kelimeler: Türk Bankacılık Sektörü, Banka Karlılık, Panel Veri Analizi.

sector represented a regional, heavily regulated, protected, closed and uncompetitive industry [3]. In order to increase the efficiency and competitiveness in the sector, a series of reforms such as eliminating restrictions on market entries, interest rates and foreign exchange operations, reductions in reserve and liquidity requirements and in financial taxes, were introduced through the financial liberalization program in 1980. Banks had begun to operate in a more competitive environment, increased their technological infrastructure investments and employed more professional employees as a result of these reforms [3-5].

Despite these reforms and legal and structural changes, the Turkish banking sector had faced serious problems such as high foreign currency, interest rate and liquidity risks and moral hazard problems due to unstable macroeconomic performance, inefficient public financial supervision framework divided between different institutions and political pressures especially to the government banks during the 1980s and 1990s. Altogether, these problems led to a big crisis in the sector

in the period of 2000-2001 [6,7]. As a result of this period many banks experienced considerable financial problems and around one-fourth of the banks in the sector were taken under the control of the Saving Deposit Insurance Fund (SDIF) [6,7]. This period had also substantial adverse impacts on the Turkish economy. The Turkish economy experienced excessive current account and trade deficits, the investments in the real sectors declined dramatically due to the high rates of inflation and interest, and all these adverse events caused a considerable downsizing in the economy [8]. In order to eliminate the reasons behind the crises and restructure the banking sector, Banking Regulation and Supervision Agency (BRSA) introduced a new program called "Banking Sector Restructuring Program", which had been an integral part of the "Program for Transition to a Strong Economy", initiated by Turkish Government, in May 2001. With the initiation of the "Banking Sector Restructuring Program", BRSA mainly aimed to cut out the adverse impacts of the crises on the financial system and to ensure a more efficient, competitive and reliable banking sector. In this context the program based on four pillars: i) restructuring of state banks, ii) resolution of banks that had been transferred to SDIF, iii) strengthening of private banks and iv) improving the legal and regulatory environment [9]. This program can be regarded as the second, probably the most important breakpoint in the Turkish banking history because of its immense positive impacts on the banking sector as well as on Turkish economy. Owing to successful implementation of the program, banks increased their capital and reached high capital-adequacy ratios, state owned banks were restructured and recapitalized, good governance and risk management principles were adopted, foreign ownership increased and Turkish banks that used to function as financing public deficits due to the high interest rates, turned back to banks' traditional role of facilitating the flow of funds from savers to borrowers, especially to the households and real sector and hereby supporting economic growth [6,10].

The history of Turkish banking industry proves that the banks' performance is an important issue particularly in developing countries and in such countries health of the banking sector is very critical to the general economy's health, as any form of failure in its operations has economy-wide effects [11-13]. This is due to the fact that commercial banks are the dominant financial institutions in developing countries and play an important role in economy by serving as financial intermediations. Therefore, assessing their overall performance and analyzing the factors influencing their financial performance is a considerable issue for depositors, investors, potential investors, managers and regulators [11]. Since healthy and sustainable profitability is one of the essential conditions of maintaining the stability of banking system, this study focuses on bank profitability among the different performance measures of the banks

which can be analyzed [14]. Therefore, the primary aim of the study is to extend the existing literature on banks' performance by determining the factors influencing the profitability of commercial banks operating in a developing country, Turkey. Given the fact that performance of the sector directly affects the country's economy, the Turkish banking sector deserves special attention. As banks operate under different ownership types such as state-owned banks, privately-owned banks, foreign banks founded in Turkey and foreign banks having branches in Turkey, the Turkish banking sector also represents an interesting research area.

In the literature, factors influencing banks' profitability are generally categorized into two groups: i) Internal (bank-specific) factors, ii) External (industry specific and macroeconomic) factors [13,15-18]. In this context, the following specific research question is addressed in the study: Which of the bank-specific, industry specific and macro-economic factors influence the profitability of Turkish commercial banks negatively or positively?

The paper is organized in the following manner. After this introduction, Section 2 describes the variables selected to measure the profitability of Turkish banks and those chosen in order to test that affect it. Section 3 outlines the data and methodology used in the study. Section 4 presents the empirical findings of the study. Finally, Section 5 concludes the paper.

II. DETERMINANTS OF BANK PROFITABILITY: VARIABLES SELECTION

In order to achieve the purpose of the study, the variables are categorized into two groups. The first group, dependent variables represents the performance measures while the second group, determinants of profitability constitutes independent variables.

II.1. Profitability Measures: Dependent Variables

In this study, Return on Assets (ROA) is used as the main indicator of the bank profitability. ROA is calculated as the net profit after tax divided by total assets and indicates the returns generated from the assets financed by the bank. In this sense, ROA represents the ability of bank's management to convert bank's assets into net profits and is seen as a key measure of managerial efficiency [16,17,19-22]. Furthermore, as an alternative measure of profitability of banks, Return on Equity (ROE) which is the ratio of net profit after tax to total shareholders' equity is also used. Return on equity can be treated as a measure of how efficiently banks use shareholder equity for the purpose of generating profits [20].

II.2. Determinants of Profitability: Independent Variables

In line with the literature, the determinants of bank profitability are divided into two main categories: the internal determinants and the external determinants.

II.2.1. Internal Determinants

Internal determinants are the bank specific determinants of the profitability; hence they represent the factors that are largely determined by the management decisions and policy objectives of banks [1,13,21,23]. In this study, five bank specific variables are used as internal determinants of profitability, namely the ratio of equity to total assets, the ratio of loan loss provisions to gross loans, the ratio of liquid assets to short term liabilities, the ratio of total costs to total income and finally, the logarithm of total assets.

The equity to total assets ratio reflects the proportion of assets financed by equity and indicates the ability of a bank to cover the risk of unexpected losses. This ratio is used in order to investigate the relationship between profitability and bank capitalization or in other words capital adequacy and solvency of the banks. Higher equity to assets ratio will reduce the need of external funding. On the other hand, lower capital ratios will increase the leverage and risk and therefore borrowing costs of banks. Because of these reasons, a positive relationship between profitability and equity to capital ratio is expected [17-19,24].

The second variable, ratio of loan loss provisions to gross loans is used as the proxy of credit risk or quality. A higher ratio represents insufficient credit management and a lower credit quality. A negative relationship is

expected between profitability and this ratio, since loan loss provisions reduce the profits of banks [18,21,23,25].

The ratio of liquid assets to short term liabilities is used to investigate the effect of liquidity risk on bank profitability. As the financial crisis periods prove, low liquidity ratios can easily cause bankruptcies. On the other hand, higher liquidity ratios usually generate lower rates of return. Thus, it could be expected that higher ratio of liquid assets to short term liabilities would be associated with lower profitability [17].

The ratio of total costs to total income is used as the proxy of efficiency of bank management and higher ratios reflect a less efficient management [17]. Therefore it is expected that total costs to total income ratio is negatively related to profitability [23].

Finally the variable of logarithm of total assets is used to investigate the effect of bank size on profitability. Size is considered as one of the important determinants of bank profitability [17]. Generally, a growing size has positive impacts on profitability to a certain extent. On the other hand, size could impact the profitability negatively, for banks that become extremely large due to bureaucratic and other reasons [21].

II.2.2. External Determinants

While the internal determinants are related to bank specific characteristics, the external determinants represent both industry and macroeconomic conditions [13,15,17,23]. In order to analyze the impacts of the industry characteristics on the profitability of banks, as a measure of concentration, Herfindahl–Hirschman Indexes (HHI) for credit, deposits and assets are used in the study.

Table.1. Variables Used In Analysis

Variables	Description
Dependent	
ROA	The return on assets (%)
ROE	The return on equity (%)
Independent	
Internal (Bank specific)	
EQ/ASS	Equity over total assets (%) (Proxy of capital adequacy)
LLP/GL	Loan loss provisions over gross loans (%) (Measure of credit risk)
LA/SL	Liquid assets over short term liabilities (%) (Measure of liquidity)
TC/TI	Total costs to total income (%) (measure of management efficiency)
LNTA	logarithm of total assets (proxy of size)
External (Industry specific and macroeconomic)	
HHI - Credits	Herfindahl–Hirschman Index for Credit
HHI - Deposits	Herfindahl–Hirschman Index for Deposits
HHI - Assets	Herfindahl–Hirschman Index for Assets
lnGDP	Logarithm of gross domestic product
INF	Annual percentage increases in the Consumer Price Index

On the other hand, logarithm of gross domestic product (GDP) and the inflation rate are used to examine the effects of macroeconomic conditions on bank profitability. It won't be wrong to say that GDP is the most commonly used measure of a country's economic activity. The GDP has substantial impacts on numerous factors which directly affects the supply and demand for loans and deposits. In recession periods with the decelerations in the GDP growth, credit quality deteriorates and defaults increase, therefore banks' profitability decreases [13,17]. On the other hand, in higher economic growth periods, banks generally lend more and charge higher margins. Based on these explanations, a positive relationship between GDP and bank profitability is expected [25]. Finally, inflation rate is another important macroeconomic factor affecting the profitability of banks [13, 17]. High inflation rates are generally related with high loan interests, and thus high profitability. On the other hand, if inflation is not anticipated banks may be slow in adjusting interest rates and this may lead to a faster increase of bank costs than bank revenues and negatively affect bank profitability

[26]. Table.1 lists the dependent and independent variables used in the study.

III. DATA and METHODOLOGY

In this study, the financial data of banks, industry characteristics data and macroeconomic data over the period 2005-2010 were used. As stated before, banks in Turkey operate under different ownership types such as state-owned banks, privately-owned banks, foreign banks founded in Turkey and foreign banks having branches in Turkey. Foreign banks having branches in Turkey were excluded from the study and the financial data of the remaining 26 commercial banks operating in Turkey and banking sector characteristics data were obtained from the statistical reports of The Banks Association of Turkey. On the other hand, the macroeconomic data were retrieved from the statistics of Turkish Statistical Institute. Table.2 shows the descriptive statistics of the variables and Table.3 reports the correlation between the dependent and independent variables.

Table.2. Descriptive Statistics

Variables	Mean	Std. Deviation	Minimum	Maximum
ROA (%)	2.1383	4.41161	-28.25	32.21
ROE (%)	11.7634	20.02664	-178.64	45.41
EQ/ASS (%)	20.4612	19.87859	3.93	85.75
LLP/GL (%)	17.4814	72.73738	0.00	467.37
LA/SL (%)	234.5074	1198.83102	13.97	14237.32
TC/TI (%)	75.4572	20.11601	7.75	144.65
LNTA (%)	6.5314	0.92754	4.41	8.10
HHI- Credits	938.0021	20.16454	918.08	970.70
HHI-Deposits	1098.9072	48.60699	1064.22	1180.40
HHI – Assets	1023.8115	20.53789	1002.36	1055.51
lnGDP	8.9150	0.07065	8.81	8.98
INF (%)	8.4700	1.43640	6.53	10.06

Table.3. Correlation Matrix

	ROA	ROE	EQ/ASS	LLP/GL	LA/SL	TC/TI	LNTA	HHI - Credits	HHI- Deposits	HHI - Assets	lnGDP
ROE	0.552**	1									
EQ/ASS	0.259**	-0.062	1								
LLP/GL	0.575**	0.078	0.608**	1							
LA/SL	-0.145	-0.104	0.462**	0.037	1						
TC/TI	-0.789**	-0.610**	-0.387**	-0.634**	0.031	1					
LNTA	0.049	0.260**	-0.605**	-0.166	-0.330**	-0.155	1				
HHI - Credits	-0.120	-0.161	-0.004	0.017	0.041	0.123	-0.099	1			
HHI - Deposits	-0.137	-0.165	0.013	0.021	0.001	0.045	-0.082	0.833**	1		
HHI - Assets	-0.042	-0.047	0.012	0.019	-0.002	-0.138	0.026	0.132	0.489**	1	
lnGDP	0.066	0.100	0.028	-0.010	-0.087	-0.137	0.134	-0.735**	-0.648**	0.076	1
INF	0.062	0.051	-0.028	-0.014	0.055	0.117	-0.006	0.011	-0.542**	-0.755**	0.027

**Significant at the 0.01 level (2-tailed)

In order to test the relationship between dependent and independent variables, the following model is considered:

$$y_{it} = \beta_0 + \beta_1 \text{EQ/ASS}_{it} + \beta_2 \text{LLP/GL}_{it} + \beta_3 \text{LA/SL}_{it} + \beta_4 \text{TC/TI}_{it} + \beta_5 \text{LNTA}_{it} + \beta_6 \text{HHI-Credits}_t + \beta_7 \text{HHI-Deposits}_t + \beta_8 \text{HHI-Assets}_t + \beta_9 \ln \text{GDP}_t + \beta_{10} \text{IR}_t + \epsilon_{it}$$

where y_{it} denoted the profitability, i refers to an individual bank, t refers to year, β_0 is a constant and ϵ_{it} is an error term.

Panel data analysis is performed in order to test this econometric model. Furthermore, Hausman specification test is conducted to make a choice between the fixed effects model and the random effects model. Since the result of the Hausman test for the dependent variable ROA indicates that the difference in coefficients between fixed effects and random effects is systematic ($p=0.0000$), fixed effects model is preferred in ROA regressions. On the contrary, for the model in which ROE is used as the measure of profitability, the Hausman test

reveals that the difference in coefficients between fixed effects and random effects is not systematic ($p=0.1276$), thus random effects model is used in ROE regressions.

IV. RESULTS

Table.4 reports the results of the panel data analysis. The results indicate that for the bank-specific characteristics, only the coefficients of the ratio of loan loss provisions to gross loans (LLP/GL) and the ratio of total cost to total income are statistically significant at 1% level when ROA is used as a measure of profitability. As expected, ratio of loan loss provisions to gross loans is negatively related to ROA. This result supports the findings of Sufian and Chong (2008), Kosmidou (2008), Alexiou and Sofoklis (2009) and Athanasoglou et al. (2008) [13,17,19,21]. The findings prove the fact that there is a negative relationship between profitability and credit risk. According to these results, bank managers should adopt risk-averse strategies that improve screening and monitoring credit risk in order to maximize their profits [21].

Table.4. Panel Results for ROA and ROE as Dependent Variables

	ROA (FE)	ROE (RE)
Constant	61.59616 (1.32)	331.0754 (1.52)
Internal (Bank specific)		
EQ/ASS	-0.0356213 (-0.57)	-0.4386918* (-3.73)
LLP/GL	-0.0102941* (-4.97)	-0.0266555* (-3.10)
LA/SL	-0.0002423 (-1.26)	0.0006328 (0.65)
TC/TI	-0.2376* (-11.87)	-0.9896359* (-11.44)
LNTA	-3.217202 (-1.42)	-3.979207** (-1.69)
External (Industry specific and macroeconomic)		
HHI - Credits	0.2035024** (1.94)	0.487852 (0.90)
HHI - Deposits	-0.1120949** (-1.95)	-0.2905355 (-0.98)
HHI - Assets	-0.0272828 (-1.60)	-0.1501113** (-1.66)
lnGDP	-4.872251 (-0.69)	-17.0675 (-0.60)
INF	-1.788534* (-1.70)	-4.829293 (-0.89)
Number of Observations	156	156
R ² within	0.6219	0.5241
R ² between	0.3963	0.6208
R ² overall	0.5101	0.5417
Prob (F Statistic)	0.0000	0.0000
Hausman Test (p-value)	0.0000	0.1276

Values in parentheses are t statistics for the fixed effects model and z statistics for the random effects model.

*Significant at the 0.01 level, **Significant at the 0.10 level

The results reveal that ratio of total cost to total income which is used as the proxy of efficiency of bank management has a negative and statistically significant relationship with ROA, as expected. This is consistent with the findings of Kosmidou (2008), Alexiou and Sofoklis (2009), Athanasoglou et al. (2008) and Dietrich and Wanzenried (2011) [17,19,21,23]. This result indicates that efficient cost management is one of the prerequisites of improving profitability. Typically, the most competitive banks have low cost to income ratios meaning that they have low expenses for a given level of output [19]. On the other hand, results of the study indicate that the coefficients of the ratio of equity to assets, liquid assets to short term liabilities ratio and logarithm of total assets are negative but not statistically significant in the ROA specification of the profitability. Turning to the model in which ROE is the dependent variable, all of the bank specific variables except liquid assets to short term liabilities ratio, are negatively and significantly related to profitability.

Concerning the industry specific determinants, HHI for credits is positively related to ROA while HHI for deposits has a negative relationship with ROA. These findings imply that concentration in terms of credit has positive impacts on profitability. In contrast, concentration in terms of deposits causes declines in the banks' profitability. On the other hand, there is a negative but insignificant relationship between HHI for assets and profitability of banks.

For the macroeconomic determinants of bank profitability, the results show that inflation has significant and negative impacts on ROA. This finding is in line with the results of Herrero et al. (2009), Sufian and Chong (2008) and Kosmidou (2008) [13,14,17]. On the contrary, as a proxy of economic activity, logarithm of gross domestic product has a negative but insignificant relationship with profitability of banks.

On the other hand, according to the results of the other profitability measure ROE, except HHI for assets, the coefficients of all external determinants are statistically insignificant. Finally, there is a negative and statistically significant relationship between HHI for assets and ROE.

V. CONCLUSION

Financial performance performed by banks plays a significant role in assuring and maintaining stability of the countries' economic systems. Especially, in the developing countries, since banks serve as fundamental financial intermediations, performance of the sector directly affects the economic development.

In this paper, the factors influencing the profitability of Turkish commercial banks in terms of ROA and ROE are analyzed by using a panel data set over the period 2005-2010. In line with the literature, the determinants of bank profitability categorized into two groups, namely internal (bank specific) determinants and external (industry specific and macroeconomic) determinants.

As bank specific determinants of profitability; the ratio of equity to total assets, the ratio of loan loss provisions to gross loans, the ratio of liquid assets to short term liabilities, the ratio of total costs to total income and finally, logarithm of total assets are used. On the other hand, Herfindahl-Hirschman Index (HHI) for credit, deposits and assets, logarithm of GDP and inflation are considered as the external determinants used in the study.

The results indicate that the ratio of loan loss provisions to gross loans (as a proxy of credit risk) and the ratio of total costs to total income (as a measure of management efficiency) have statistically significant and negative relationships with ROA. These results are in line with the previous literature and imply that banks can improve their profitability through enhancing their credit risk management and cost management functions. On the other hand, the findings for the industry specific determinants are mixed. According to the results, HHI for credits is positively related to ROA while HHI for deposits has a negative relationship. Concerning macroeconomic determinants, the findings show that inflation is negatively and significantly related to bank profitability.

Finally, for the ROE specification of profitability, all of the bank specific variables, except liquid assets to short term liabilities ratio, are negatively and significantly related to profitability and for the external determinants, only the coefficient of HHI for assets is statistically significant. In the light of these results, it is possible to say that for ROE, external determinants, especially macroeconomic determinants have limited effects on profitability.

Future research could investigate differences in the determinants of Turkish commercial banks' profitability according to their ownership types. Also, a comparison could be made with commercial banks of other countries which have similar economic conditions with Turkey.

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Halil Emre AKBA

(eakbas@yildiz.edu.tr)

He has received his Ph.D. from Marmara University Social Sciences Institute. He is instructor at Yıldız Technical University. His research areas include financial markets, financial reporting and managerial accounting.