

## Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey

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**Abstract:** The aim of this study is to examine the bank-specific and macroeconomic determinants of the banks profitability in Turkey over the time period from 2002 to 2010. The bank profitability is measured by return on assets (ROA) and return on equity (ROE) as a function of bank-specific and macroeconomic determinants. Using a balanced panel data set, the results show that asset size and non-interest income have a positive and significant effect on bank profitability. However, size of credit portfolio and loans under follow-up have a negative and significant impact on bank profitability. With regard to macroeconomic variables, only the real interest rate affects the performance of banks positively. These results suggest that banks can improve their profitability through increasing bank size and non-interest income, decreasing credit/asset ratio. In addition, higher real interest rate can lead to higher bank profitability.

**Keywords:** Bank profitability, Commercial banks, Turkish banking sector

**JEL Classification:** G21, M20

### 1. Introduction

Financial intermediaries perform key financial functions in economies; provide a payment mechanism, match supply and demand in financial markets, deal with complex financial instruments and markets, provide markets transparency, perform risk transfer and risk management functions.

Banks are the most important financial intermediaries in the most economies that provide a bundle of different services. As financial intermediaries, banks play a crucial role in the operation of most economies. The efficiency of financial intermediation can also affect economic growth. Besides, banks insolvencies can result in systemic crisis. Economies that have a profitable banking sector are better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou, Brissimis and Delis, 2005). Therefore, it is important to understand the determinants of banking sector profitability.

The Turkish banking system has traditionally occupied an important position in Turkish financial system which is based on universal banking framework that legally authorizes commercial banks to service various kinds of activities in financial markets. Most of transactions and activities of money and capital markets are carried out by

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banks and the banking sector is most important mechanism to finance economic growth in Turkey.

Banks in Turkey became more open to these kinds of risks particularly in the financial liberalization period after 1980. As a result of various financial risks, financial crises in 1994, 2000 and 2001 occurred and they showed how important risk management is to the financial institutions and the businesses in the real sector. After the 2001 Crisis, the Rehabilitation Program was launched by Turkish Banking Regulation and Supervisory Agency. State and private banks were restructured and profitability and stability of Turkish banking system increased with the help of this program (Aysan and Ceyhan, 2006).

The recent global economic crisis had a considerable impact on Turkish real economy, in particular, starting from the last quarter of 2008. However, effects of the global crisis on Turkish Banking Sector remained relatively limited compared to its peers in developed and other developing countries (Aras, 2010; Yorukoglu and Atasoy, 2010). This has been mainly due to the post-2001-crisis restructuring program, several structural and fundamental features of the sector itself and the macroeconomic policies of the Central Bank of Turkey (Yuce, 2009). The profitability of Turkish banks generally increased during the crisis.

As macroeconomic and legal environment changes, determinants of profitability banking sector might change as well. This paper attempts to examine the determinants of the profitability of commercial banks over the period 2002-2010, in Turkey. The rest of the paper is organized as follows: Section 2 provides a background of the existing literature, relating bank profitability to its determinants. Section 3 describes research methodology; variables, data and research method, while Section 4 presents and analyses the empirical results. Conclusions are offered in the final section.

## **2. Literature Review**

Early studies on bank profitability were provided by Short (1979) and Bourke (1989). Then, in order to identify the determinants of bank performance, numerous empirical studies were held. In recent literature, the determinant of bank profitability is defined as a function of internal and external determinants. Internal determinants are related to bank management and termed micro or bank specific determinants of profitability (Gungor, 2007). The external determinants are reflecting economic and legal environment that affects the operation and performance of banks. According to the nature and purpose of each study, different variables could be used. Among the internal determinants, there are bank specific financial ratios representing capital adequacy, cost efficiency, liquidity, asset quality, and size. Economic growth, inflation, market interest rates and ownership are external determinants that affect bank profitability.

In literature, some empirical studies on the bank profitability have focused on a specific country, while others have concentrated on a panel of countries. For example, the studies aimed at explaining bank profitability in a single country include the US (Berger, 1995; Angbazo, 1997), Colombia (Barajas et al., 1999), Malaysia (Guru, Staunton and Balashanmugam, 2002), Brazil (Afanasieff et al., 2002), Greece

(Mamatzakis and Remoundos, 2003; Kosmidou, 2006), Tunisia (Naceur, 2003), India (Badola and Verma, 2006), China (Heffernan and Fu, 2008), Taiwan (Ramlall, 2009), Switzerland (Dietrich and Wanzenried, 2009), Pakistan (Javaid, Anwar, Zaman and Gafoor, 2011), Japan (Lui and Wilson, 2010), and Korea (Sufian, 2011).

Berger (1995) investigates the relationship between the return on equity and the capital asset ratio for a sample of US banks for a the 1983-1992 time period and find positive relationship between two variables. Angbazo (1997) examines net interest margin for a sample of US banks for the 1989-2003 time period and find that management efficiency, default risk, opportunity cost of non-interest bearing reserves and leverage are positively associated with bank interest margin.

In Colombian case, Barajas et al. (1999) examines the effects of financial liberalization on banks' interest margin. After liberalization, is found that loan quality increased and overall spread has not declined, the relevance of the different factors behind the bank spreads are affected by such measures. Guru et al. (2002) studies on a sample of seventeen commercial bank 1986-1995 time period in Malaysia. In this study, it is found that efficient expenses management is one of the most significant in explaining high bank profitability, high interest ratio is associated with low bank profitability and inflation is found to have positive effect on bank performance.

Mamatzakis and Remoundos (2003) show that the variables that are directly related to the strategic planning of the banks (i.e. personnel expenses, loans to assets ratio, equity to assets ratio) are the ones that mainly explain profitability. They reported that economies of scale play a significant role in the market, and has a positive impact on profitability. In the study, Mamatzakis and Remoundos also find that the size of the market, an external variable, defined by the supply of money, significantly influences profitability.

Afanasieff et al. (2002) examines the determinants of banks interest spreads using macro and micro variables in Brazil and find that macroeconomic variables have the most impact on bank interest spread in Brazil. Naceur (2003) investigates the impact of banks characteristics, final structure and macroeconomic indicators on banks net interest margin and profitability in Tunisian Banking Industry for the 1983-2000 period. High net interest margin and profitability tend to be associated with banks that hold o relatively high amount of capital, and with large overheads. Naceur finds that inflation and growth rates have negative and stock market development has positive impact on profitability and net interest margin.

The research in Switzerland, Dietrich and Wanzenried (2009) find that significant differences in profitability between commercial banks and these differences can to a large extent be explained by the factors included in analysis. It is found that, better capitalized bank seem to be more profitable. Also, in case that a bank's loan volume is growing faster than the market, the impact on bank profitability is positive. They find that banks with a higher interest income share are less profitable. The most important factors are the GDP growth variable, which affects the bank profitability positively, and the effective tax rate and the market concentration rate, which both have a significantly negative impact on bank profitability in Switzerland.

In Pakistan case, Javaid et al. (2011) find higher total assets may not necessarily lead to higher profits due to the diseconomies of scale and higher loans contribute towards profitability but their impact is not significant. Also it is found that equity and deposits have significant impact on profitability.

Some studies aimed at analyzing bank profitability in groups of countries, such as Molyneux & Thornton (1992), Demircuc-Kunt and Huizinga (1999, 2001), Abreu & Mendes (2001), Bashir (2000), Hassan and Bashir (2003), Athanasoglou, Delis and Stakouras (2006).

Molyneux and Thornton (1992) were the first to investigate a multi-country setting by examining the determinants of bank profitability for a panel of 18 European countries for the 1986-1989 time period. It is found that significant positive association between the return on equity and the level of interest rates in each country, bank concentration and government ownership.

Demircuc-Kunt and Huizinga (1999) examine the determinants of bank profit and net interest margins, using a comprehensive set of bank specific characteristics, as well as macroeconomic conditions, taxation, regulations, financial structure and legal indicators for 80 countries, both developed and developing, in the 1988-1995 period. It is found that foreign banks have higher profitability than domestic banks in developing countries, while the opposite holds in developed countries. Nevertheless, their overall results show support for the positive relationship between the capital ratio and financial performance.

The study is followed by Abreu and Mendes (2001), and examines the determinants of bank's interest margins and profitability for some European countries. It is found that well-capitalized banks have lower expected bankruptcy costs and better profitability.

In the other multi-country studies, Bashir (2000), Hassan and Bashir (2003) examine the determinants of Islamic banks' performance. Bashir (2000) reports that higher leverage and large loans to asset ratios. It is found that taxation has negative, macroeconomic setting and stock market development have positive impact on banks profitability. Hassan and Bashir (2003) investigate profitability for a sample of Islamic banks from 21 countries. They show that a higher loan ratio actually impacts profits negatively.

Athanasoglou, Delis and Stakouras (2006) have analyzed the effect of selected set of determinants on banks profitability in the South Eastern European region over 1998-2002 period. It is found that concentration is positively correlated with bank profitability and inflation has a strong effect on profitability while banks profits are not significantly affected by real GDP per capita fluctuations.

In the literature on determinants of banks profitability in Turkey, there are some studies. According to the study by Kaya (2002), equity to assets affects ROA ratio positively while affecting ROE negatively. Furthermore, real interest rate, ratio of securities to total assets, share of the bank in total assets of the sector and open foreign currency position have positive impact on ROE while budget deficit of the public

sector and ratios of credits and liquid assets to total assets affect both ROA and ROE positively. On the other hand, net non-performing loans affects ROA negatively while ratios of staff expenditures and deposits to total assets affect both ROA and ROE negatively.

Tunay and Silpar (2006) investigates profitability of the Turkish banking sector in the period of 1988-2004. It is found that the ratios of equity, non-interest expenditures to total assets, national income and concentration ratio have positive impact on ROE and that the ratio of deposits to stock market capitalization have negative impact on both ROE and ROA.

Atasoy (2007) examines profitability determinants and expenditure-income structure of Turkish banking sector between 1990 and 2005. Atasoy determines that ROA is affected positively by the ratio of equity and total assets and inflation rate positively and negatively by concentration ratio in the banking sector, ratio of banking sector asset size to national income and ratios of fixed assets and special provisional costs to total assets.

Sayilgan and Yildirim (2009) investigates the relationship between the return on assets and the return on equity ratio for a sample of Turkish banks for the 2002-2007 time period using monthly data. The profitability of the banking sector seems to have increased along with declining inflation rate, consistently increasing industrial production index and improving budget balance. It is found that profitability positively affected by capital adequacy and negatively by growing off-balance sheet assets.

The results of the studies differ significantly due to the variation of the environment and data included in the analysis. However, there are common factors influencing profitability identified by several researchers. Summarizing the results from numerous studies, various measures of costs are generally negatively correlated with profits. Larger bank size, greater dependence upon loans for revenue, higher market concentration, greater GDP growth and higher proportion of equity capital to asset have generally been associated with greater profitability. Higher liquidity, greater provisions for loan losses and more reliance on debt have been lower indicative of lower bank profits (Olson and Zoubi, 2011).

### **3. Research Methodology**

#### **3.1. Variables**

In the empirical study, in order to analyze the determinants of commercial bank profitability, we include thirteen variables, two of them are the dependent and the others are as explanatory variables. The independent variables are divided two sub-categories as bank-specific and macroeconomic determinants of bank profitability.

##### ***Dependent Variables***

In the literature, banks profitability, typically measured by return on asset (ROA), return on equity (ROE), net interest margin (NIM). ROA is defined as net profit divided by total assets and is expressed in percent. NIM reflects the difference between interest income and interest expense as a percentage of total assets.

In this study, we use two measures of bank's profitability: return on assets (ROA) and return on equity (ROE). ROA is a general measure for bank profitability reflects bank ability to achieve return on its sources of fund to generate profits. The second measure ROE is defined as net profit divided by shareholders' equity and is expressed in percent.

### ***Bank-Specific Independent Variables***

Bank specific determinants as internal factors are determined by bank's management decisions and policy objectives, such as asset size, capital adequacy, asset quality, liquidity, deposit and income-expenditure structure. We use the following eight bank-specific characteristics as internal determinants of bank profitability:

- **Asset size:** In most finance literature, total assets of the banks are used as a proxy for bank size. Bank size is represented by natural logarithm of total asset ( $\log A$ ). The effect of bank size on profitability is generally expected to be positive (Smirlock, 1985).
- **Capital adequacy:** The ratio of equity to total assets (CA) is considered one of the basic ratios for capital strength. It is expected that the higher this ratio, the lower the need for external funding and the higher the profitability of the bank. It shows the ability of bank to absorb losses and handle risk exposure with shareholder. Equity to total assets ratio is expected to have positive relation with performance that well-capitalized banks face lower costs of going bankrupt which reduces their costs of funding and risks (Berger, 1995; Bourke, 1989; Hassan and Bashir, 2003).
- **Asset quality:** Regarding asset quality we use two ratio: loans to total assets (LA) and loans under follow-up (net) to total loans (LFA). Loans to total assets ratio is a measure of income source of banks and it is expected to affect profitability positively unless bank takes on unacceptable level of risk. Loans under follow-up (net) (Loans under follow up - specific provisions) to total loans ratio is one of the important measure of asset quality and reflects changes in the health of bank's loan portfolio that affects performance of bank negatively (Aydogan, 1990). The higher the ratio the poorer the quality and therefore the higher the risk of the loan portfolio will be.
- **Liquidity:** The ratio of liquid assets to total assets (LQD) is used in this study as a measure of liquidity. The higher this percentage the more liquid the bank is. Insufficient liquidity is one of the major reasons of bank failures. However, holding liquid assets has an opportunity cost of higher returns. Bourke (1989) finds a positive significant link between bank liquidity and profitability. However, in times of instability banks may chose to increase their cash holding to mitigate risk. Unlike Bourke (1989), Molyneux and Thorton (1992) come to a conclusion that there is a negative correlation between liquidity and profitability levels.
- **Deposits:** Deposits are the main source of banks funding and are the lowest cost of funds. The more deposits are transformed into loans, the higher the interest margin and profit. Therefore deposits have positive an impact on profitability of the banks.

- **Income-expenditure structure:** In the study, regarding income-expenditure structure, net interest margin (NIM) and non-interest income (NII) ratios are used. Net interest margin measures a bank's net interest spread and is defined as net interest income to total assets. Net interest margin is focused on the profit earned on interest activities and is an important measure of bank efficiency. Non-interest income is measured by non-interest income (net) (to total assets. Non-interest income include generated from net fees and commissions income/ expenses, dividend income, trading profit/loss(net), other operating income.

#### ***Macroeconomic Independent Variables***

Banks profitability is expected to be sensitive to macroeconomic variables. In the literature in terms of external determinants, generally three macroeconomic variables are used: Annual real gross domestic product growth rate (GDP), annual inflation rate (INF) and real interest rate (RI). In our study we use GDP, INF and RI, too.

- **Annual real GDP growth rate:** It is a measure of the total economic activity and it is adjusted for inflation. It is expected to have an impact on numerous factors related to the demand and supply for banks deposits and loans. According to the literature on the association between economic growth and financial sector profitability, GDP growth is expected to have a positive relation on bank profitability (Demirguc-Kunt and Huizinga, 1999; Bikker and Hu, 2002). In this context, we expect a positive relationship between bank profitability and GDP development as the demand for lending is increasing (decreasing).
- **Annual inflation rate:** This measures the overall percentage increase in Consumer Price Index (CPI) for all goods and services. Inflation affects the real value of costs and revenues. The relationship between the inflation and profitability may have a positive or negative effect on profitability depending on whether it is anticipated or unanticipated (Perry, 1992). If an inflation rate is anticipated, banks can adjust interest rate in order to increase revenues than costs. On the contrary, if inflation rate is not anticipated, banks can not make proper adjustments of interest rate that costs may increase faster than revenues. But most studies observe a positive impact between inflation and profitability (Bourke, 1989; Molyneux and Thorton 1992; Hassan and Bashir 2003; Kosmidou, 2006) and that we expect to be positive in this study.
- **Real interest rate:** Referring to previous studies, there is a positive relationship between interest rates and banks performance, bank profits increase with rising interest rates (Samuelson 1945). Real interest rate is calculated by Fisher equation.

Table 1 shows the definitions and notation of all variables.

**Table 1. Definitions and Notation of the Variables**

	Variable	Measure	Notation
Dependent Variables	Profitability	Return on Assets (RAO) = Net Profit/Total Assets	ROA
		Return on Equity (ROE) = Net Profit/Equity	ROE
Bank-Specific Independent Variables	Asset Size	Natural Logarithm of Total Assets	logA
	Capital Adequacy	Equity / Total Assets	CA
	Asset Quality	Loans / Total Assets	LA
		Loans under Follow-up (net) / Total Loans	LFA
	Liquidity	Liquid Assets/Total Assets	LQD
	Deposit	Deposits/Total Assets	DP
Income-Expenditure Structure	Net Interest Margin = Net Interest Income/ Total Assets	NIM	
	Non-Interest Income = Non-Interest Income /Total assets	NII	
Macroeconomic Independent Variables	Economic Activity	Annual Real GDP Growth Rate	GDP
	Inflation	Annual Inflation Rate (Consumer Price Index, CPI)	INF
	Interest Rate	Real Interest Rate	RI

### 3.2. Data and Research Method

Our sample is a balanced panel dataset of 10 commercial banks observed over the period 2002 - 2010 consisting of 90 observations. Because of using all bank-specific variables for the banks in the entire period, commercial banks which shares are traded on the Istanbul Stock Exchange (ISE) from 2002 through 2010 are included to the study. The bank-specific variables are derived from income statements and balance sheets of commercial banks. The financial statement data is collected from Statistical Bulletin of Banking Regulation and Supervision Agency (BRSA), websites of the banks and Istanbul Stock Exchange. With regard to the macroeconomic variables, the data of economic growth, inflation rate and interest rates are obtained from Turkish Statistical Institute. The real interest rate is calculated by Fisher equation.

To examine the determinants of bank profitability, we use panel data. A data set that comprises both time series and cross-sectional elements is known as a panel of data or longitudinal data. In panel data models, the data set consists of  $n$  cross-sectional units, denoted  $i = 1, \dots, N$ , observed at each of  $T$  time periods,  $t = 1, \dots, T$ . In data set, the total observation is  $nxT$ . The basic framework for the panel data is defined according to the following regression model (Brooks, 2008):

$$y_{it} = \alpha + \beta' x_{it} + u_{it}$$

where  $y_{it}$  is the dependent variable,  $\alpha$  is the intercept term,  $\beta$  is a  $k \times 1$  vector of parameters to be estimated on the explanatory variables, and  $x_{it}$  is a  $1 \times k$  vector of observations on the explanatory variables,  $t = 1, \dots, T$ ;  $i = 1, \dots, N$ .

Panel data models are usually estimated using either fixed effects or random effects models. In the fixed effects model, the individual-specific effect is a random variable that is allowed to be correlated with the explanatory variables. The rationale behind random effects model is that, unlike the fixed effects model, the individual-specific effect is a random variable that is uncorrelated with the independent variables included in the model. The fixed effects model is an appropriate specification if we are focusing on a specific set of N firms and our inference is restricted to the behavior of these sets of firms (Baltagi, 2005). Also, in order to find which of these models is the most appropriate, the Hausman test can be conducted. In this study, the fixed effects model is used.

## 4. Results

### 4.1. Descriptive Statistics

The basic descriptive statistics of the variables are presented in Table 2. For each variable, Table 2 shows mean, standard deviation, minimum and maximum value. On average, banks in our sample have a return on assets ROA of 1.9% and return on equity ROE 14% over the entire time period from 2002 to 2010. The mean of ROE varies greatly across banks and periods, the standard deviation of ROE is 23%, minimum and maximum values are -178% and 62%, respectively. When the mean of capital adequacy ratio (CA) is 11%, minimum value is 2.6% and maximum value is 21.9%. Averages of loans/assets ratio (LA) and deposits/assets (DP) are approximately 50% and 62%, respectively. Liquidity ratio which is one of the important ratios for the banks amounts to 31.5% on average, while it varies between 8.6% and 56.5%. The net interest margin (NIM) amounts to 4.9% on average and non-interest income/assets ratio (NII) amounts to 3.5% on average, for commercial banks in the sample. On the other hand, Table 2 reports the mean of macroeconomic variables over the year 2002 through 2010. The average growth rate of real GDP is approximately 6% (minimum -4.8% in year 2009 and maximum 9.4% in year 2004). When the mean of inflation rate is 11.8%, real interest rate has an 8% mean value for 2002-2010 periods.

**Table 2. Descriptive Statistics for Variables**

	Mean	Std. Dev.	Min.	Max.
ROA	0.0191	0.0304	-0.126	0.241
ROE	0.1423	0.2333	-1.786	0.618
logA	23.3715	1.3927	20.802	25.739
LQD	0.3154	0.1107	0.086	0.565
LA	0.4963	0.1322	0.234	0.752
LFA	0.0524	0.0440	0.003	0.221
DP	0.6209	0.0731	0.457	0.829
CA	0.1143	0.0341	0.026	0.219
NIM	0.0487	0.0160	0.001	0.095
NII	0.0348	0.0265	-0.007	0.145
GDP	0.0578	0.0405	-0.048	0.094
INF	0.1180	0.0721	0.064	0.297
RI	0.0823	0.0389	0.016	0.155

Correlation matrix between independent variables is presented in Table 3. As seen in Table 3, there are fairly low data correlations among the independent variables, except between inflation (INF) and real interest rate (RI). These low correlation coefficients show that there are have no multicollinearity problem.

**Table 3. Correlations between Independent Variables**

	logA	LQD	LA	LFA	DP	CA	NIM	NII	GDP	INF	RI
logA	1.00										
LQD	0.32	1.00									
LA	-0.13	-0.39	1.00								
LFA	-0.18	-0.22	-0.39	1.00							
DP	-0.22	-0.30	-0.11	0.39	1.00						
CA	0.24	0.24	0.16	-0.09	-0.33	1.00					
NIM	-0.12	0.13	0.15	0.11	0.18	0.24	1.00				
NII	0.08	0.18	-0.56	0.44	-0.01	0.18	-0.17	1.00			
GDP	-0.09	0.10	-0.15	-0.11	-0.13	-0.22	-0.19	0.14	1.00		
INF	-0.26	0.04	-0.65	0.31	0.25	-0.26	-0.11	0.31	0.09	1.00	
RI	-0.27	0.06	-0.54	0.16	0.10	-0.27	0.08	0.23	0.19	0.70	1.00

#### 4.2. Empirical Results from Panel Data Analysis

Tables 4 and 5 show the estimated parameters and t-statistics obtained from the application of fixed effects model, using ROA and ROE, respectively, as the dependent variable. Bank size (logA) is highly significant and positively related to ROA at 1% level of significance. This positive relationship shows that the size of the bank have significant positive impact on profitability. Non-interest income (NII) is found to be significantly affecting the profitability of commercial banks measured by ROA. The results show that the impact of loans/assets ratio (LA) and loans under follow-up/loans ratio (LFA) have a negative impact on profit and significant at 5% level of significance. As for the other bank-specific variables, namely liquidity, deposit volume, capital adequacy and net interest margin, they all show no impact on bank profitability. The macroeconomic variables are not found to have a significant impact on banks' return on assets.

**Table 4. Determinants of Return on Assets (ROA)**

	Coef.	Std.Err.	t	P >  t
logA	0.0348	0.0128	2.72	0.008*
LQD	0.0326	0.0510	0.64	0.524
LA	-0.1276	0.0604	-2.11	0.038**
LFA	-0.2914	0.1162	-2.51	0.015**
DP	-0.0179	0.0689	-0.26	0.796
CA	0.1735	0.1562	1.11	0.271
NIM	-0.0612	0.1914	-0.21	0.834
NII	0.3969	0.2107	1.88	0.064***
GDP	-0.0994	0.0865	-1.15	0.255
INF	0.1292	0.0800	1.61	0.111
RI	0.0251	0.1399	0.18	0.858
Constant	-0.7574	0.3190	-2.37	0.020

Note: \*, \*\* and \*\*\* indicate significance level of 1%, 5% and 10% respectively.

Bank size (logA) shows a positive and significant relationship with profitability, when ROE is used as the dependent variable. Other bank-specific variables do not seem to present any significant effect on return on equity. Among macroeconomic variables, only real interest rate is found to be significantly affecting ROE at 5% level of significance. There is not found relationships between ROE and real GDP growth rate and inflation.

**Table 5. Determinants of Return on Equity (ROE)**

	Coef.	Std.Err.	t	P >  t
<b>logA</b>	0.3026	0.1005	3.01	0.004*
<b>LQD</b>	0.0432	0.3999	0.11	0.914
<b>LA</b>	-0.6193	0.4737	-1.31	0.195
<b>LFA</b>	-1.0435	0.9121	-1.14	0.257
<b>DP</b>	-0.0894	0.5407	-0.17	0.869
<b>CA</b>	0.9828	1.2260	0.80	0.426
<b>NIM</b>	-0.4928	2.2868	-0.22	0.830
<b>NII</b>	0.7749	1.6533	0.47	0.641
<b>GDP</b>	-0.3381	0.6786	-0.50	0.620
<b>INF</b>	1.0085	0.6279	1.61	0.113
<b>RI</b>	1.8639	1.0980	1.70	0.094**
<b>Constant</b>	-6.8940	2.5032	-2.75	0.008

Note: \*, \*\* and \*\*\* indicate significance level of 1%, 5% and 10% respectively.

## 5. Conclusions

Profitability is an important criterion to measure the performance of banks, especially in the changing environment of banking. This study examines the determinants of commercial bank profitability in Turkey. For this aim, panel data method (fixed effects model) is applied to data which is obtained 10 banks' financial statements from 2002 to 2010. We find that asset size has a positive and significant effect on profitability. It suggests that larger banks achieve a higher ROA and ROE. Also, the positive and significant coefficients of asset size variable provide evidence for the economies of scale theory. The ratios of loans/assets and loans under follow-up/loans are found negative and significant impacts on ROA. This indicates that credit portfolio volume and weak asset quality impact negatively return on asset. Bank loans are expected to be the main source of income and are expected to have a positive impact on bank performance. However it is found a negative relationship between loans and profitability. Another bank-specific variable, non-interest income/assets ratio has a positive and significant effect on ROA. This indicates that greater bank activity diversification positively influence returns. On the macroeconomic variables, only real interest rate is found to having positive affect on profitability, as measured by ROE. When real interest rates are higher, return on equity of banks rises. The remaining bank-specific factors (capital adequacy, liquidity, deposits/assets ratio and net interest margin) and macroeconomic factors (real GDP growth rate and inflation rate) have not important effect on bank profitability.

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