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Turkish Banking Sector's Profitability Factors

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ABSTRACT: The profitability of banking sector is the most important instrument of financial system for the future of the economy. The objective of this study is to determine by using Johansen and Juselius cointegration test approach of the bank specific and macroeconomic factors that affect the profitability of commercial banks in Turkish banking sector. In study, the data are collected from the three biggest state-owned, privately-owned and foreign banks. The sample period spans from 1998 to 2011. In the study, return of asset, return of equity and net interest margin were used as proxy for profitability of banks. The bank specific determinants, which were thought to have effects on profitability are total credits/total assets, total deposits/total assets, total liquid assets/total assets, total wage and commission incomes/ total assets, total wage and commission expenses/total assets, the logarithm of total assets and total equity/total assets. The macroeconomic determinants of study are real gross domestic product, inflation rate, real exchange rate and real interest rate. Empirical findings suggest that the bank specific determinants have been more effect than macroeconomic factors on profitability of the banks. The reel gross domestic product and real exchange rate have been effective on the profitability. In addition, the 2001 economic crisis has a negative effect on all Turkish Banking sector.

Keywords: Profitability of banking; banking performance; deposit banks; the net interest margin; time series analysis.
JEL Classifications: G21; M20

1. Introduction

The commercial banks are important financial institutions in the financial system and the economy. They accept demand deposits and make loans and provide other services for the public. These banks make a profit by intermediating between depositors (savers) and borrowers (investors). As financial intermediaries, banks play a crucial role in the operation of most economies. Banks require a good management team to enable them to segregate between different level of liquidity, maturity, and risk preferences. As such, the commercial banks must be able to evaluate a borrower's creditworthiness and monitor performance if they are to stay in profit (Ilhomovich, 2009).

The importance of bank profitability can be appraised at the micro and macro levels of the economy. At the micro level, profit is the essential prerequisite of a competitive banking institution and the cheapest source of funds. The basic aim of a bank's management is to achieve a profit, as the essential requirement for conducting any business. At the macro level, a profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. The importance of bank profitability at both the micro and macro levels has made researchers, academics, bank managements and bank regulatory authorities to develop considerable interest on the factors that determine bank profitability (Aburime, 2008).

Banking sector's financial soundness indicators are analyzed under four main titles which are banking activities, capital adequacy, asset quality, income-expenses and profitability. The banking sector's profitability potential will probably contribute to encouragement of investors, strengthening of the economic motion and the increase of global orientation to the sector. When the income-expenses and profitability ratios of the Turkish banking sector are analyzed, it is seen that the sector's profitability is in a sufficient level to maintain activities but the assets' income-creating ratios and profitability ratios are in a general decreasing tendency since 2008. Income increasing rates fell behind the increasing rates in the related assets, so the income-creating levels of assets seem to be reduced. Especially the net interest margin reflecting the net interest incomes to average assets ratio is decreasing. However, the sector's interest incomes to interest expenses coverage ratio is still high. As a matter of fact, interest incomes are 1.8 times bigger than interest expenses. Non-interest incomes to non-interest expenses ratio is under 100% which may be considered as a negative fact. The sector's non-interest incomes/non-interest expenses ratio is 63.1%, which is considered as a factor affecting the profitability negatively and it is deemed necessary to equilibrate the non-interest income-non-interest expense position. Within this framework, it is important to raise the operational productiveness and to give priority to policies regarding strategic collaboration. In the environment of recessed interest margins and ongoing competition, distribution channels shall be developed and customer-focused point of view shall be improved to sustain profitability (Financial Markets Report, 2011).

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 1998 to 2011. This paper is structured as follows: Section 2 includes the banking system in Turkey. Section 3 reviews the previous studies on profitability of banks and summaries the main determinants and relevant findings. Section 4 describes research methodology, variables and data. Section 5 presents the empirical results of analyses. Conclusions are offered in the final section.

2. The Banking System in Turkey

The number of banks operating in Turkey was 48 at the end of March 2012 with 31 in deposit banks group and 13 in non-deposit banks group, while there were also 4 participation banks (Table 1). Among deposit banks, there were 3 state-owned banks, 11 privately-owned banks and 16 foreign banks (TBB, 2012).

Table 1. Number of Banks and Branches in the System *

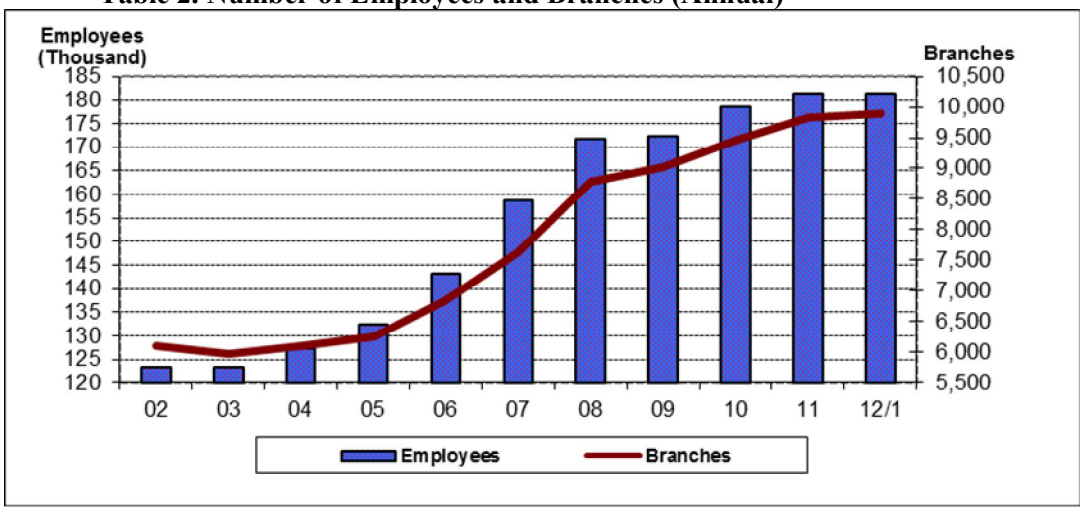
	March 2011		December 2011		March 2012	
	Banks	**Branches**	**Banks**	**Branches**	**Banks**	**Branches**
Deposit banks	**31**	**9,539**	**31**	**9,792**	**31**	**9,844**
State-owned banks	3	2,793	3	2,909	3	2,936
Privately-owned banks	11	4,896	11	4,944	11	4,969
Banks in the Fund**	1	1	1	1	1	1
Foreign banks	16	1,849	16	1,938	16	1,938
Development and investment banks	**13**	**42**	**13**	**42**	**13**	**42**
Total	**44**	**9,581**	**44**	**9,834**	**44**	**9,886**

* Branches in foreign countries and Turkish Republic of Northern Cyprus are included.
** Banks under the Deposit Insurance Fund
Source: The Banks Association of Turkey, 2012,
http://www.tbb.org.tr/eng/Banka_ve_Sektor_Bilgileri/Tum_Raporlar.aspx

The total number of branches in the deposit banks and development and investment banks increased by 305 to 9,886 at the end of March 2012 as compared to March 2011 and by 52 as compared to December 2011 (Table 2).

The number of branches increased by 27 in state-owned deposit banks and 25 in privately-owned deposit banks. The number of branches per bank was 318 in deposit banks. The number was 979 in state-owned deposit banks, 452 in privately-owned deposit banks and 121 in foreign banks. The average number of employees was 5,697 in deposit banks, 16,731 in state-owned banks, 8,115 in privately-owned banks and 2,307 in foreign banks.

Table 2. Number of Employees and Branches (Annual)



3. Literature Review

A large number of empirical studies covered developed economies have been conducted about factors influencing bank profitability or determinants of bank profitability. However, there is much less studies covered emerging economies (Al-Tamimi, 2010).

The determinants of banks' profitability are usually assorted into internal and external factors. These studies specify return on asset (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM) as the dependent variables and considering the internal and external factors as independent variables (Gul et al., 2011).

In most studies, variables such as the level of liquidity, provisioning policy, capital adequacy, bank size, risk and overhead costs are used as internal determinants of banking profitability. On the other hand, the external determinants, both industry-related and macroeconomic, are variables that reflect the economic and legal environment where the credit institution operates.

The following is a summary of the findings of some of these studies:

Mamatzakis and Remoundos (2003) examine the determinants of the performance of Greek commercial banks over the last decade. They measure the profitability of the commercial banks using the ratios return on assets (ROA) and return on equity (ROE). Their results provide weak evidence of the phenomenon of persistence in profitability. They report that the deregulation of the market in the last decade and the process of European integration with the introduction of the Euro have enhanced the competitiveness of the banking sector. On the strong side of the evidence, the variables related to management decisions are found to assert a major impact on the profitability of Greek commercial banks.

Athanasoglou et al. (2006) examine the profitability behaviour of bank-specific, industry-related and macroeconomic determinants, using an unbalanced panel dataset of South Eastern European (SEE) credit institutions over the period 1998-2002. The estimation results indicate that, with the exception of liquidity, all bank-specific determinants significantly affect bank profitability in the anticipated way. The macroeconomic environment has a direct impact on the aggregate performance of the industry. Concentration is positively correlated with bank profitability. With respect to the macroeconomic variables, inflation has a strong effect on profitability, while bank profits are not significantly affected by real GDP per capita fluctuations, probably owing to the small sample period. However, as financial systems develop and the reform process ends, both the current and future rates of economic growth are likely to have an enhanced impact on bank profitability.

Beckmann (2007) analyses structural and cyclical determinants of banking profitability in 16 Western European countries. The data set comprises aggregate annual country data and banking group data over the period 1979-2003. The estimation results show that financial structure matters, particularly through the beneficial effect of the capital market orientation in the respective national financial system. Furthermore, higher diversification regarding banks' income sources shows a positive effect. The industry concentration of national banking systems, though, does not significantly

affect aggregate profitability. Business cycle effects, in particular lagged GDP growth, display a substantial procyclical impact on bank profits.

Athanasoglou et al. (2008) examine the effect of bank-specific, industry-specific and macroeconomic determinants of bank profitability, using an empirical framework that incorporates the traditional Structure-Conduct-Performance (SCP) hypothesis. They apply a GMM technique to a panel of Greek banks that covers the period 1985-2001. The estimation results show that profitability persists to a moderate extent, indicating that departures from perfectly competitive market structures may not be that large. All bank-specific determinants, with the exception of size, affect bank profitability significantly in the anticipated way. However, no evidence is found in support of the SCP hypothesis. Finally, the business cycle has a positive, albeit asymmetric effect on bank profitability, being significant only in the upper phase of the cycle.

Flamini et al. (2009) use a sample of 389 banks in 41 Sub-Saharan Africa (SSA) countries to study the determinants of bank profitability. They find that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification, and private ownership. Bank returns are affected by macroeconomic variables.

Ilhomovich (2009) analyses the performance of domestic and foreign banks operating in Malaysia for the period of 5 years, from 2004 to 2008. He found that foreign banks have strong capital, but the statistics show that domestic banks more profitable. However, existing foreign banks are affecting financial services quality in Malaysia, because all banks offer better and low cost banking services for customer during strong competition.

Krakah and Ameyaw (2010) examine the determinants of the profitability of commercial banks in Ghana. Results from the study reveal that the performance of the Banks has been highly volatile with the banks recoding negative profits during some periods within the two decade under study. The study also revealed that non-interest income, non-interest expense, bank's capital strength, natural log of total assets, growth of money supply, and annual rate of inflation are significant key drivers of banks' profitability in Ghana. However, the size of the Ghanaian economy and loan loss provision or provisions for bad debt did not have any significant impact on the banks profitability.

Al-Tamimi (2010) investigates some influential factors in UAE's Islamic and conventional national banks during the period 1996-2008. The UAE Islamic banks have a small market share, though there is an increasing demand on their services. This might give a motivation to examine the influencing factors on the performance of these banks compared with conventional banks. ROE and ROA are used as dependent variables. The internal and external factors are considered as independent variables including: GDP per capita, size, financial development indicator, liquidity, concentration, cost and number of branches. The results indicate that liquidity and concentration were the most significant determinants of conventional national banks' performance. On the other hand, cost and number of branches were the most significant determinants of Islamic banks' performance.

Rasiah (2010) represents a theoretical review of the profitability of commercial banks. The profitability determinants are basically divided into two main categories, namely the internal determinants and the external determinants. The internal variables included in this study are asset portfolio mix, total expenses, liability composition, and liquidity ratio and capital structure. The external determinants are taken as competition, regulation, inflation, market share, market growth, firm size and interest rate. The internal variables alone are adequate in explaining the profitability of the commercial banks in Malaysia and Singapore. On the other hand, the external variables are also relevant and hence should be included in the profitability models.

Scott and Arias (2011) suggest that it is possible to discern relevant indicators of profitability for the banking industry today. The purpose of this study is to develop an appropriate econometric model whereby the primary determinants of profitability of the top five bank holding companies in the United States could be examined and understood. This study shows that profitability determinants for the banking industry include positive relationship between the return of equity and capital to asset ratio as well as the annual percentage changes in the external per capita income. The internal factor of size as measured by an organization's total assets has on its ability to compete more effectively, even in times of economic downturns.

Davydenko (2011) examines the determinants of bank profitability in Ukraine. It relates bank specific, industry specific and macroeconomic indicators to the overall profitability of Ukrainian banks. The study uses a panel of individual banks' financial statements from 2005 to 2009. According

to the empirical results, Ukrainian banks suffer from low quality of loans and do not manage to extract considerable profits from the growing volume of deposits. This study finds evidence for the difference in profitability patterns of banks with foreign capital versus exclusively domestically owned banks.

Gul et al. (2011) examine the relationship between bank specific and macroeconomic characteristics over bank profitability by using data of top fifteen Pakistani commercial banks over the period 2005-2009. They investigates the impact of assets, loans, equity, deposits, economic growth, inflation and market capitalization on major profitability indicators i.e., return on asset, return on equity, return on capital employed and net interest margin separately. The empirical results have found strong evidence that both internal and external factors have a strong influence on the profitability.

Shaher et al. (2011) evaluate the major factors that affect the commercial banks' performance in the Middle East region. The results revealed that the first factor (banks' characteristics) is considered the most important factor to banks' performance. On the contrary, the sixth factor (other factors) is considered the least important factor that influences commercial banks' performance in the Middle East region. The results suggest that commercial banks in Middle East region should concentrate on the six factors, mainly variables in the first factor, in order to improve their performance and compete efficiently with global commercial banks.

In addition, other empirical studies were made by Smirlock (1985), Miller and Noulas (1997), Tregenna (2009) for USD; Saunders and Schumacher (2000) for USD and the European Union; Jiang et al. (2003) for Hong Kong; Jeon and Miller (2004) for South Korea; Bodla and Verma (2006), Kalluru and Bhat (2008) for India; Sufian and Chong (2008) for Philippines; Vong and Chan (2009) for Macao; Sufian (2009) for Malaysia; Sufian and Habibullah (2009) for Bangladesh; Sufian (2009) for China.

Teker et al. (2011) measure financial performances of commercial banks of Turkey in the period of 2003 and 2010. The study covers 13 commercial banks of Turkey listed in Istanbul Stock Exchange. All banks for each year are ranked by employing the proposed indexing model. Moreover, the results of proposed performance measurement system are compared to annual net income and ROE of banks. Inclusion of nonfinancial factors such as higher customer satisfaction, effective management and leadership, using more advanced technology in banking operations etc. makes valuable contributions to the measurement of overall performance of banks rather than limiting the measurement by financials only.

Alper and Anbar (2011) examine the bank specific and macroeconomic determinants of the banks profitability in Turkey over the time period from 2002 to 2010. 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 performance of banks positively.

Other empirical studies for Turkey were made by Ozkul (2001), Kaya (2002), Kaya and Dogan (2005), Dinc (2006), Tunay and Silpagar (2006a), Tunay and Silpagar (2006b), Atasoy (2007), Serbetli (2008), Yildirim (2008), Arslan and Yaprakli (2008), Sayilgan and Yildirim (2009), Bumin (2009), Demirhan (2010), Alp et al. (2010).

4. Data, Methodology and Model

4.1. Data

In this study, three different models are used to determine factors that affect the profitability of commercial banks in Turkish banking sector. The data are collected from the three biggest state-owned, privately-owned and foreign banks. The sample period spans from 1998 to 2011. Annual balance sheet, income statement and macroeconomic data are gathered from the Banks Association of Turkey (BAT), the Istanbul Stock Exchange (ISE), Central Bank of the Republic of Turkey (CBRT), Public Disclosure Platform (PDP), OECD and IFS.

The state-owned bank is defined as "Bank 1". The privately-owned bank is defined as "Bank 2". The foreign bank is defined as "Bank 3". The dependent and explanatory variables are explained in Table 3.

Table 3. The Dependent and Explanatory Variables

Notation	The Dependent Variables	Measure
ROA	Return on Assets	Net Income / Total Assets
ROE	Return on Equity	Net Income / Total Equity
NIM	Net Interest Margin	Net Interest Income / Total Assets
	The Bank-Specific Explanatory Variables	
LOAN	Asset Quality	Total Loans / Total Assets
DEPOS	Deposit	Total Deposits / Total Assets
LQD	Liquidity	Liquid Assets / Total Assets
FCI	Income Structure	Fees and Commission Incomes/Total Assets
FCE	Expenditure Structure	Fees and Commission Expenses/Total Assets
CA	Capital Adequacy	Equity / Total Assets
LOGA	Asset Size	Natural Logarithm of Total Assets
	The Macroeconomic Explanatory Variables	
GDP	Economic Activity	Real Gross Domestic Product (2005=100)
RER	Exchange rate (50% $ + 50% €)	Real Exchange Rate (2005=100)
P	Inflation	Annual Inflation Rate (Consumer Price Index)
R	Interest Rate	Real Interest Rate

Source: ISE, PDP, BAT, CBRT, OECD, IFS

In the literature, profitability of banks is generally measured by return on asset (ROA), return on equity (ROE) and net interest margin (NIM).

The return on assets (ROA), which is the ratio of net income to total assets, measure how profitably and efficiently the management, is using the firm's total assets. On the other hand, the return on equity (ROE), which is the ratio of net income to total equity, would indicate returns to shareholders on the book value of their investments (Guru et al., 1999). The NIM variable is defined as the net interest income divided by total assets. NIM is focused on the profit earned on interest activities.

The loans to total assets ratio (LOAN) is a measure of income source of banks and it is expected to affect profitability positively unless bank takes on unacceptable level of risk. This ratio is one of the important measures of asset quality (Alper and Anbar, 2011). But, the coefficient of this ratio is also expected to be negative because bad loans are expected to reduce profitability.

The total deposit to total assets (DEPOS) ratio is a variable measuring the amount of deposits held by a bank proportional to its size. Deposits are banks' primary sources of funds that they can invest to generate income. Therefore, a positive correlation between ROA and deposits ratio is expected (Davydenko, 2010).

The results concerning liquidity [Liquid Assets/Total Assets, (LQD)] are mixed. Molyneux and Thorton (1992), and Guru et al. (1999) find a negative and significant relationship between the level of liquidity and profitability. However, Bourke (1989) and Kosmidou and Pasiouras (2005) find a significant positive relationship between liquidity and bank profits.

Fees and Commission Incomes (FCI) are called non-interest incomes in total assets. It would represent a key source of bank revenue in the future. The coefficient of this ratio is expected to be positive. Fees and Commission Expenses (FCE) are called non-interest expenses in total assets. The coefficient of this ratio is expected to be negative.

The equity to assets ratio (CA) is also included as a measure of the overall capital strength. The ratio is a measure of capital adequacy, and should capture the general average safety and soundness of the financial institutions. The theory of capital structure states that a higher use of debt (equity) financing within a certain range, called the target capital structure, might actually reduce (increase) firms' cost of capital. Thus a positive (negative) coefficient estimate for equity to assets indicates an efficient (inefficient) management of banks' capital structure. On the other hand, according to some authors the equity to assets ratio is negatively related to the total revenue dependent variable, since lower capital ratios should lead to higher bank revenues. A higher equity to assets ratio tends to reduce the risk of equity and therefore lowers the equilibrium expected return on equity required by investors. In addition, a higher equity to assets ratio lowers after tax earnings by reducing the tax shield provided by the deductibility of interest payments (Staikouras and Wood, 2004).

The asset size of bank is measured by natural logarithm of total assets. One of the most important questions in the literature is if there exists an optimal bank size in order to maximize bank profitability. It has been argued that a growing bank size is positively related to bank profitability. Larger banks are likely to have a higher degree of product and loan diversification than smaller banks. In addition to the higher diversification potential, economies of scale can also arise from a larger size. As diversification reduces risks and economies of scale lead to increased operational efficiency, we expect a positive effect of size on bank profitability. However, it is well known that banks that have become extremely large exhibit a negative relationship between size and profitability due to agency costs, bureaucratic processes and other reasons (Dietrich and Wanzenried, 2009). Firm size impacts negatively profitability of bank for large banks but positively for small ones (Vong and Chan, 2009).

Some of the recent literature emphasizes the importance of changes in macroeconomic conditions on bank performance. The common variables used include real gross domestic product (GDP), real exchange rate (RER), inflation rate (P), interest rate (R).

Revell (1979) notes that the effect of inflation on bank profitability depends on whether the wages of banks' and other operating expenses increase at faster rate than inflation. Perry (1992) suggests that the extent to which inflation affects bank profitability depends really on whether inflation expectations are fully anticipated. If the bank fully anticipates the inflation rate, then this implies that it can accordingly adjust its interest rates in order to increase their revenues faster than their costs and thus acquire higher economic profits. Previous studies have reported a positive relationship between inflation or long-term interest rate and profitability (Li, 2007). High inflation rates are generally associated with high loan interest rates, and therefore, high incomes. However, if inflation are not anticipated and banks are sluggish in adjusting their interest rates then there is a possibility that bank costs may increase faster than bank revenues and hence adversely affect bank profitability. The GDP per capital growth is expected to have a positive impact on bank's performance (Naceur, 2003). Demirguc-Kunt and Huizinga (1999) show that rapid economic growth increase profitability for a large number of countries.

Foreign Exchange risk arises when a bank holds assets or liabilities in foreign currencies and impacts the earnings and capital of bank due to the fluctuations in the exchange rates. No one can predict what the exchange rate will be in the next period, it can move in either upward or downward direction regardless of what the estimates and predictions were. This uncertain movement poses a threat to the earnings and capital of bank, if such a movement is in undesired and unanticipated direction (Maroof Hussain, 2011).

4.2. Methodology

The long-run relationship between the bank specific and macroeconomic explanatory variables and profitability variables will be examined by using time series econometric methods. All of the series in model are seasonally adjusted to remove the seasonal effects by using Census X-12 seasonal adjustment method and then, they are transformed with their natural logarithms to reduce heteroscedasticity. Firstly we will define the order of integration in series by using unit root test. This is accomplished by performing the augmented Dickey-Fuller (ADF) test. Testing the stationarity of economic time series is of great importance since standard econometric methodologies assume stationarity in the time series while they are, in fact, non-stationary. Consequently, the usual statistical tests are likely to be inappropriate and the inferences drawn are likely to be erroneous and misleading (Ekanayake, 1999).

The next step is to search for the long run relationships between nonstationary variables. In this study the long run relationships between the variables will explore by using Johansen (1988) and Johansen and Juselius (1990); hereafter JJ) cointegration procedure that is a popular conventional cointegration method in empirical studies. The model is based on the error correction form given by:

$$\Delta Z_t = \Pi Z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Z_{t-i} + \mu_0 + \mu_1 t + \upsilon_t \qquad t = 1,...,T \tag{1}$$

where Z_t is an (nx1) column vector of p variables, Γ and Π are matrices of coefficients, μ_0 and μ_1 are (nx1) column vectors of constant terms and trend coefficients, Δ is a difference operator, and υ_t is p-dimensional Gaussian error with mean zero and variance matrix. The coefficient matrix Π is known as the impact matrix and it contains information about the long-run relationships (Awokuse,

2003). Johansen's methodology requires the estimation of the vector autoregression (hereafter VAR). Equation (1) and the residuals are then used to compute two likelihood ratios (*LR*) test statistics that can be used in the determination of the unique cointegrating vectors of Z_t. The first test which considers the hypothesis that the rank of Π is less than or equal to *r* cointegrating vectors is given by the trace test and the maximal eigenvalue test (Johansen, 1995).

5. Empirical Results

Results of the ADF test for Bank 1 are presented in Table 4. The null hypothesis is unit root and the alternative hypothesis is level stationary. The Dickey-Fuller regressions include an intercept and a linear trend in the levels, and include an intercept in the first differences. The numbers of optimal lags are based on Schwarz Bayesian Criterion (SBC). 95% of the critical values for several observations are computed by stochastic simulations.

Table 4. ADF Unit Root Test Results (Bank 1 - Quarterly Data)

	in Levels			in 1st Differences			
Variable	**ADF**	**CV at 5 %**	**Models**	**ADF**	**CV at 5 %**	**Models**	**Conclusion**
LQD	(-3.0669)	[-3.4937]	[0, none]	(-4.7798)	[-1.9474]	[3, none]	I (1)
DEPOS	(-0.6331)	[-1.9470]	[1, none]	(-4.4825)	[-1.9470]	[0, none]	I (1)
LOAN	(-5.8676)	[-3.4953]	[1, c+t]				I (0)
FCE	(-2.2914)	[-2.9199]	[4, c]	(-6.7843)	[-1.9474]	[3, none]	I (1)
FCI	(-0.6392)	[-1.9470]	[0, none]	(-8.4448)	[-1.9470]	[0, none]	I (1)
CA	(-2.2856)	[-2.9212]	[5, c]	(-2.7531)	[-1.9475]	[4, none]	I (1)
LOGA	(-5.8896)	[-2.9155]	[0, c]				I (0)
GDP	(-2.4424)	[-3.4953]	[1, c+t]	(-5.7301)	[-2.9166]	[0, c]	I (1)
P	(-10.7952)	[-2.9155]	[0, c]				I (0)
R	(-9.8728)	[-3.5131]	[10, c+t]				I (0)
RER	(-3.0402)	[-3.4937]	[0, c+t]	(-8.0903)	[-1.9470]	[0, none]	I (1)
ROA	(-2.6811)	[-2.9155]	[0, c]	(-9.7726)	[-1.9470]	[0, none]	I (1)
ROE	(-3.4518)	[-2.9166]	[1, c]				I (0)
NIM	(-1.2219)	[-1.9470]	[1, none]	(-11.9874)	[-1.9470]	[0, none]	I (1)

Notes: c+t, c and none refer linear trend and constant with random walk model; constant with random walk model and pure random walk model, respectively. CV is critical values.

Findings for Bank 1 indicate that LQD, DEPOS, FCE, FCI, CA, GDP, RER, ROA, NIM variables have unit root or they are non-stationary in levels. However, they are stationary in first differences. LOAN, LOGA, P, R, ROE are stationary in levels. In model obtained for Bank 1 are used non-stationary variables in levels. However, ROA dependent variable is non-stationary in levels; it isn't taken as model, because this model isn't statistically significant. Furthermore, in all model, D2001 is dummy variable used for effects of the 2001 financial crisis in Turkey. The model obtained for Bank 1 is follow:

Model 1: NIM f (LQD, DEPOS, FCE, FCI, CA, GDP, RER, D2001)

Results of the ADF test for Bank 2 are presented in Table 5.

Findings for Bank 2 indicate that LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, NIM variables have unit root or they are non-stationary in levels. However, they are stationary in first differences. LOGA, P, R, ROA, ROE are stationary in levels. In model obtained for Bank 2 are used non-stationary variables in levels. The model obtained for Bank 2 is follow:

Model 2: NIM f (LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, D2001)

Results of the ADF test for Bank 3 are presented in Table 6.

Findings for Bank 3 indicate that LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, NIM variables have unit root or they are non-stationary in levels. However, they are stationary in first differences. LOGA, P, R, ROA, ROE are stationary in levels. In model obtained for Bank 3 are used non-stationary variables in levels. The model obtained for Bank 3 is follow:

Model 3: NIM f (LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, D2001)

The cointegration test models are obtained from the analysis results of unit roots. These models give summary in Table 7.

Table 5. ADF Unit Root Test Results (Bank 2 - Quarterly Data)

	in Levels			in 1st Differences			
Variable	**ADF**	**CV at 5 %**	**Models**	**ADF**	**CV at 5 %**	**Models**	**Conclusion**
LQD	(-3.4386)	[-3.4937]	[0, c+t]	(-10.4436)	[-1.9470]	[0, none]	I (1)
DEPOS	(-2.4952)	[-2.9155]	[0, c]	(-6.7947)	[-1.9470]	[0, none]	I (1)
LOAN	(-1.8443)	[-3.4953]	[1, c+t]	(-5.8663)	[-3.4953]	[0, c+t]	I (1)
FCE	(-3.0677)	[-3.4937]	[0, c+t]	(-7.7099)	[-1.9470]	[0, none]	I (1)
FCI	(-2.6571)	[-3.4937]	[0, c+t]	(-8.4336)	[-1.9470]	[0, none]	I (1)
CA	(-2.9214)	[-3.4937]	[0, c+t]	(-5.7054)	[-1.9474]	[3, none]	I (1)
LOGA	(-2.9601)	[-2.9281]	[10, c]				I (0)
GDP	(-2.4424)	[-3.4953]	[1, c+t]	(-5.7301)	[-2.9166]	[0, c]	I (1)
P	(-10.7952)	[-2.9155]	[0, c]				I (0)
R	(-9.8728)	[-3.5131]	[10, c+t]				I (0)
RER	(-3.0402)	[-3.4937]	[0, c+t]	(-8.0903)	[-1.9470]	[0, none]	I (1)
ROA	(-3.3753)	[-2.9155]	[0, c]				I (0)
ROE	(-2.1199)	[-1.9470]	[1, none]				I (0)
NIM	(-2.9865)	[-3.4937]	[0, c+t]	(-7.2641)	[-1.9470]	[0, none]	I (1)

Notes: c+t, c and none refer linear trend and constant with random walk model; constant with random walk model and pure random walk model, respectively. CV is critical values.

Table 6. ADF Unit Root Test Results (Bank 3 - Quarterly Data)

	in Levels			in 1st Differences			
Variable	**ADF**	**CV at 5 %**	**Models**	**ADF**	**CV at 5 %**	**Models**	**Conclusion**
LQD	(-3.2984)	[-3.4937]	[0, c+t]	(-7.0757)	[-1.9470]	[0, none]	I (1)
DEPOS	(-2.1573)	[-2.9155]	[0, c]	(-9.4292)	[-1.9470]	[0, none]	I (1)
LOAN	(+1.0717)	[-1.9469]	[0, none]	(-6.3557)	[-1.9470]	[0, none]	I (1)
FCE	(-0.8411)	[-1.9469]	[0, none]	(-7.9218)	[-1.9470]	[0, none]	I (1)
FCI	(-2.2910)	[-3.5550]	[0, c]	(-6.4402)	[-1.9474]	[3, none]	I (1)
CA	(-2.4494)	[-2.9166]	[1, c]	(-12.6665)	[-1.9470]	[0, none]	I (1)
LOGA	(-4.9176)	[-3.5085]	[8, c+t]				I (0)
GDP	(-2.4424)	[-3.4953]	[1, c+t]	(-5.7301)	[-2.9166]	[0, c]	I (1)
P	(-10.7952)	[-2.9155]	[0, c]				I (0)
R	(-9.8728)	[-3.5131]	[10, c+t]				I (0)
RER	(-3.0402)	[-3.4937]	[0, c+t]	(-8.0903)	[-1.9470]	[0, none]	I (1)
ROA	(-6.0169)	[-2.9155]	[0, c]				I (0)
ROE	(-6.4714)	[-3.4937]	[0, c+t]				I (0)
NIM	(-2.7233)	[-2.9166]	[1, c]	(-8.9449)	[-1.9471]	[1, none]	I (1)

Notes: c+t, c and none refer linear trend and constant with random walk model; constant with random walk model and pure random walk model, respectively. CV is critical values.

Table 7. The Cointegration Test Models

Models	**Dependent Variable**	**Explanatory Variables**
Model 1	NIM	f (LQD, DEPOS, FCE, FCI, CA, GDP, RER, D2001)
Model 2	NIM	f (LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, D2001)
Model 3	NIM	f (LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, D2001)

The null hypothesis (H_0: r=0) for Model 1 is rejected at 5 percent significance. But, second hypothesis (H_1: r≤1) isn't rejected. The results of Johansen-Juselius cointegration tests indicate that there is a unique long-term or equilibrium relationship between variables. The cointegrating coefficients are presented in Table 8. The long-run coefficients for the variables DEPOS, CA, GDP and RER are positive and strongly statistically significant in Model 1. But FCE variable is not significant. In addition, the long-run coefficients for the variables LQD and FCI are negative and statistically significant in this model.

Table 8. The Results of Johansen-Juselius Cointegration Tests for Bank 1

MODEL 1: NIM= f (LQD, DEPOS, FCE, FCI, CA, GDP, RER, D2001), k = 1

H_0	H_1	Eigenvalue	Trace Statistic	5 % CV	P-Value	Max-Eigenvalue Statistic	5 % CV	P-Value
r=0	r=1	0.598264	159.9325	159.5297	0.0475	49.24578	52.36261	0.1009
r≤1	r=2	0.575083	110.6867	125.6154	0.2814	46.21646	46.23142	0.0502
r≤2	r=3	0.384562	64.47021	95.75366	0.8765	26.21277	40.07757	0.6879
r≤3	r=4	0.290936	38.25745	69.81889	0.9693	18.56570	33.87687	0.8475
r≤4	r=5	0.133099	19.69175	47.85613	0.9925	7.712861	27.58434	0.9991
r≤5	r=6	0.100755	11.97889	29.79707	0.9326	5.734808	21.13162	0.9876
r≤6	r=7	0.067568	6.244084	15.49471	0.6667	3.777768	14.26460	0.8820
r≤7	r=8	0.044645	2.466316	3.841466	0.1163	2.466316	3.841466	0.1163

Estimated long-run coefficients

NIM =	LQD	DEPOS	FCE	FCI	CA	GDP	RER
	-3.589	1.920	99.544	-23.588	1.433	73.867	102.281
	(1.079)	(0.670)	(104.010)	(11.471)	(0.710)	(25.919)	(18.589)
	[-3.327]	[2.865]	[0.957]	[-2.056]	[2.020]	[2.850]	[5.502]

AC= 84.234 (0.046) HET=747.194 (0.047)

Notes: k is # of optimal lags based on FPE, AIC, SIC and HQ information criterias test results. Critical values (CV) used are taken from Osterwald-Lenum (1992). Values in parentheses are standard errors.
t-statistics for coefficients are in [ ]. AC and HET are the LM test and White's (1980) test, respectively.
P-values for these tests are in ( ) then test coefficients.

The null hypothesis (H_0: r=0) for Model 2 is also rejected at 5 percent significance. But, second hypothesis (H_1: r≤1) isn't rejected. The results of Johansen-Juselius cointegration tests indicate that there is a unique long-term or equilibrium relationship between variables. The cointegrating coefficients are presented in Table 9. The long-run coefficients for the variables LQD and CA are positive and strongly statistically significant in Model 2. But DEPOS, FCE, FCI and RER variables are not significant. In addition, the long-run coefficients for the variables LOAN and GDP are negative and statistically significant in this model.

Table 9. The Results of Johansen-Juselius Cointegration Tests for Bank 2

MODEL 2: NIM = f (LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, D2001), k = 1

H_0	H_1	Eigenvalue	Trace Statistic	5 % CV	P-Value	Max-Eigenvalue Statistic	5 % CV	P-Value
r=0	r=1	0.653144	205.4449	197.3709	0.0187	57.17767	58.43354	0.0662
r≤1	r=2	0.548405	148.2672	159.5297	0.1735	42.92831	52.36261	0.3281
r≤2	r=3	0.455333	105.3389	125.6154	0.4331	32.80936	46.23142	0.6040
r≤3	r=4	0.378885	72.52951	95.75366	0.6344	25.71693	40.07757	0.7214
r≤4	r=5	0.337596	46.81259	69.81889	0.7679	22.24154	33.87687	0.5889
r≤5	r=6	0.175594	24.57105	47.85613	0.9296	10.42695	27.58434	0.9780
r≤6	r=7	0.174628	14.14410	29.79707	0.8324	10.36374	21.13162	0.7099
r≤7	r=8	0.054979	3.780358	15.49471	0.9204	3.053586	14.26460	0.9431
r≤8	r=9	0.013369	0.726772	3.841466	0.3939	0.726772	3.841466	0.3939

Estimated long-run coefficients

NIM =	LQD	DEPOS	LOAN	FCE	FCI	CA	GDP	RER
	3.240	0.036	-0.500	-33.622	-12.588	2.206	-60.507	18.134
	(0.483)	(0.410)	(0.147)	(18.781)	7.240)	(0.441)	(15.797)	(10.085)
	[6.704]	[0.087]	[-3.409]	[-1.790]	[-1.739]	[5.001]	[-3.830]	[1.798]

AC= 83.427 (0.405) HET= 963.980 (0.327)

Notes: k is # of optimal lags based on FPE, AIC, SIC and HQ information criterias test results. Critical values (CV) used are taken from Osterwald-Lenum (1992). Values in parentheses are standard errors.
t-statistics for coefficients are in [ ]. AC and HET are the LM test and White's (1980) test, respectively.
P-values for these tests are in ( ) then test coefficients.

The null hypothesis (H_0: r=0) for Model 3 is also rejected at 5 percent significance. But, second hypothesis (H_1: r≤1) isn't rejected. The results of Johansen-Juselius cointegration tests indicate that there is a unique long-term or equilibrium relationship between variables. The cointegrating coefficients are presented in Table 10. The long-run coefficients for the variables LQD, LOAN and RER are positive and strongly statistically significant in Model 3. But DEPOS and FCE variables are not significant. In addition, the long-run coefficients for the variables FCI, CA and GDP are negative and statistically significant in this model. All results and comparison of cointegration tests results are reported in Table 11.

Table 10. The Results of Johansen-Juselius Cointegration Tests for Bank 3

MODEL 3: NIM = f (LQD, DEPOS, LOAN, FCE, FCI, CA, GDP, RER, D2001), k = 1

H_0	H_1	Eigenvalue	Trace Statistic	5 % CV	P-Value	Max-Eigenvalue Statistic	5 % CV	P-Value
r=0	r=1	0.713593	226.6506	197.3709	0.0007	67.51852	58.43354	0.0051
r≤1	r=2	0.595982	159.1321	159.5297	0.0525	48.94002	52.36261	0.1077
r≤2	r=3	0.513862	110.1921	125.6154	0.2941	38.94815	46.23142	0.2431
r≤3	r=4	0.386729	71.24396	95.75366	0.6801	26.40321	40.07757	0.6748
r≤4	r=5	0.300717	44.84075	69.81889	0.8359	19.31581	33.87687	0.8022
r≤5	r=6	0.232438	25.52493	47.85613	0.9039	14.28495	27.58434	0.8025
r≤6	r=7	0.112403	11.23999	29.79707	0.9551	6.438809	21.13162	0.9726
r≤7	r=8	0.071122	4.801178	15.49471	0.8296	3.984003	14.26460	0.8610
r≤8	r=9	0.015019	0.817176	3.841466	0.3660	0.817176	3.841466	0.3660

Estimated long-run coefficients

NIM =	LQD	DEPOS	LOAN	FCE	FCI	CA	GDP	RER
	0.674	0.977	0.225	9.086	-5.281	-0.742	-26.132	10.323
	(0.258)	(0.066)	(0.107)	(8.188)	(1.503)	(0.221)	(12.188)	(5.162)
	[2.615]	[1.490]	[2.108]	[1.110]	[-3.514]	[-3.353]	[-2.144]	[2.000]

AC= 74.198 (0.691) HET= 997.033 (0.170)

Notes: k is # of optimal lags based on FPE, AIC, SIC and HQ information criterias test results. Critical values (CV) used are taken from Osterwald-Lenum (1992). Values in parentheses are standard errors. t-statistics for coefficients are in [ ]. AC and HET are the LM test and White's (1980) test, respectively. P-values for these tests are in ( ) then test coefficients.

Table 11. Comparison of Cointegration Tests Results

Determinants	Expected Relationship	Bank 1 (Model 1)	Bank 2 (Model 2)	Bank 3 (Model 3)
LQD	+, -	-	+	+
DEPOS	+	+	**	**
LOAN	+, -		-	+
FCE	-	**	**	**
FCI	+	-	**	-
CA	+, -	+	+	-
GDP	+, -	+	-	-
RER	+	+	**	+

Notes : Empty box shows that variable is not take part in model.
+,- = There are different opinions.
+ = Positive relationship.
- = Negative relationship.
** = Variable is insignificant.

Liquidity (LQD) defined as cash as a percent of total assets has a significant and negative impact on profitability in Model 1 (for state-owned bank). This may possibly be due to the fact that the state-owned bank has high liquid assets to decrease liquidity risk of bank. But, in Model 2 (for

privately-owned bank) and Model 3 (for foreign bank), this variable has a significant and positive impact on profitability. This may possibly be due to the fact that the privately-owned and foreign banks have more opportunities to invest in various short term liquid assets. These results are in line with prior studies.

Deposits (DEPOS) measured as total deposits to total assets has a significant and positive impact on profitability in Model 1 (for state-owned bank). This is expected, since banks normally should strive to attract more deposits as a source of funds. But, in Model 2 (for privately-owned bank) and Model 3 (for foreign bank), this variable has an insignificant impact on profitability.

Asset Quality (LOAN) measured as total loans to total assets ratio isn't used in Model 1. This variable has a significant and negative impact on profitability in Model 2 (for privately-owned bank) and a significant and positive impact on profitability in Model 3 (for foreign bank). These results are in line with prior studies. Loans are a measure of income source of banks. Thus, we expect a positive relationship between asset quality and profitability. But, the coefficient of this ratio is also expected to be negative because bad loans are expected to reduce profitability.

Fees and Commission Expenses (FCE) to total assets ratio has an insignificant impact on profitability in all models.

Fees and Commission Incomes (FCI) to total assets ratio has an insignificant impact on profitability in Model 2 (for privately-owned bank). In Model 1 (for state-owned bank) and Model 3 (for foreign bank), this variable has a significant and negative impact on profitability. This relationship is unexpected since it would represent a key source of bank revenue in the future. This indicates that greater bank activity diversification negatively influences returns.

Capital Adequacy (CA) measured as equity to total assets is expected that the higher this ratio, the lower the need for external funding and the higher the profitability of the bank. On the other hand, according to some authors the equity to assets ratio is negatively related to the total revenue dependent variable, since lower capital ratios should lead to higher bank revenues and a higher equity to assets ratio lowers after tax earnings by reducing the tax shield provided by the deductibility of interest payments. Thus, this variable is expected that it has positive and negative impact on profitability. In Model 1 (for state-owned bank) and Model 2 (for privately-owned bank), this variable has a significant and positive impact on profitability. But, in Model 3 (for foreign bank), it has a significant and negative.

Real Gross Domestic Product (GDP) is expected to have a positive impact on profitability since the banking sector is sensitive to the overall development of the economy. With the real sector growing, banks can successfully collect their loans and extend new ones. This variable has a significant and positive impact on profitability in Model 1 (for state-owned bank). This result stands in line with the empirical evidence of Bourke (1989), Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1999), Bikker and Hu (2002), Athanasoglou et al. (2008), Dietrich and Wanzenried (2009) and Davydenko (2011). But, in Model 2 (for privately-owned bank) and Model 3 (for foreign bank), this variable has a significant and negative impact on profitability. This finding agrees with theory and empirical evidence that; the relationship between GDP trend growth and bank profitability could be pro-cyclical. When GDP trend growth is positive, the effect to bank profitability is positive and when GDP trend growth in negative, the effect on profitability is negative. This result stands in line with the empirical evidence of Naceur (2003), Panayiotis et al., (2005) and Francis (2011).

Real Exchange Rate (RER) is expected to have a positive impact on profitability. In Model 1 (for state-owned bank) and Model 3 (for foreign bank), this variable has a significant and positive impact on profitability. This result is in line with expected relationship. But, in Model 2 (for privately-owned bank), it has an insignificant impact on profitability.

6. Concluding Remarks

The main aim of the study is to investigate the long-run relationship between the bank specific and macroeconomic factors and the profitability of commercial banks in Turkish banking sector. The sample period spans from 1998 to 2011. The previous findings in the literature are examined. Referring to the literature, banks profitability is determined by internal factors in terms of bank-specific determinants and external factors that reflect the macroeconomic factors. The results from both previous studies and this study showed that compared with internal factors, external factors have less impact on bank profitability.

Empirical findings can be summarized as follows:

i) The state-owned bank has high liquid assets to decrease liquidity risk of bank. The privately-owned and the foreign banks have more opportunities to invest in various short term liquid assets.

ii) The state-owned bank normally should strive to attract more deposits as a source of funds. But, deposits for the privately-owned and the foreign banks have an insignificant impact on profitability.

iii) Loans are a measure of income source of banks. In the privately-owned bank, bad loans reduce profitability while loans for the foreign bank have positive impact on profitability.

iv) Fees and commission expenses have an insignificant impact on profitability for all banks.

v) Greater bank activity diversification negatively influences returns.

vi) The lower the need for external funding, the higher the profitability of the state-owned and the privately-owned banks. But, in the foreign bank, lower capital leads to higher bank revenues.

vii) The banking sector is sensitive to the overall development of the economy. With the real sector growing, banks can successfully collect their loans and extend new ones.

viii) In the state-owned and the foreign banks, real exchange rate has a significant impact on profitability.

ix) The 2001 economic crisis has a negative effect on all Turkish Banking sector.

This study makes original contributions to finance and banking literature and this issue will be addressed in future work.

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