Bank-specific and Macroeconomic Determinants of Bank Profitability: Case of Turkey

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ABSTRACT

The aim of this study is to analyze the impact of bank-specific and macroeconomic determinants of bank profitability for 25 commercial banks in Turkey for the period of 2001-2010. We categorize those banks into three (3) groups as follow: Public, Private and Foreign Banks. A panel regression is used to carry empirical investigation based on the unique feature of the 3 categories mentioned above; then a general model is formulated to check the combined effect of bank-specific and macro-economic variables on commercial bank profitability in Turkey. It is important to consider the 3 categories of banks separately to identify peculiar hypothesis for each model and compare the bank profitability factored on different ownership structure. In addition, this study examines the impact of the sub-prime mortgage crisis of 2008 and also includes the consequences of 2001 national crisis in Turkey and sees the impacts of it as well on those selected commercial banks. Some similar study such of Alper and Anbar (2011) has been done but in our case, we try to evaluate the bank-specific and macroeconomic determinants in different groups and also emphasizing their performance during the crisis.

Keywords: Profitability, Bank Management, Cyclicality.

ÖZ

Bu çalışma bankalara özel ve makro-ekonomik belirleciyilerin 2001-2010 seneleri arasında, Türkiyedeki ticari bankaların karlılığını üzerine nasıl bir etkisi olduğunu incelemeyi amaçlıyor. Bu analiz için bankalar yapılarına gore üç sınıfa ayrılmıştır: Kamu Bankaları, Özel Bankalar ve Yabancı Bankalar. Yukarda bahsedilen 3 sınıfa dayalı olarak, deneysel araştırma panel veri analizi yapılmıştır. Daha sonra bankalara özel ve makro-ekonomik belirleciyilerin banka karlılığına etkisi genel bir model ile incelenmiştir. Kamu Bankaları, Özel Bankaları ve Yabancı Bankaları ayrı hipotez ve modelde incelemek ve nasıl farklı etkilendiklerini görmek önemli ve de uygulanmışır. Araştırmamıza 2007senesinde başlayan uluslararası finansal kredi krizinin etkisi ve 2001 senesinde Türkiye'de oratya çıkan krizin sonuçları da dahil edilmiştir. Alper ve Anbar (2011) çalışması gibi önceden yapılmış araştırmalara ilişkin, bu inceleme bankaların kriz sırasında nasıl yürütüldüğü ve bankalara özel ve makro-ekonomik belirleciyiler tarafından nasıl etkilendiklerini göstermeyi hedefliyor.

Anahtar Kelimeler: karlılık, banka yönetimi, döngüsel

Dedicated to my family

And the

Chadian community in

TRNC

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LIST OF ABBREVIATIONS

GDP:	Gross Domestic Product
ROA:	Return on asset
ROE:	Return on equity
CAR:	Capital adequacy ratio
EFF:	Management efficiency ratio
ASQ:	Asset quality ratio
LQR:	Liquidity ratio
LSIZE:	Natural logarithm of total assets
INF:	Inflation
GRT:	Economic growth
IMF:	International Monetary Fund
M&As:	Mergers and acquisitions
TBS:	Turkish Banking System
GMM:	Generalized Method Moment
POLS:	Pooled Ordinary Least Square
NIM:	Net Interest Margin
CRTA:	Capital and Reserves to Total Asset
LIQ:	Loans to Deposit Ratio
OLS:	Ordinary Least Square
E-VIEWS:	Econometric views
VAR Model:	Vector autoregressive model

Chapter 1

INTRODUCTION

1.1   Historical background

Financial institutions simply started in the 18th century BC which wasn't called a bank but as a place to keep your valuable items there. The first institution that was called a bank was in 15th century AD. Nowadays, banks become part of our life whether in transaction, deposit or loans etc... The main source of income comes from interest charge on loans. Atici and Gursoy (2011) presented in their studies that the first Turkish bank was founded by Galata Bankers during the Ottoman Empire in 1847. As of 2010, Turkey has 45 Banks constituted of 32 Commercial Banks (3 state-owned, 12 privates and 17 foreign banks) and 13 Development and Investment Banks (3 publics, 6 privates and 4 foreign banks). Some of the Banks in the list has altered their names [1] more than once. For instance ING Bank A.S was founded under the name of The First National Bank of Boston A.S in 1984 then transferred to the name of Turk Boston Bank A.S in 1991, then to Oyakbank in 1996 and finally to ING BANK A.S which was established in 7th July 2008. What is more, JPMorgan Chase Bank N.A. was founded in 1984 in the name of The Chase Manhattan Bank and eventually merged with Morgan Guaranty Trust Company in December of 2001,

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[1] Example of Banks that changed their names: Şekerbank T.A.Ş. (from Pancar Kooperatifleri Bankası A.Ş), The Royal Bank of Scotland N.V.(from Holantse Bank Uni. N.V then ABN AMRO Bank N.V) and etc….

and then the merging name was changed to JP Morgan Chase &Co on February 28th 2005. These changes are due ownership structure.

Over the past 2 decades the Turkish banking system has experienced many crises such as in 1991, 1994, 1998, 2001 and 2008. The biggest challenge for Turkish banks was in the year of 2001 and certainly the global crisis of 2008. The Russian crisis of 1998, the Marmara earthquake of 1999 can be some of the reasons of financial crisis in Turkey (Atici & Gursoy, 2008).

Our focus here is on the period of 2001-2010 that includes the national crisis of 2001 as well as the global crisis of 2008. Ozatay and Sak (2003) mention in their studies that the main reason of the Turkish crisis of 2001 was caused by the fragility of banks as well as a set of triggering factors. In addition to that, the 2008 global financial crisis was caused by excessive lending that started in US before spreading in most of the other countries which Turkey was also been affected by the crisis.

1.2 Aim of the study

There was a similar study such of Alper & Anbar (2011) that investigate the bank-specific and macroeconomic determinants of the bank's profitability in Turkey over the time period of 2002-2010 that includes 10 commercial banks.

In this thesis, the aim is to analyze the bank- specific and macroeconomic determinants of bank profitability in the case of Turkey during the period of 2001-2010. The Turkish banks profitability is examined by implementing Capital ratio,

Asset Quality ratio, Management Efficiency ratio, Liquidity ratio and Bank size as bank-specific and inflation and GDP (Gross Domestic Product) growth as macroeconomic determinants.

The bank profitability is measured by return on assets (ROA) and return on equity (ROE) as dependent variables. Three (3) different banking perspectives such as public banks, private banks and foreign owned banks are used to determine the impact of selected ratio on them in terms of profitability. In addition, the impact of sub-prime mortgages crisis of 2008 and the national crisis of 2001 are also included as dummy variables. There are considerable amount of studies[2] that have also been conducted in the same field such as the work of Dietrich & Wanzenried (2009), focus on the profitability of 453 Swiss commercial banks for the period of 1999-2006, Athanasoglou et al. (2005) study bank-specific, industry-specific and macroeconomic determinants of Greek banks profitability.

1.3   Research to find out

This study focuses on the profitability of selected 25 commercial banks in Turkey based on their asset size; we need to answer the following crucial questions especially in data methodology and empirical results chapters; If Public Banks are more profitable than Private or Foreign Banks or vice versa. These questions can also be understood by looking at the national crisis of 2001 or the global mortgage crisis of 2008.And also, what the reaction was of Turkish commercial banks in terms

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[2] Examples for the study are Anwar and Herwanay (2006), Aysan (2007), Sing and Chaudhary (2009) , Ramllal (2009) , Sufian (2011) , Alper and Anbar (2011) ,Davydenko (2010) .

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of profitability during the crisis of 2001 and 2008.How profitable the 25 commercial banks were for the 10 years (2001-2010) of period.

1.4 Structure of the thesis

This paper is organized as follows. Section 2 brings out the overview of the Turkish banking system, section 3 focuses on literature review based on previous studies, section 4 analyzes the methodology and research data, section 5 investigates the empirical results and finally in section 6, a conclusion and recommendation for further research .

Chapter 2

OVERVIEW OF THE TURKISH BANKING SYSTEM

Turkey is one of the most developing countries in the world; it's been categorized as 16th in terms of GDP (Gross Domestic Product) listed by the International Monetary Fund (IMF)[3]. The Turkish Banking System has an overall of 45 banks that constitute of 32 Commercial (3 publics, 12 privates and 17 foreign banks) and 13 Development and Investment Banks (3 stated-owned, 6 privates and 4 foreign banks) as a publication of 2010 by the Central Bank of Turkey[4].

The Turkish banking had faced many crises in its history. Atici and Gursoy (2011) mentioned in their study about the financial crisis in Turkey, some of the examples are the 1994 crisis which was caused by the unbounded growth of domestic crisis. They further stated that the effects of 1998 Russian crisis, the Marmara earthquakes of 1999, the early elections and the change of government affected the Turkish banking economy negatively. These basically are some of the roots of the 2001 national crisis. Our focuses in this thesis are the 2001 and 2008 crisis.

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[3] http://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)

[4] http: //www.tbb.org/en

2.1 The 2001 national Crises

Atici and Gursoy (2011) brought out the main reason of the nation crisis of 2001; after the previous crisis especially such as the Russian crisis of 1998 and the Marmara Earthquake of 1999, Turkey started to have a non-stable environment caused by higher inflation in the economy. It firstly began at the end of 1999 when the Turkey agreed the terms of the IMF which would be supported by the 3 year exchange rate based on disinflation program. Toward the end of 2000, the new economic program started to show some deficiencies by putting banks into difficulties to close their open positions. During these complex periods of time, the interest rate jumped to 900% overnight. The Central Bank of Turkey lost its confidence upon the IMF, by mid of November 2000, the drastic increases in the interest rate created damage in the fiscal structure of banks and deteriorated the banking system. This emerging crisis of banking, created a political crisis within the government of Ecevit (former Turkish Prime Minister) [5] by February 2001. Atici and Gursoy (2011) also revealed some other main bases of crisis such as insufficiency inspection, maturity mismatch, lack of financial management in the public banking sector, deformity in financial structure etc… Some banks were transferred to Saving Insurance fund; some others were sold to private sectors in a different name.

When considering other studies about the same crisis, Ozatay and Sak (2003) pointed out that on 22nd February; the exchange rate of the Turkish Lira crumpled which put pressure on the Central Bank to allow the Lira to float freely, this lead to a

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[5] http://en.wikipedia.org/wiki/List_of_Prime_Ministers_of_Turkey

depreciation of Lira against Dollar. Some outcomes were also stated by different other scholars, such as Yildirim (2008) who stated that a booming increase in interest rate provoke a low probability of profit of banks especially to those with substantial portfolio of government debt security. The decrease of banks was well observed while concentration levels increased as a result of M&As (Mergers and acquisitions) , the number of banks dropped to 33 commercial banks towards the end of 2006 from 62 banks at the end of 1999 right before the national crisis of 2001. The bankruptcies of Turkish banks were not only caused by the rise of interest rate, but also the low efficiency or low performance to handle properly the riskier portfolios. The widespread of failure of the Turkish banking system, caused a huge emerging opportunity of foreign banks into the local market, their interest and investment augmented dramatically and new foreign banks were also founded in the host country.

Koch and Chaudhary (2001) inspected the February 2001 national crisis; they mentioned that the Turkish government have not only privatized some state banks but also allowed some holding companies to purchase TV's and newspapers industries in order to establish banks.

Atici and Gursoy (2011) brought out a program that was revealed by the Banking Regulation and Supervision Agency; it comprised of four (4) main Pillars listed as follow: Restructuring of the state banks, prompt resolution of the Saving Deposit Insurance Funds Banks, strengthening the private banks and strengthening the regulatory and supervisory framework.

2.2 The 2008 Global Crises

The 2008 global crises which started in the United States due to sub-prime mortgages, widely spread all around the world by affecting some countries, but the crisis had no significant impact on the Turkish Banking System (TBS) according to the work of Erdem (2010). He further pointed out that Turkey was one of the countries taking few financial support measures. The reason behind it is that TBS was well aware of 2001 financial crisis and the measurements taking to keep the TBS as stable as possible. He drew out the measurements carried out by the Central Bank such as to cut its interest rates and decrease the spread rate between the lending and the borrowing rate with the intention of avoiding the overnight jump of interest rate. During the crisis period, the Central Bank decreases the provision rate to 5% from 6% in order to decrease intermediary cost and provide with permanent liquidity.

In the view of Aras (2010) , he also mentioned that the TBS was not influenced by the crisis comparing to the Americans and Europeans Banks due to the fact that Turkish banking industry have a solid background of capital adequacy. Throughout the crisis, the Turkish banks operated properly even made profit out of the crisis, the number of branches and personnel increased despite the fact that the global crisis was still rolling around the other countries.

Table 2.1 Turkish Banks - Ranked by Total Assets

N0	Banks	Groups	Date of Establish.	Total Assets (USD Million)
1	Türkiye Cumhuriyeti Ziraat Bankası A.Ş.	State-owned Deposit B.	1863	98,309
2	Türkiye İş Bankası A.Ş.	Privately-owned Deposit B.	1924	85,716
3	Türkiye Garanti Bankası A.Ş.	Privately-owned Deposit B.	1946	80,621
4	Akbank T.A.Ş.	Privately-owned Deposit B.	1948	73,610
5	Yapı ve Kredi Bankası A.Ş.	Privately-owned Deposit B.	1944	55,135
6	Türkiye Vakıflar Bankası T.A.O.	State-owned Deposit B.	1954	48,102
7	Türkiye Halk Bankası A.Ş.	State-owned Deposit B.	1938	47,439
8	Finans Bank A.Ş.	Foreign B.	1987	24,771
9	Denizbank A.Ş.	Foreign B.	1997	17,989
10	Türk Ekonomi Bankası A.Ş.	Privately-owned Deposit B.	1927	12,377
11	HSBC Bank A.Ş.	Foreign B.	1990	11,536
12	ING Bank A.Ş.	Foreign B.	1984	11,251
13	Fortis Bank A.Ş.	Foreign B.	1964	7,891
14	Şekerbank T.A.Ş.	Privately-owned Deposit B.	1953	7,394
15	İller Bankası A.Ş.	Dev't and Inv't B.	1933	6,294
16	Türkiye Sınai Kalkınma Bankası A.Ş.	Dev't and Inv't B.	1950	5,146
17	Türk Eximbank	Dev't and Inv't B.	1987	4,090
18	Citibank A.Ş.	Foreign B.	1980	4,087
19	Anadolubank A.Ş.	Privately-owned Deposit B.	1996	2,919
20	Alternatif Bank A.Ş.	Privately-owned Deposit B.	1992	2,770
21	Eurobank Tekfen A.Ş.	Foreign B.	1992	2,700
22	Deutsche Bank A.Ş.	Foreign B.	1988	1,984

23	Tekstil Bankası A.Ş.	Privately-owned Deposit B.	1986	1,674
24	Bank Mellat	Foreign B.	1982	1,193
25	BankPozitif Kredi ve Kalkınma Bankası A.Ş.	Dev't and Inv't B.	1999	1,057
26	Türkiye Kalkınma Bankası A.Ş.	Dev't and Inv't B.	1975	1,039
27	Turkland Bank A.Ş.	Foreign B.	1991	982
28	İMKB Takas ve Saklama Bankası A.Ş.	Dev't and Inv't B.	1995	979
29	Aktif Yatırım Bankası A.Ş.	Dev't and Inv't B.	1999	962
30	WestLB AG	Foreign B.	1985	777
31	Arap Türk Bankası A.Ş.	Foreign B.	1977	742
32	The Royal Bank of Scotland N.V.	Foreign B.	1921	740
33	Turkish Bank A.Ş.	Privately-owned Deposit B.	1982	670
34	Millennium Bank A.Ş.	Foreign B.	1984	587
35	Birleşik Fon Bankası A.Ş.	B. Under the Dep.Ins.Fund	1958	514
36	JPMorgan Chase Bank N.A.	Foreign B.	1984	456
37	Société Générale (SA)	Foreign B.	1989	439
38	Merrill Lynch Yatırım Bank A.Ş.	Dev't and Inv't B.	1992	220
39	Nurol Yatırım Bankası A.Ş.	Dev't and Inv't B.	1999	141
40	GSD Yatırım Bankası A.Ş.	Dev't and Inv't B.	1998	68
41	Diler Yatırım Bankası A.Ş.	Dev't and Inv't B.	1998	67
42	Habib Bank Limited	Foreign B.	1983	49
43	Credit Agricole Yatırım Bankası Türk A.Ş.	Dev't and Inv't B.	1990	43
44	Adabank A.Ş.	Privately-owned Deposit B.	1985	33
45	Taib Yatırım Bank A.Ş.	Dev't and Inv't B.	1987	9

Source: http://www.tbb.org.tr/eng/default.aspx

Chapter 3

LITERATURE REVIEW

Following the previous studies focusing on bank profitability either internal or external factors, the famous papers such of Short (1979) and Bourke (1989) were also part of the studies on bank profitability. The respective studies have focused on different singled countries. They are as follow: Athanasoglu et at. (2005), Alper and Anbar (2011),Aysan and Ceyhan (2007) ,Ramllal (2009) ,Sufian (2011), Sing and Chaudhary (2009), Gul et al. (2011), Anwar and Herwanay (2006) Dietrich and Wanzenried (2009) and Davydenko (2011).

In Greece case, Athanasoglou et al. (2005) set to examine the internal and external determinants of bank profitability on Greek banks for the period 1985-2001 by implementing the Generalized Method Moment (GMM) technique. They found out that the empirical outcomes of the regression are tied to bank-specific and macroeconomics determinants. The results show that all the bank-specific tested affect bank profitability significantly with the exception of the total asset or so-called bank-size. For instance a bank with a sound capital which is important in explaining bank profitability is competent to engage effectively in business opportunities, though unexpected losses can occur on the way but still it could achieve a high chance on being profitable. Some of the bank-specific and industry-specific variables

have insignificant impact on profitability but due to the efficient ability of the Greek banks, their management is able to overcome such inconsequential matters. Furthermore, the macroeconomics variables; inflation and cyclical output have a positive impact on profitability.

For the case of Turkey which is the most important and mostly related to my topic, Alper and Anbar (2011) investigated the profitability of the sample of 10 commercial banks in Turkey for the period of 2002-2010. They came up with the result that the banks size has a positive impact on profitability, in other word, the larger size a bank has, the higher the profitability of that bank. They also found out that the remaining bank specific variables such as liquidity, deposit volume, capital adequacy and net interest margin do not have impact on the bank profitability. However some variables of bank-specific do have negative impact on profitability such as size of credit portfolio and loans under follow-up in other word, there is negative relationship between loans and profitability. Therefore, macroeconomic factors like real GDP growth rate and inflation rate have no important effect on profitability but the real interest does have a significant influence on profitability. In addition to that, Aysan and Ceyhan (2007) also focused on the performance of the Turkish banking sector; the study suggests that medium sized banks are more efficient than larger size banks. This same study finds a positive relationship between loan ratio and the performances indices. And most interestingly, return on equity is not statistically significant in explaining any of the efficiency measures.

In the case of Taiwanese banks, Ramlall (2009) analyzed the profitability determinants of Taiwanese banks based on bank-specific, industry-specific and macroeconomics factors under a quarterly time period from 2002-2007. Result shows that bank capital have positive impact on profitability this can be explained by the fact that having more capital, banks can easily extend loans to customers and most likely complete high profit at the end of their maturities. However credit risk brings out a negative effect on bank, this is indeed explained by a 1% change in credit risk lead to a -94% change in profitability. This is obviously a rise on loan loss provisions that can simply deteriorate the profitability of banks. A solution is undertaken by the Central bank of China (Taiwan) is to establish sound policies in order to supervise credit risk.

Sufian (2011) investigated the profitability of the Korean banking sector for the period of 1992-2003 and he comes up with the following findings that the banking system in Korea impulses profitability when there is low liquidity in their assets and their macroeconomic determinants especially inflation have a significant impact on bank profitability. However, the impact of credit risk and cost are always negative. Furthermore, it is observed that on average the Korean banking sector is relatively more profitable during the pre-crisis period under both profitability measures, i.e., ROA and ROE. One relevant view that is included in Sufian paper is that the Korean banking system was under fire during the Asian financial crisis.

Sing and Chaudhary (2009) put their efforts together to analyze the Indian's banking sector from three (3) different perspectives such as Public, Private and Foreign banks

from 2002 to 2007 in terms of profitability. The frequent determinants such of macroeconomics and bank-specific are to be implemented in this subject. Moreover the outcomes of this analysis reveal the profitability of Indian banks has significantly increased over the past years. The macroeconomics determinants (income per capita, exports and foreign exchange reserves) indeed influence substantially their profitability. In other word, no sign of negativity in profitability is emphasized on this Indian banking sector. For instance, for every unit of investment in Indian banks, it causes 0.094, 0.068 and 0.173 times changes in profitability of public sector, private and foreign banks respectively.

Gul et al. (2011) examined the profitability of 15 Pakistani commercial banks using bank-specific and macro-economic determinants over the period of 2005-2009. Using Pooled Ordinary Least Squares (POLS), their results prove that the internal (bank size, capital, loan and deposits) and external factors (GDP, inflation and stock market capitalization) have strong influence on the profitability. On the other hand, some insignificant outcomes are also found in the correlation between variables, for example Net Interest Margin (NIM) is negatively correlated to Bank Size, Loan, Deposits and GDP.

Anwar and Herwanay (2006) worked on the subject of bank profitability in Indonesia that specialized on empirical study between Provincial Government's banks and Private Non-foreign Exchange banks. Their data are set for the period of 1993-2000. ROA and ROE are used as dependent variables to determine the profitability of the Indonesian banking industry. Their results show that Capital and

Reserves to Total Asset (CRTA) and Loans to Deposits Ratio (LIQ) are the ones affecting the profitability positively.

A study on bank profitability is also been achieved by Dietrich and Wanzenried (2009) focusing on 453 Swiss commercial Banks over the period of 1999 to 2006, it has 1919 observations. The research includes the recurrent determinants such as bank-specific, industry-specific and macroeconomic factors. Most interestingly, their results demonstrate the existence of significant differences in profitability between the Swiss Commercial Banks and the determinants listed above are the main influences behind this positive impact on profitability. Some controversy matters are also listed, Banks in Lake Geneva region are slightly profitable than Banks in the Zurich region. Furthermore results also show that foreign banks are clearly less profitable compared to public banks. And also, some of macroeconomic variable such as effective tax rate and market concentration rate have negative effect on profitability.

Davydenko (2011) focused his study on Ukrainian banking profitability by implementing the internal and externals variables that play a huge role defining bank profitability. Using a panel data, he utilizes the frame time of 2005-2009.

According to his results, the Ukrainian banking sector suffered a big blow on the quality of loans and is not able at the end to reconstruct their profits based on the growing flow of deposits. Therefore, credit risk, liquidity, deposits, inflation as well as foreign ownership dummy all have negative effect on profitability which are

regressed separately. Not only negative side Davydenko found out but positive effect as well such of capital, bank size, concentration rate and exchange rate depreciation. For instance , Capital is positively significant at 1 % confidence level in other word, the Ukrainian banking industry that rise up their equity have a lower cost of capital and thus are more profitable.

Chapter 4

METHODOLOGY

4.1 Data

In this empirical study, 25 Turkish Commercial Banks are selected based on their bank size, have been put together to analyze their profitability measure for the time frame of 2001-2010. The data of these banks were obtained from the Central Bank of Turkey that provides them on its website[6].

Some of the tools that are used to run the regression are Microsoft excel that is to calculate some of the ratios are not provided on the Turkish Central Bank website and E-views which is the software that facilitate the task to use panel data analysis. Furthermore, panel data is a combination of time series and cross-sectional data that is used to carry out an empirical analysis. In this case, it is applied to determine the profitability of the Turkish Commercial Banks.

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[6] http://www.tbb.org.tr/eng/Banka_ve_Sektor_Bilgileri/Tum_Raporlar.aspx

Table 4.1: The Commercial Banks and their category

No	Name of Banks	Category
1	Türkiye Cumhuriyeti Ziraat Bankası A.Ş	Public Bank
2	Türkiye Halk Bankası A.Ş	Public Bank
3	Türkiye Vakıflar Bankası T.A.O	Public Bank
4	Akbank T.A.Ş	Private Bank
5	Alternatif Bank A.Ş	Private Bank
6	Anadolubank A.Ş	Private Bank
7	Şekerbank T.A.Ş	Private Bank
8	Tekstil Bankası A.Ş	Private Bank
9	Türk Ekonomi Bankası A.Ş	Private Bank
10	Türkiye Garanti Bankası A.Ş	Private Bank
11	Türkiye İş Bankası A.Ş.	Private Bank
12	Yapı ve Kredi Bankası A.Ş	Private Bank
13	Arap Turk Bankasi A.Ş	Foreign Bank
14	Citibank A.Ş	Foreign Bank
15	DenizBank A.Ş	Foreign Bank
16	Eurobank Tekfen A.Ş.	Foreign Bank
17	Finans Bank A.Ş	Foreign Bank
18	Fortis Bank A.Ş	Foreign Bank
19	HSBC Bank A.Ş	Foreign Bank
20	ING Bank A.Ş	Foreign Bank
21	Turkland Bank A.Ş	Foreign Bank
22	JPMorgan Chase Bank N.A	Foreign Bank
23	Societe Generale (SA)	Foreign Bank
24	The Royal Bank of Scotland N.V	Foreign Bank
25	WestLB AG	Foreign Bank

Source: http://www.tbb.org.tr/eng/default.aspx

Table 4.2 The Variables Notation and Their Measure:

	variables	Measures	Notation
Dependent Variables	Profitability	Return on Assets(ROA)= Net Income/Total Assets	ROA
		Return on Equity(ROE)= Net Income/Total Equity	ROE
Independent Variables	Capital Adequacy	Equity/Total Assets	CAR
	Asset Quality	Total Loans and Receivables/Total Assets	ASQ
Bank-Specific	Efficiency	Interest Income/ Interest Expense	EFF
	Liquidity	Liquid Assets / Total Assets	LQR
	Bank-size	Natural Logarithm of Total Assets	LSIZE
Macroeconomic determinants	Inflation		INF
	Growth		GRT

4.2 Variables:

In this empirical study, in order to investigate the profitability of the 25 Turkish commercial banks nine (9) variables have been selected for this study, whereby two dependent variables and the remaining seven (7) are independent variables. The independent variables are sub-classified into 2 categories as bank-specific and macroeconomic variables[7].

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[7] http://data.worldbank.org/country/turkey

4.2.1 Dependent Variables:

Since the model is set on bank profitability, typically the main measurements of bank profitability are Return on Assets (ROA) and Return on Equity (ROE). Both are calculated in percentage.

ROA

Return on Assets (ROA) is defined as net income divided by total assets. It is considered as one of most relevant profitability measure in the banking sector. It shows how a company generates revenues from its assets and be able to indicate its profitability. It is used in most of studies that deal with profitability measurement of banks. Naceur (2003) mentioned in his studies about bank profitability that ROA measures the profit earned per dollar of assets and reflect how well bank management uses the bank's real investments resources to generate profit.

ROE

Return on Equity (ROE) is defined as Net Income over Total Equity. Gul et al. (2011) clarified in their study the importance of profitability, saying that, ROE can tell how profitable a firm or a bank is from every unit of capital invested by shareholders. Moreover, the higher the ratio is the more effective the bank can be and the more return it could get. This also means that a bank with a higher ratio of ROE has a good background of equity.

4.2.2 Independent Variables:

Capital Adequacy

It is a ratio of Capital over Total Asset; it is stated as a percentage of a bank's risk weighted credit exposures. It is used to protect investors and promote the stability and efficiency of a firm financial system. According to Alper and Anbar (2011) the higher this ratio is, the lower the need for shareholder's equity and that leads to a higher profitability.

Asset Quality

It is calculated as Total loans and Receivables over Total Assets. Gunsel (2007) explained in his study that Asset quality is the main source of risk that banks could face, As a bank includes non performing loans in the portfolio, the exposures of failures are likely. Thus an increasing in loans could lead to a probability of failure.

Management Efficiency

It is determined as Interest Income over Interest Expense; it is used to estimate how well an institution can utilize its assets and liabilities internally. Banks desire to have a higher efficiency ratio which means the bank makes substantial profit more than expenses.

Liquidity

It is evaluated as Liquid Assets over Total Assets; Gunsel (2007) looked closely to the Liquidity risk in his study. He mentioned that Liquidity ratios are estimated to be positively and negatively associated with a possibility of failure. To emphasis more,

when the ratio is high that means there is existence of liquid assets and low probability of failure on the bank that gives a high confidence to depositors to be attracted. However, higher liquidity ratio can also mean weak financial activity in the institution and thus it is related to a higher probability of failure.

Bank Size

In most context of articles or thesis, Total Asset is represented by Bank Size. Usually, the impact of bank size on profitability is expected to be positive, in other words, the larger the size, the more profit a bank could get, Athanasoglou et al. (2005). They also pointed out that even if a bank has an extreme size of asset, this may lead to a negative impact on profitability due to bureaucracy or any other reasons.

Inflation rate

It is an overall increase in prices. Economically, inflation (i) is a rate of increase in price index. Furthermore, the formula is defined as Price of initial year (Po) minus Price of last year (P1) over Price of last year (P1) times hundred (100).

$$i = \frac{Po - P1}{P1} * 100$$

Central Banks around the world seek to minimize the prices of goods and services at an affordable level in order to avoid inflation.

Athanasoglou et al. (2005) considered the inflation impact on profitability; they suggested that the relationship between Inflation and profitability is ambiguous. The data of inflation was found from the World Bank website[8].

Gross Domestic Product (GDP) growth rate:

The economic growth rate calculated as $\frac{GDP2 - GDP1}{GDP1}$, it provides an approach into the general direction and magnitude of the growth for the overall economy.

Log Size:

The logarithm of a bank size or Total Assets. Total Assets are absolute numbers in the balance sheet, thus Logarithm of bank size is taken to run the regression analysis.

Dummy Variable:

In a regression analysis a dummy variable also known as indicator variable, takes the values 0 or 1 to point out some unconditional effect that may be expected to shift the output. In this thesis, there is a single dummy that contains both the national crisis of 2001 and the global crisis of 2008. It is used to underline how the Turkish commercial Banks have been confronted by the 2 crisis.

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[8] http://data.worldbank.org/country/turkey

4.3 Methodology

The balanced panel data is a combination of cross section and time series; it is used here to run regression analysis on bank profitability. In order to evaluate if the data are stationary or not, unit root test is required. Davydenko (2011) stated in his researches that stationary is implemented to detect if the mean, variance and autocorrelation of a variable do not change with time. In this case, the unit root test confirmed that all variables are stationary[9], which means we proceed with the regression analysis.

Once the stationary is established, Ordinary Least Square (OLS) method is applied to estimate the profitability of the Turkish Banks. In order to use OLS, Econometric views (E-views) is employed to run the regression analysis. The OLS method can be less effective when it comes to multicollinearity in the model, so in case of that, Var model(Vector Auto regression model) estimation method can be used at lag1, lag2 and so on in order to eliminate the multicollinearity and find significant variables at a best fitted model.

Moreover, each model of the 3 categories of bank plus the general model is evaluated by ROA and ROE with and without the financial crisis.)

The Econometric form of the Panel Regression is:

$$Y_i = \beta_0 + \beta X_i + D_i + \varepsilon_t$$

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[9] The tables of unit root test are on Appendix

Where:

Yi is the dependent variable of the function

β_0 is the intercept of model

Xi repesents the independent variables in the corresponding time (i)

Di is the dummy variable in period i

ε_t represents error term

In this study the models are as follow:

Y= f (CAR, ASQ, EFF, LQR, SIZE, INF, GRT)

$$ROA=\beta_0+\beta_1(CAR)+\beta_2(ASQ)+\beta_3(EFF)+\beta_4(LQR)+\beta_5(SIZE)+\beta_6(INF)+\beta_7(GRT)+\varepsilon_t$$

$$ROE=\beta_0+\beta_1(CAR)+\beta_2(ASQ)+\beta_3(EFF)+\beta_4(LQR)+\beta_5(SIZE)+\beta_6(INF)+\beta_7(GRT)+\varepsilon_t$$

Y= f (CAR, ASQ, EFF, LQR, SIZE, INF, GRT, DUMMY)

$$ROA=\beta_0+\beta_1(CAR)+\beta_2(ASQ)+\beta_3(EFF)+\beta_4(LQR)+\beta_5(SIZE)+\beta_6(INF)+\beta_7(GRT)+Di+\varepsilon_t$$

$$ROE=\beta_0+\beta_1(CAR)+\beta_2(ASQ)+\beta_3(EFF)+\beta_4(LQR)+\beta_5(SIZE)+\beta_6(INF)+\beta_7(GRT)+Di+\varepsilon_t$$

Chapter 5

EMPIRICAL RESULTS

5.1 Correlation Analysis

Correlation analysis shows the relationship between the variables. The correlation of variables is categorized into 3 groups of banks (public, private and foreign banks) and one group that take all the banks together. Therefore, Correlation Analysis is implied to forecast how the selected independent variables can influence the profitability indicators (ROA, ROE). It is also used to test the model to see if there is multicollinearity amongst the independent variables. In all the tables below, ROA and ROE are positively correlated.

Table 5.1: Correlation Analysis: All banks

	ROA	ROE	CAR	ASQ	LQR	EFF	LSIZE	INF	GRT
ROA	1.000000								
ROE	0.289984	1.000000							
CAR	0.333952	0.066691	1.000000						
ASQ	0.059220	0.111552	-0.294241	1.000000					
LQR	0.115393	-0.008702	0.432404	-0.664171	1.000000				
EFF	0.145939	-0.002460	0.486539	-0.205463	0.295602	1.000000			
LSIZE	0.097862	0.064368	-0.418350	0.410955	-0.437237	-0.242428	1.000000		
INF	-0.349865	-0.165201	-0.027986	-0.441824	0.015196	-0.096742	-0.307366	1.000000	
GRT	0.286703	0.155546	-0.063761	0.094755	0.070466	-0.035101	0.053855	-0.378874	1.000000

In this table, CAR, ASQ, LQR, EFF, LSIZE and GRT are positively related to ROA, same case for ROE as well except LQR and EFF, they are inversely related to it. However, INF is negatively correlated to both ROA and ROE. Another relevant point is that, explanatory variables are not highly correlated to each other, thus no sign of multicollinearity can be identified.

Table 5.2: Correlation Analysis: Public banks

	ROA	ROE	CAR	ASQ	LQR	EFF	LSIZE	INF	GRT
ROA	1.000000								
ROE	0.964936	1.000000							
CAR	0.484362	0.454996	1.000000						
ASQ	0.223220	0.177647	0.146780	1.000000					
LQR	0.063092	0.017223	-0.217889	0.159996	1.000000				
EFF	0.413117	0.402114	0.357147	**0.516260**	-0.048234	1.000000			
LSIZE	0.477615	0.474278	0.194756	0.395255	0.072309	**0.715618**	1.000000		
INF	-0.663513	-0.594714	-0.330478	**-0.606585**	-0.198203	**-0.599079**	**-0.722426**	1.000000	
GRT	0.561770	0.511542	0.336258	-0.001019	0.215865	0.044347	0.083236	-0.378874	1.000000

In the correlation analysis of Public banks, all the explanatory variables are positively related to both dependent variables except the inflation that have a negative impact on them.

Table 5.3: Correlation Analysis: Private Banks

	ROA	ROE	CAR	ASQ	LQR	EFF	LSIZE	INF	GRT
ROA	1.000000								
ROE	0.321187	1.000000							
CAR	0.521355	0.180419	1.000000						
ASQ	0.400977	0.235530	0.315203	1.000000					
LQR	-0.064751	-0.048912	0.067046	-0.482388	1.000000				
EFF	-0.104033	-0.139235	0.131582	0.238200	0.113049	1.000000			
LSIZE	0.254028	0.103555	0.382234	0.056892	0.189959	0.061099	1.000000		
INF	-0.469377	-0.201963	-0.385771	**-0.797185**	0.239530	-0.192925	-0.319440	1.000000	
GRT	0.391462	0.179933	0.127184	0.209244	0.028558	-0.171532	0.023735	-0.378874	1.000000

For the case of private banks, CAR, ASQ, LSIZE and GRT affect the dependent variables (ROA & ROE) positively. On the other hand, LQR, EFF and INF have an inverse relationship toward both dependent variables.

Table 5.4: Correlation Analysis: Foreign Banks

	ROA	ROE	CAR	ASQ	LQR	EFF	LSIZE	INF	GRT
ROA	1.000000								
ROE	0.817923	1.000000							
CAR	0.332541	0.070791	1.000000						
ASQ	-0.044275	0.110337	-0.405528	1.000000					
LQR	0.157919	-0.038710	0.392077	-0.832242	1.000000				
EFF	0.176034	0.042256	0.455276	-0.257201	0.248995	1.000000			
LSIZE	0.071967	0.199542	-0.443377	**0.704487**	-0.482540	-0.173642	1.000000		
INF	-0.266946	-0.208665	0.057781	-0.278590	-0.032915	-0.106706	-0.415972	1.000000	
GRT	0.213193	0.271580	-0.141846	0.063882	0.079580	-0.033203	0.097528	-0.378874	1.000000

In this table of correlation analysis of foreign banks, CAR, LQR, EFF, LSIZE and GRT are the variable that have a positive impact on ROA and the rest are inversely related to it. Furthermore, ROE is positively affected by CAR, ASQ, EFF, LSIZE and GRT, and the remaining independent variables have negative effect.

One thing it's realized in this correlation analysis is that inflation has a negative impact on profitability. As it is defined an increase in overall price, basically as price goes up, no profit can be expected from it whether it is a return on assets or equity. Furthermore, CAR which the ratio of total equity over total assets, it is realized to be positively related to profitability in all the category above which means many equity shareholders invest in the firm which boost up its capital ,thus attracting more customers and leading to flow of profit at the end.

Negative correlation of LQR and EFF toward profitability has been observed in the private sector. In the case of LQR, the private sector holds on more assets than liquid

ones, which lead to have a less liquidity ratio. EFF that is used to estimate the efficiency of an institution, the correlation analysis brings out that it is negatively correlated to the profitability to the private sector. However EFF is detected as a positive effecter on profitability of foreign banks. As expected, bank size has positive relationship toward the profitability of the all category of banks listed above.

Multicollinearity is noticed on public, private and foreign banks, which needs to be eliminated in order to carry on with the research, in that case Var model at lag 1 is used to eradicate the multicollinearity.

Table 5.5 Regression Analysis of All Banks

ALL Banks				
	ROA	ROE	ROA(dummy)	ROE(dummy)
Constant				
Coefficient	-4.734548	-82.79551	-4.240345	-76.74801
Prob.Value	(0.0343)	(0.2905)	(0.0553)	(0.3288)
T-Stat	[-2.128632]	[-1.059348]	[-1.925568]	[-0.978465]
CAR				
Coefficient	0.176346	1.639446	0.171701	1.582606
Prob.Value	(0.0000)*	(0.0907)***	(0.0000)*	(0.10)***
T-Stat	[6.418867]	[1.698242]	[6.321394]	[1.635810]
ASQ				
Coefficient	-0.000465	0.637532	0.000301	0.646900
Prob.Value	(0.9795)	(0.3162)	(0.9866)	(0.3093)
T-Stat	[-0.025732]	[1.004385]	[0.016871]	[1.018787]
LQR				
Coefficient	0.002116	0.186577	0.002850	0.195559
Prob.Value	(0.8991)	(0.7504)	(0.8626)	(0.7389)
T-Stat	[0.126921]	[0.318507]	[0.173221]	[0.333720]
EFF				
Coefficient	-0.000693	-0.028311	-0.000661	-0.027930
Prob.Value	(0.6121)	(0.5553)	(0.6236)	(0.5608)
T-Stat	[-0.507697]	[-0.590613]	[-0.491375]	[-0.582515]
LSIZE				
Coefficient	0.442145	3.728630	0.445119	3.765019
Prob.Value	(0.0021)*	(0.4566)	(0.0017)*	(0.4523)
T-Stat	[3.107305]	[0.745724]	[3.170101]	[0.752809]
INF				
Coefficient	-0.047561	-0.410536	-0.037462	-0.286960
Prob.Value	(0.0123)**	(0.5361)	(0.0494)**	(0.6714)
T-Stat	[-2.522096]	[-0.619546]	[-1.975039]	[-0.424742]
GRT				
Coefficient	0.179675	3.005377	0.098590	2.013148
Prob.Value	(0.0001)*	(0.0666)***	(0.0717)***	(0.3008)
T-Stat	[3.870369]	[1.842352]	[1.808965]	[1.037033]
DUMMY				
Coefficient	-	-	-1.946561	-23.81980
Prob.Value	-	-	(0.0065)*	(0.3464)
T-Stat	-	-	[-2.746001]	[-0.943390]
R-squared	0.296719	0.052880	0.318056	0.056365
F-stat	14.58594	1.930215	14.05020	1.799419
Prob.Value	0.000000*	0.065515***	0.000000*	0.077828***

*Indicates significance at 1% level

** Indicates significance at 5% level

*** Indicates significance at 10% level

Table 5.6 Regression Analysis of, Public, Private and Foreign Banks Using VAR model
        (ROA)

	Public Banks	Private Banks	Foreign Banks
		ROA	
Constant			
Coefficient	4.437619	-0.694600	-7.239121
Prob.Value	(3.42891)	(2.84356)	(2.10168)
T-Stat	[1.29418]	[-0.24427]	[-3.44445]
CAR(-1)			
Coefficient	-0.107097	-0.175899	0.062724
Prob.Value	(0.06057)	(0.06268)	(0.02469)
T-Stat	[-1.76819]	[-2.80651]*	[2.54030]**
ASQ(-1)			
Coefficient	-0.016351	-0.003758	0.013599
Prob.Value	(0.01128)	(0.02737)	(0.02290)
T-Stat	[-1.44960]	[-0.13730]	[0.59397]
LQR(-1)			
Coefficient	-0.013668	0.014092	0.041279
Prob.Value	(0.00893)	(0.02112)	(0.01827)
T-Stat	[-1.52980]	[0.66722]	[2.25961]**
EFF(-1)			
Coefficient	-0.005810	0.011738	0.003801
Prob.Value	(0.00952)	(0.00626)	(0.00193)
T-Stat	[-0.61005]	[1.87403]*	[1.97328]***
LSIZE(-1)			
Coefficient	0.139278	0.218892	0.473406
Prob.Value	(0.30248)	(0.16384)	(0.19572)
T-Stat	[0.46046]	[1.33604]	[2.41879]**
INF(-1)			
Coefficient	-0.031271	0.007030	0.049209
Prob.Value	(0.01549)	(0.02518)	(0.01605)
T-Stat	[-2.01927]*	[0.27923]	[3.06685]*
GRT(-1)			
Coefficient	0.023764	-0.068749	0.124174
Prob.Value	(0.04332)	(0.05081)	(0.04485)
T-Stat	[0.54863]	[-1.35318]	[2.76885]**
R-squared	0.494468	0.190693	0.314569
F-stat	2.200753**	2.120623**	6.195644*
Prob.Value			

*Indicates significance at 1% level

** Indicates significance at 5% level

*** Indicates significance at 10% level

Table 5.7 Regression Analysis of, Public, Private and Foreign Banks Using VAR model
(ROA) with Dummy

	Public Banks	Private Banks	Foreign Banks
	ROA		
Constant			
Coefficient	3.143304	-0.618526	-7.457128
Prob.Value	(3.46836)	(2.86056)	(2.11040)
T-Stat	[0.90628]	[-0.21623]	[-3.53351]
CAR(-1)			
Coefficient	-0.124213	-0.173528	0.061449
Prob.Value	(0.06030)	(0.06312)	(0.02471)
T-Stat	[-2.06009]**	[-2.74908]**	[2.48722]**
ASQ(-1)			
Coefficient	-0.009906	-0.006192	0.015618
Prob.Value	(0.01192)	(0.02785)	(0.02296)
T-Stat	[-0.83076]	[-0.22232]	[0.68022]
LQR(-1)			
Coefficient	-0.019503	0.013364	0.042191
Prob.Value	(0.00966)	(0.02126)	(0.01828)
T-Stat	[-2.01895]**	[0.62850]	[2.30833]**
EFF(-1)			
Coefficient	-0.008449	0.012070	0.003995
Prob.Value	(0.00947)	(0.00632)	(0.00193)
T-Stat	[-0.89193]	[1.90918]***	[2.06607]**
LSIZE(-1)			
Coefficient	0.330058	0.207115	0.456186
Prob.Value	(0.32497)	(0.16598)	(0.19627)
T-Stat	[1.01566]	[1.24781]	[2.32425]**
INF(-1)			
Coefficient	-0.025738	0.004252	0.046444
Prob.Value	(0.01561)	(0.02579)	(0.01625)
T-Stat	[-1.64920]	[0.16492]	[2.85890]*
GRT(-1)			
Coefficient	0.025009	-0.055178	0.152893
Prob.Value	(0.04223)	(0.05658)	(0.05233)
T-Stat	[0.59223]	[-0.97525]	[2.92159]*
Dummy(-1)			
Coefficient	-0.574075	0.365845	0.671690
Prob.Value	(0.41135)	(0.65757)	(0.63185)
T-Stat	[-1.39558]	[0.55636]	[1.06305]
R-squared	0.546431	0.194206	0.321733
F-stat	2.275617**	1.901315***	5.639435*
Prob.Value			

*Indicates significance at 1% level

** Indicates significance at 5% level

*** Indicates significance at 10% level

Table 5.8 Regression Analysis of, Public, Private and Foreign Banks Using VAR model
(ROE)

	Public Banks	Private Banks	Foreign Banks
	ROE		
Constant			
Coefficient	26.31529	-12.13275	-30.21755
Prob.Value	(34.0516)	(34.4428)	(12.8724)
T-Stat	[0.77281]	[-0.35226]	[-2.34747]
CAR(-1)			
Coefficient	-1.824655	-2.291399	0.124535
Prob.Value	(0.58200)	(0.68976)	(0.14824)
T-Stat	[-3.13514]*	[-3.32202]*	[0.84007]
ASQ(-1)			
Coefficient	-0.215064	0.201186	-0.001183
Prob.Value	(0.10914)	(0.33520)	(0.14172)
T-Stat	[-1.97052]***	[0.60020]	[-0.00834]
LQR(-1)			
Coefficient	-0.005937	0.210385	-0.032586
Prob.Value	(0.08725)	(0.25819)	(0.11312)
T-Stat	[-0.06805]	[0.81483]	[-0.28807]
EFF(-1)			
Coefficient	-0.185304	0.101110	0.018968
Prob.Value	(0.09235)	(0.07647)	(0.01188)
T-Stat	[-2.00644]**	[1.32225]	[1.59600]
LSIZE(-1)			
Coefficient	5.542518	1.910642	3.662553
Prob.Value	(2.96045)	(1.99692)	(1.21356)
T-Stat	[1.87219]***	[0.95680]	[3.01802]*
INF(-1)			
Coefficient	-0.315392	0.097460	0.337512
Prob.Value	(0.14908)	(0.30819)	(0.09881)
T-Stat	[-2.11555]**	[0.31623]	[3.41582]*
GRT(-1)			
Coefficient	-0.045158	-0.296028	0.469378
Prob.Value	(0.41859)	(0.59497)	(0.28039)
T-Stat	[-0.10788]	[-0.49755]	[1.67401]
R-squared	0.741930	0.207094	0.246812
F-stat	6.468573*	2.350645**	4.423804*
Prob.Value			

*Indicates significnce at 1%

** Indicates significance at 5% level

*** Indicates significance at 10% level

Table 5.9 Regression Analysis of, Public, Private and Foreign Banks Using VAR model
(ROE) with Dummy

	Public Banks	Private Banks	Foreign Banks
	ROE		
Constant			
Coefficient	14.71473	-12.41369	-29.87086
Prob.Value	(34.3787)	(34.6512)	(13.0082)
T-Stat	[0.42802]	[-0.35825]	[-2.29632]
CAR(-1)			
Coefficient	-2.000171	-2.341033	0.125489
Prob.Value	(0.58362)	(0.70448)	(0.14895)
T-Stat	[-3.42715]*	[-3.32305]*	[0.84251]
ASQ(-1)			
Coefficient	-0.158364	0.219033	-0.004119
Prob.Value	(0.11464)	(0.34001)	(0.14286)
T-Stat	[-1.38138]	[0.64419]	[-0.02883]
LQR(-1)			
Coefficient	-0.057063	0.217219	-0.034141
Prob.Value	(0.09330)	(0.26025)	(0.11380)
T-Stat	[-0.61164]	[0.83465]	[-0.30002]
EFF(-1)			
Coefficient	-0.211542	0.098864	0.018674
Prob.Value	(0.09235)	(0.07711)	(0.01200)
T-Stat	[-2.29055]**	[1.28204]	[1.55639]
LSIZE(-1)			
Coefficient	7.245601	2.005709	3.685074
Prob.Value	(3.15631)	(2.02220)	(1.22244)
T-Stat	[2.29559]**	[0.99185]	[3.01452]*
INF(-1)			
Coefficient	-0.255514	0.122540	0.341645
Prob.Value	(0.15233)	(0.31609)	(0.10070)
T-Stat	[-1.67738]	[0.38768]	[3.39256]*
GRT(-1)			
Coefficient	-0.066464	-0.428812	0.428580
Prob.Value	(0.40956)	(0.68197)	(0.32832)
T-Stat	[-0.16228]	[-0.62878]	[1.30538]
Dummy(-1)			
Coefficient	-5.099429	-3.184028	-0.945322
Prob.Value	(3.76915)	(7.84183)	(3.91044)
T-Stat	[-1.35294]	[-0.40603]	[-0.24174]
R-squared	0.767016	0.208930	0.247223
F-stat	6.218499*	2.083544**	3.904481*
Prob.Value			

*Indicates significnce at 1%

** Indicates significance at 5% level

*** Indicates significance at 10% level

5.2 Regression Analysis Result

As the correlation analysis between variables is drawn out, in this specific part of the thesis, the results of regression model is run through the E-views software by analyzing all the specific ratios of the different bank selected. In order to explain how the explanatory variables affect the profitability (ROA& ROE), eight estimated regression analysis has been run and categorized into four main models. Model one (1) that take all the selected banks into consideration and run the regression with dummy and without dummy to see how the two (2) crises affected the banks during that periods. Model two (2) for the public banks run through the same procedures of the general model (1) and the same goes to private and foreign banks.

5.2.1 Regression Analysis Result of All Banks

5.2.1.1 Result without Dummy

In table 5.5, the models of all Banks are best fitted at 1% for ROA and at 10% for ROE, and also some variables that have positive/negative impact on profitability have been brought out. Firstly, capital adequacy ratio (CAR) has a positive impact on return on asset at 1% significance level (0.000<1%), and on return on equity at 10% (0.090 <10%).This result is consistent with the work of Athanasoglou et al. (2005), they mention that a bank with a good background of capital has the opportunity to be more efficient and be able to deal with any unexpected loss that could occur, and thus it achieves an increase in profitability. Basically, as CAR is total equity/ total assets, the higher this ratio could be the more profitable is the

institution; this is because many equity shareholders contribute to the well performance of the organization.

Ramall (2009) point out that profitability is positively affected by capital; the study also indicates that a bank with large amount of capital is expected to extend more loans to customers which in turn create an incentive for profit making.

Considering Bank size, the regression result shows a direct positive impact of total asset on returns (ROA) at 1% significant level (0.002<1%). This indication broadens the fact that changes in bank assets grossly impact on profitability, specifically on return on assets. This output is also consistent with the study by Alper and Anbar (2011) that examine how the total assets affect the Turkish banks positively at 1% level of significance. However, Bank size does not have an effect on return on equity (ROE) in other words; it is even insignificant at 10% level.

Cyclicality of bank profit has been argued by different scholars as a significant component to be considered when modeling for bank performance. In Turkey, the study shows that Turkish banks are prone to price changes as this affects nominal rates and cost of working capital. Inflation in turkey shows a negative impact on return on assets (ROA) at 5 % level of significance (0.012 < 5%) but it does not have any significance on return on equity (ROE). This result of insignificance of inflation on return on equity has been stated in the work of Davydenko (2011) by saying, when holding everything constant, inflation has an insignificance level in the dynamic model. As it is also mentioned early in the methodology section,

Athanasoglou et al. (2005) noted that inflation has an ambiguous relationship with profitability.

Additionally, the economic growth in Turkey has a positive impact on profitability. ROA positively related at 1% level of significance (0.0001<1%) and ROE is at 10% (0.0666< 10%). Turkey is one of the fastest growing economies in the world during the years of 2002-2007, that create an opportunity for the financial sector to widen its business. This output also stands in line with the finding of Dietrich and Wanzenried (2009) that focus on the profitability of the Swiss banks; clearly, there is a positive impact of more business opportunities caused to rise by economic growth on profitability.

Some variables that were selected among the independent variables do not have any significant impact on profitability. For instance in the case of ROA; ASQ, EFF and LQR are insignificant, and for ROE; ASQ, EFF, LQR, SIZE and INF are insignificant. What is more, when ROA is considered as dependent variable, R-square is 0.2967, which means 29.67% change in profitability. In all banks, it can be explained in terms of changes in CAR, ASQ, LQR, EFF, LSIZE, INF and GRT and the 70.33% remaining can be explained by other variables that are not included in the model. In the case of ROE when its R-square is 0.052880 ,which shows that 5.288% changes in profitability of all banks can be explained in terms of changes in CAR , ASQ, LQR, EFF, LSIZE , INF and GRT and the remaining 94.71% can be elaborated by the others factors that are not part of the model.

5.2.1.2 Result with Dummy

In table 5.5, When ROA is run with a dummy in the model of all Banks; the outcomes obtained are basically the same as the ones when the ROA is run without dummy, but their level of significance differ. For instance CAR and LSIZE are significant at 1%, INF is significant at 5%, and GRT is significant at 10%. The Dummy is 0.0065 which is also significant at 1% level.

Its significance shows that the national crisis of 2001 and the global crisis of 2008 had a huge negative impact on commercials banks in Turkey in terms of profitability. On the other hand, when the dummy is run with ROE, only the CAR is significant at 10% although ROE with no dummy has two (2) significant. This also shows, the Dummy is insignificant in the model.

R-squared of ROA and ROE are 31.8% and 5.63% respectively. The F statistic under both models shows that the selected variables, including the dummy variable are jointly significant and the models are indicative of this study.

5.2.2 Regression Analysis Result of Public Banks

5.2.2.1 Result without Dummy

In table 5.6 and 5.8, The INF of public banks appears to be highly significant in the model. Its effect is negatively related to profitability that includes ROA and ROE at 5% level of significance. In Turkey, public banks are the ones expecting a bail out from government in case of deficiency or bankruptcy. So, when inflation emerges in the market, overall prices of products go up, interest rate goes up and that leads to costlier loans. Mostly, public banks are the ones with low asset size compare to private or foreign banks. When such troubles occur, the banks expect the

government to show up for a rescue which in the other hand are not be able to do so. Thus, these banks in category of public sector seek to manage themselves and struggle through against such dilemma.

None of the other explanatory variables have a significant impact on return on assets. However, some do have towards the return on equity in table 5.8. For instance, ASQ which is one of most regular component that affect profitability is significant at 10% level. In this case, it influences the ROE negatively. Loans are the main source of income of a bank, which are expected to be a positive inflow in return, but in this scenario, this negativity indicates a sign of weakness in the credit portfolio of the bank.

Similarly, CAR has a huge negative impact on ROE at 1% level of significance. This means that public banks in Turkey have a low capital which keeps them out of the chase of profit.

Bank size which is also another variable that affect the return on equity positively. As , it's stated earlier in the interpretation of the general model, capital plays an important role in the banking sector, and in most cases it has a direct positive impact on profitability specially on ROE at 10% level of significance.

EFF is obtained to have a significant level at 5%; its relationship is negative to return on equity. This shows the weakness of the public banks in management in other words, its expenditures are higher than its income.

Furthermore, when ROA is pointed as dependent variable, R-squared is 0.4944, which demonstrates that 49.44% change in profitability in Public banks can be elucidated in terms of changes in CAR , ASQ, LQR, EFF, LSIZE , INF and GRT and the 50.56% remaining can be explained by other variables that are not included in the model. In the case of ROE, its R-squared is 0.7419 ,which shows that 74.19% changes in profitability of public banks can be explained regarding the changes in CAR , ASQ, LQR, EFF, LSIZE , INF and GRT and the remaining 25.81% can be explained by the others factors that are not part of the model. The F-statistic probability shows 2.200 for ROA and 6.468 for ROE; precisely the models are best fitted at 5% and 1% respectively.

5.2.2.2 Result with Dummy

When the dummy is incorporated in the model, there are some few changes that affect the profitability, although the dummy does not make the significance level.CAR and LQR have an inverse relationship with return on assets in table 5.7. However, when the dummy is run with ROE in table 5.9; CAR and EFF affect it negatively but the bank size has a positive impact on it.

R-squared of ROA is 54.64% and 76.70% for ROE .The F statistic of both models shows significance at 5% and 1% respectively.

5.2.3 Regression Analysis Result of Private Banks

5.2.3.1 Result without Dummy

Private Banks are the ones owned by partnership or limited partnership and so on. They are nongovernmental institution. In the above table 5.6 and 5.8, CAR impacts the profitability at 5% and 1% respectively of ROA and ROE. The ratio is negatively

related to profitability, this obviously bring out the non access of capital in the private sector. As it is formed by partnership, once the owners of these institutions have limited resources of equity or non shareholders coming in, this will lead to an eventual failure.

No other explanatory variables have an impact on public banks profitability except the management efficiency on ROA. EFF, this ratio has a positive impact at 10% level of significance. Basically, we could say that although private banks do not have much opportunity to capital but they are good at managing their institution quietly.

In addition to that, if ROA is the dependent variable, R-squared is 0.1906 in the model, which illustrates that 19.06% change in profitability in Private Banks. It can be explained in terms of changes in CAR, ASQ, LQR, EFF, LSIZE, INF and GRT and the 80.94% remaining can be explained by other variables that are not in the model. In the case of ROE, its R-squared is 0.2070 ,which shows that 20.70% changes in profitability of private banks can be explained in terms of changes in CAR , ASQ, LQR, EFF, LSIZE , INF and GRT and the remaining 79.30% can be explained by the others factors that are not part of the model. The F-statistic probability shows 2.12 for ROA and 2.35 for ROE; hence the models are best fitted at 5%.

5.2.3.2 Result with Dummy

In the table 5.7 and 5.9 when the dummy is implemented in the model. In both cases of ROA and ROE, the same variables as the ones without dummy are significant. CAR is significant at 5% for ROA and 1% for ROE and EFF significant at 10% level

for ROA. The dummy is still not significant in both scenarios. Furthermore, the R-squared are quite the same, 19.42% and 20.89% and F-statistic are 1.90 significant at 10% and 2.08 at 5% respectively of ROA and ROE.

5.2.4 Regression Analysis Result of Foreign Banks

5.2.4.1 Result without Dummy

As it is given in table 5.6 and 5.8 where the focus is switched to foreign banks, there are some interesting result compare to public and private banks. Schafer and Talavera (2007) mentioned that foreign banks bring new product, new management strategy, and a sound corporate governance culture that will make the host country in a good development track. All of the significant variables have a positive impact on profitability either on return on assets or equity.

This positive impact is because, foreign banks are less influenced by the local markets conditions and also have the opportunity to access the international market as it is mentioned in the research of Havrylchyk and Jurzyk (2010). Considering ROA as dependent variable for the model, all the explanatory variables are significant except the asset quality ratio (ASQ), but ROE is significant with only LSIZE and INF. Firstly, CAR, significant at 5% level, is the ratio that protects investors from instability or inefficiency, as it is positively related to ROA that shows the bank's strength in terms of profitability. This strength of equity, allow the banks to be less needy to have external funding from a second party or outside investors. So the bank has the capability to control its capital in a way that benefit itself and make profit out of it.

Likewise, liquidity ratio (LQR) is significant at 5% level; its impact is on return on assets. Davydenko (2011) mentions in his study that positive effect of LQR indicates how well are the ability of foreign banks to manage their business. This study extends to the finding that the possibility of having better LQR in foreign banks is because they have the opportunity to invest in different short term liquidity abroad while the domestic markets will not get the chance to do so. A bank with such a LQR has more of liquid assets in its balance sheet; this catches the attention of domestic customers to shift toward the foreign bank, and that will lead to more of loans and deposits or any other transactions and ending up with a good profit in favor of the bank.

Management efficiency (EFF) which is the ratio that ease the work to know how the assets and liability are efficiently utilized. It impacts the ROA at 10% level of significance. It is measured by the interest income over the interest expenses in this study, when the interest income is higher than interest expense which evidently the case here, the institution clearly create a good sound of management in its area, and open the door of many opportunities that could come along to revitalize the bank.

In addition to that, Bank size affects both return on asset and equity at 5% and 1% level of significance respectively. Foreign banks reach the outside world to deal with in terms of transaction; the source of fund of foreign banks is not just from domestic market. Even in a case of default, these foreign banks usually get a funding support from their parent banks, which give them the good reputation in the host country. Subsequently, Turkish customers approach such sector to avoid failure.

That is why; foreign banks in Turkey have the highest bank size in the commercial banking industry.

Surprisingly, inflation (INF) has a positive relationship with profitability significant at 1% level. Possibly this is due to the ability of better management. This can also be explained by the fact that foreign banks correctly forecast the inflation with the help of parent banks, and try to adjust the interest rate accordingly in order to earn profit, basically the foreign banking sector appear to be successfully anticipate the overall price of products, seek to cope with it and make profit eventually ,Davydenko (2011).

The impact of economic growth (GRT) on profitability precisely on ROA is significant at 5% level. As Turkish economy was growing faster especially in the period of 2002-2007, foreign banks took the opportunity to broaden its business not only in the local market but also to the outside world.

Furthermore, if ROA is ran as dependent variable, its R-squared is 0.3145, which shows that 31.45% change in profitability in Foreign banks can be explained in terms of changes in CAR , ASQ, LQR, EFF, LSIZE , INF and GRT and the 68.55% remaining can be elaborated by other variables that are not part of the model. In the case of ROE, its R-squared is 0.2468 ,which means that 24.68% changes in profitability of Foreign banks can be explained in terms of changes in CAR , ASQ, LQR, EFF, LSIZE , INF and GRT and the remaining 75.32% can be explained by the others factors that are not included in the model. The F-statistic probability

shows 6.195 for ROA and 4.423 for ROE or in other word; both models are best fitted at 1%.

5.2.4.2 Result with Dummy

In the table 5.7 and 5.9, the results of dummy give the same positive significant variable as the ones ran without dummy only their level of significance differ at some point. For instance in the case of ROA; CAR, LQR, EFF, LSIZE and INF are at 5% and GRT is at 1%. On the other hand of ROE; LSIZE and INF are significant at 1%. Basically, the same interpretation above can be given here as well. Unfortunately the dummy of ROA and ROE are not significant in the model. Their R-squared are 32.17% and 24.72%.The F-statistic are 5.639 and 3.904 respectively significant at 1%.

5.3 Comparison between the categories of banks

The result above of public, private and foreign banks definitely indicates that foreign banks are efficient, reliable than domestic banks (public and private). Firstly, all of the selected significant variables have positive impact on foreign banks profitability especially the return on assets. They hold a huge amount of assets which play an important in their success.

Moreover, a rise in inflation which is expected to be negative in relation to profitability like in the case of public banks, but it causes a positive impact on profitability of foreign banks. This indicates that foreign banks were able to forecast the overall prices and knew how to adjust with it and make profit in a ways that none

of domestic banks could. This success of foreign banks is also because Turkey is one of the developing countries in the world which reaches to the outside world in terms of business. On other hand, management efficiency and bank size affect the domestic banks in some cases in a positive way. Although they are not as good as foreign banks but still they can stand up for themselves in a financial failure or in any other default.

When considering the crisis of 2001 and 2008, based on the result obtained, foreign banks were able to resist them in any way to avoid deficiency. This give them the courage of attract more customers. However, public and private banks are the victims of the crisis, but still some of them are still in the market.

Chapter 6

CONCLUSION AND SUGGESTION

The aim of this study is to investigate the profitability of 25 commercial banks selected based on their assets, to be evaluated in accordance with some ratios that are follows: CAR, ASQ, LQR, EFF, LSIZE, INF and GRT. As the research is for the period of 2001-2010, during this range some crisis had happened in Turkey, in order to study the main crisis such of the 2001 national crisis and 2008 global crisis, a single dummy is generated in order to see, how the Turkish commercial banks sustain the crisis.

Similar study was also been conducted, like the work of Alper and Anber (2011) that focus on the profitability of 10 commercial banks in Turkey for the period of 2002-2010 by utilizing some bank-specific and macroeconomic determinants, whom concluded that Bank size contributes to the profitability of commercial banks in Turkey, and some other ratios were also significant with regards to the profitability of these banks. Further research in the same field of profitability was also conducted by Athnasaoglou et al. (2005) that focused on bank-specific, industry specific and macroeconomic determinants of Greek Banks for the period of 1985-2001. Their results showed that capital is an important component to elucidate profitability of Greek Banks and many more ratios were also found significant to this study.

The result found in this thesis shows that all commercial banks ran with ROA as profitability item, demonstrate that CAR, LSIZE and GRT are positively related and INF is the one inversely related to it, the remaining variables are significant. When the dummy is included in the regression, CAR and LSIZE are the ones with a positive relationship but INF and Dummy which is significant, are the negative ones. This evidently tells us that the 2 crisis mentioned above, had a clear negative impact on the Turkish commercial Banks in Turkey. On the other hand, when ROE is the dependent variable of the regression, only CAR and GRT are significant with positive impact, but when the dummy is inserted in the regression, none of the variables are significant including the Dummy itself.

Furthermore, when Public banks are considered, only INF is negatively related to ROA but CAR and LQR are also part of significance when it is run with Dummy which they are negatively related to it. When ROE is taken into consideration; CAR, ASQ, EFF, LSIZE and INF are negatively related but only CAR, EFF and LSIZE are negatively part of it when the Dummy is introduced. Although the dummy is insignificant, they are few changes of variables in the models.

 In the case of Private Banks, CAR is negatively related to both ROA and ROE, and only EFF has a positive impact on ROA, the rest are insignificant. If the Dummy is included in the model, the same variables mentioned on the regression without dummy are significant too, CAR for ROA and ROE with negative impact, and EFF for ROA with positive significance. Unfortunately the dummy is insignificant.

Foreign Banks are the ones with most significant variables with positive impact on profitability. CAR, LQR, EFF, LSIZE, INF and GRT are the significant variables when the ROA is run with and without dummy. The return on equity has only 2 significant which are LSIZE and INF and have the same effect with or without dummy.

For this purpose, domestic banks need to introduce new services to improve the productivity and efficiency that basically lead to profitability. As Public Banks are governmental institutions, the government itself needs to stand up for their banks to keep them on track and to be in the competitive market not always the foreign banks that take over their clients.According to the work of Schafer and Talavera (2007), the growing of foreign banks causes a narrowing profitability for the domestic banks. They suggested the possibility of closing the foreign investment for a period of time in order to protect the growing of domestic markets.

What we finally suggest is that the Central Bank of Turkey, need to revise this high profitability of foreign banks in their country, like to establish an efficient corporate governance, the taxes on these banks should not be the same as the domestic banks because the foreign ones have external funding. And hopefully this suggestion can be a breakthrough for the domestic banks. We believe that this thesis can facilitate further in-depth research in that field.

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APPENDICES

Table 1. Panel Unit Root Tests (All Banks)

Variables	Levels		
	LLC	IPS	M-W
ROA			
τ_T	-66.56*	-17.53*	314.515*
τ_μ	-74.049*	-34.93*	313.902*
τ	-21.98*	-	184.66*
ROE			
τ_T	-465.206	-66.047*	314.07*
τ_μ	-559.88*	-139.097	324.847*
τ	-24.53	-	220.23*
CAR			
τ_T	-10.40*	-1.54***	87.10*
τ_μ	-7.05*	-4.04*	106.32*
τ	1.45	-	34.79
ASQ			
τ_T	-8.90*	-0.40	94.29*
τ_μ	-7.55*	-2.20**	138.51*
τ	5.43	-	27.54
EFF			
τ_T	-5.46*	-0.33	86.81*
τ_μ	-9.14*	-1.96**	67.09***
τ	1.89	-	23.94
LQR			
τ_T	-6.49*	-0.35	127.46*
τ_μ	-7.54*	-3.20*	145.85*
τ	-3.01*	-	81.77*
LSIZE			
τ_T	-22.25*	-0.68	42.72
τ_μ	-15.60*	-4.13*	71.81**
τ	12.48	-	1.53
INF			

	LLC	IPS	M-W
τ_T	-37.21*	-6.93*	39.16
τ_μ	-16.07*	-7.88*	414.28*
τ	-24.47*	-	525.97*
GRT			
τ_T	-7.71*	-2.60*	224.40*
τ_μ	-7.90*	-6.91*	141.45*
τ	-8.11*	-	118.59*

Table 2. Panel Unit Root Tests (public Banks)

		Levels	
Variables	LLC	IPS	M-W
ROA			
τ_T	6.50	-0.65	39.07*
τ_μ	-29.64*	-21.65*	48.35*
τ	-0.12	-	19.48*
ROE			
τ_T	-45.74*	-20.99*	36.89*
τ_μ	-22.62*	-15.62*	45.23*
τ	0.03	-	31.98*
CAR			
τ_T	-3.55*	-0.39	18.63*
τ_μ	-2.18**	-0.71	12.34***
τ	-0.14	-	5.95
ASQ			
τ_T	-0.78	0.07	16.56*
τ_μ	1.78	2.86	0.27
τ	3.38	-	0.05
EFF			
τ_T	1.86**	0.28	5.93
τ_μ	0.09	0.54	2.92

τ	1.65	-	0.60
LQR			
τ_T	-2.05**	0.39	2.98
τ_μ	-0.99	0.09	6.12
τ	-1.06	-	5.11
LSIZE			
τ_T	-2.21**	0.01	10.37***
τ_μ	-4.21*	-0.38	2.42
τ	5.66	-	0.003
INF			
τ_T	-12.89*	-2.40*	4.70
τ_μ	5.56*	-2.73*	49.71*
τ	-8.47*	-	63.11*
GRT			
τ_T	-2.67*	-0.90	26.93*
τ_μ	-2.73*	-2.39*	16.97*
τ	-2.81*	-	14.23**

Table 3. Panel Unit Root Tests (private banks)

		Levels	
Variables	LLC	IPS	M-W
ROA			
τ_T	-37.18*	-16.50*	136.05*
τ_μ	-37.66*	-22.08*	145.74*
τ	-8.33*	-	83.31*
ROE			
τ_T	-477.19*	-88.89*	131.65*
τ_μ	-539.24*	-198.63*	141.57*
τ	-23.32*	-	94.86*
CAR			
τ_T	-7.56*	-1.07	21.74
τ_μ	-4.01*	-2.39*	42.78*

τ	2.16	-	7.98
ASQ			
τ_T	4.28*	-0.13	29.36**
τ_μ	-3.55*	-0.06	42.00*
τ	4.60	-	1.14
EFF			
τ_T	-10.79*	-2.28**	49.82*
τ_μ	5.67*	-2.55*	33.08**
τ	0.29	-	10.58
LQR			
τ_T	-6.66*	-1.26***	43.44*
τ_μ	-2.81*	-0.21	35.12*
τ	-2.55*	-	39.86*
LSIZE			
τ_T	-0.96	0.58	20.04
τ_μ	-2.99*	1.11	5.97
τ	8.09	-	0.45
INF			
τ_T	-22.33*	-4.15*	14.10
τ_μ	-9.64*	-4.73*	149.14*
τ	-14.68*	-	189.3*
GRT			
τ_T	-4.62*	-1.56***	80.78*
τ_μ	-4.74*	-4.14*	50.92*
τ	-4.87*	-	42.69*

Table 4. Panel Unit Root Tests (foreign Banks)

Variables	LLC	IPS	M-W
		Levels	
	LLC	IPS	M-W
ROA			
τ_T	-58.92*	-10.68*	139.38*
τ_μ	-59.11*	-19.75*	119.79*
τ	-25.31*	-	81.85*
ROE			
τ_T	-38.30*	-8.10*	145.52*
τ_μ	-45.95*	-19.56*	138.03*
τ	-19.19*	-	93.38*
CAR			
τ_T	-6.31*	-1.04	46.72*
τ_μ	-6.77*	-3.28*	51.19*
τ	0.11	-	20.85
ASQ			
τ_T	-7.64*	-0.41	48.35*
τ_μ	-9.58*	-4.45*	93.23*
τ	2.07	-	26.34
EFF			
τ_T	2.80	1.20	31.05
τ_μ	-7.38*	-0.86	31.08
τ	1.31	-	12.75
LQR			
τ_T	-2.21**	0.34	81.03*
τ_μ	-6.69*	-4.33*	104.59*
τ	-1.86**	-	37.28***
LSIZE			
τ_T	-21.90*	-1.44***	12.29
τ_μ	-15.59*	-6.51*	63.42*
τ	8.00	-	1.07

INF			
τ_T	-26.83*	-4.99*	20.36
τ_μ	-11.58*	-5.68*	215.42*
τ	-17.65*	-	273.50*
GRT			
τ_T	-5.56*	-1.87**	116.68*
τ_μ	-5.70*	-4.98*	73.55*
τ	-5.85*	-	61.66*

Note for the four tables:
ROA represents return on assets; ROE represents return on equity; CAR represent Capital adequacy; ASQ represents asset quality, EFF represents management efficiency; LQR represents liquidity; LSIZE represents the bank size; INF represents inflation; GRT represents the economic growth of the country; τ_T represents the most general model with a drift and trend; τ_μ is the model with a drift and without trend; τ is the most restricted model without a drift and trend. Optimum lag lengths are selected based on Schwartz Criterion. *, **, ***denote rejection of the null hypothesis at the 1%,5% and 10% level. Tests for unit roots have been carried out in E-VIEWS 6.

Regression Analysis

Regression Analysis of All Banks

Table.5 General Regression Model
Dependent Variable: ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.734548	2.224221	-2.128632	0.0343
CAR	0.176346	0.027473	6.418867	0.0000
ASQ	-0.000465	0.018064	-0.025732	0.9795
EFF	-0.000693	0.001364	-0.507697	0.6121
LQR	0.002116	0.016671	0.126921	0.8991
LSIZE	0.442145	0.142292	3.107305	0.0021
INF	-0.047561	0.018858	-2.522096	0.0123
GRT	0.179675	0.046423	3.870369	0.0001
R-squared	0.296719	Mean dependent var		1.183200
Adjusted R-squared	0.276377	S.D. dependent var		4.078521
S.E. of regression	3.469437	Akaike info criterion		5.357339
Sum squared resid	2912.953	Schwarz criterion		5.470025
Log likelihood	-661.6673	Hannan-Quinn criter.		5.402692
F-statistic	14.58594	Durbin-Watson stat		1.352329
Prob(F-statistic)	0.000000			

Table.6 General Regression Model with Dummy
Dependent Variable: ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.240345	2.202127	-1.925568	0.0553
CAR	0.171701	0.027162	6.321394	0.0000
ASQ	0.000301	0.017827	0.016871	0.9866
EFF	-0.000661	0.001346	-0.491375	0.6236
LQR	0.002850	0.016452	0.173221	0.8626
LSIZE	0.445119	0.140412	3.170101	0.0017
INF	-0.037462	0.018968	-1.975039	0.0494
GRT	0.098590	0.054501	1.808965	0.0717
DUMMY	-1.946561	0.708871	-2.746001	0.0065
R-squared	0.318056	Mean dependent var		1.183200
Adjusted R-squared	0.295419	S.D. dependent var		4.078521
S.E. of regression	3.423483	Akaike info criterion		5.334530
Sum squared resid	2824.576	Schwarz criterion		5.461302
Log likelihood	-657.8162	Hannan-Quinn criter.		5.385552
F-statistic	14.05020	Durbin-Watson stat		1.306134
Prob(F-statistic)	0.000000			

Table.7 General Regression Model

Dependent Variable: ROE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-82.79551	78.15701	-1.059348	0.2905
CAR	1.639446	0.965378	1.698242	0.0907
ASQ	0.637532	0.634749	1.004385	0.3162
EFF	-0.028311	0.047934	-0.590613	0.5553
LQR	0.186577	0.585787	0.318507	0.7504
LSIZE	3.728630	5.000010	0.745724	0.4566
INF	-0.410536	0.662639	-0.619546	0.5361
GRT	3.005377	1.631271	1.842352	0.0666

R-squared	0.052880	Mean dependent var		2.478800
Adjusted R-squared	0.025484	S.D. dependent var		123.4965
S.E. of regression	121.9127	Akaike info criterion		12.47596
Sum squared resid	3596776.	Schwarz criterion		12.58865
Log likelihood	-1551.496	Hannan-Quinn criter.		12.52132
F-statistic	1.930215	Durbin-Watson stat		1.185991
Prob(F-statistic)	0.065515			

Table.8 General Regression Model with Dummy

Dependent Variable: ROE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-76.74801	78.43717	-0.978465	0.3288
CAR	1.582606	0.967476	1.635810	0.1032
ASQ	0.646900	0.634971	1.018787	0.3093
EFF	-0.027930	0.047947	-0.582515	0.5608
LQR	0.195559	0.585997	0.333720	0.7389
LSIZE	3.765019	5.001296	0.752809	0.4523
INF	-0.286960	0.675610	-0.424742	0.6714
GRT	2.013148	1.941257	1.037033	0.3008
DUMMY	-23.81980	25.24916	-0.943390	0.3464

R-squared	0.056365	Mean dependent var		2.478800
Adjusted R-squared	0.025041	S.D. dependent var		123.4965
S.E. of regression	121.9404	Akaike info criterion		12.48028
Sum squared resid	3583543.	Schwarz criterion		12.60705
Log likelihood	-1551.035	Hannan-Quinn criter.		12.53130
F-statistic	1.799419	Durbin-Watson stat		1.180578
Prob(F-statistic)	0.077828			

Regression Analysis of State-owned Banks

Table.9 Public Banks Regression Model (ROA & ROE)

	ROA		ROE
ROA(-1)	-0.121934 (0.07785) [-1.56633]	ROE(-1)	-0.077606 (0.03654) [-2.12407]
CAR(-1)	-0.107097 (0.06057) [-1.76819]	CAR(-1)	-1.824655 (0.58200) [-3.13514]
ASQ(-1)	-0.016351 (0.01128) [-1.44960]	ASQ(-1)	-0.215064 (0.10914) [-1.97052]
LQR(-1)	-0.013668 (0.00893) [-1.52980]	LQR(-1)	-0.005937 (0.08725) [-0.06805]
EFF(-1)	-0.005810 (0.00952) [-0.61005]	EFF(-1)	-0.185304 (0.09235) [-2.00644]
LSIZE(-1)	0.139278 (0.30248) [0.46046]	LSIZE(-1)	5.542518 (2.96045) [1.87219]
INF(-1)	-0.031271 (0.01549) [-2.01927]	INF(-1)	-0.315392 (0.14908) [-2.11555]
GRT(-1)	0.023764 (0.04332) [0.54863]	GRT(-1)	-0.045158 (0.41859) [-0.10788]
C	4.437619 (3.42891) [1.29418]	C	26.31529 (34.0516) [0.77281]
R-squared	0.494468	R-squared	0.741930
Adj. R-squared	0.269787	Adj. R-squared	0.627233
Sum sq. resids	5.086030	Sum sq. resids	470.9477
S.E. equation	0.531561	S.E. equation	5.115052
F-statistic	2.200753	F-statistic	6.468573
Log likelihood	-15.77526	Log likelihood	-76.90663
Akaike AIC	1.835205	Akaike AIC	6.363454
Schwarz SC	2.267150	Schwarz SC	6.795399
Mean dependent	2.281481	Mean dependent	23.55926
S.D. dependent	0.622054	S.D. dependent	8.377821

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Table 10 Public Banks Regression Model (ROA & ROE) with Dummy

	ROA		ROE
ROA(-1)	-0.175195 (0.08493) [-2.06276]	ROE(-1)	-0.094969 (0.03796) [-2.50200]
CAR(-1)	-0.124213 (0.06030) [-2.06009]	CAR(-1)	-2.000171 (0.58362) [-3.42715]
ASQ(-1)	-0.009906 (0.01192) [-0.83076]	ASQ(-1)	-0.158364 (0.11464) [-1.38138]
LQR(-1)	-0.019503 (0.00966) [-2.01895]	LQR(-1)	-0.057063 (0.09330) [-0.61164]
EFF(-1)	-0.008449 (0.00947) [-0.89193]	EFF(-1)	-0.211542 (0.09235) [-2.29055]
LSIZE(-1)	0.330058 (0.32497) [1.01566]	LSIZE(-1)	7.245601 (3.15631) [2.29559]
INF(-1)	-0.025738 (0.01561) [-1.64920]	INF(-1)	-0.255514 (0.15233) [-1.67738]
GRT(-1)	0.025009 (0.04223) [0.59223]	GRT(-1)	-0.066464 (0.40956) [-0.16228]
DUMMY(-1)	-0.574075 (0.41135) [-1.39558]	DUMMY(-1)	-5.099429 (3.76915) [-1.35294]
C	3.143304 (3.46836) [0.90628]	C	14.71473 (34.3787) [0.42802]
R-squared	0.546431	R-squared	0.767016
Adj. R-squared	0.306307	Adj. R-squared	0.643672
Sum sq. resids	4.563236	Sum sq. resids	425.1684
S.E. equation	0.518098	S.E. equation	5.000991
F-statistic	2.275617	F-statistic	6.218499
Log likelihood	-14.31097	Log likelihood	-75.52609
Akaike AIC	1.800813	Akaike AIC	6.335266
Schwarz SC	2.280753	Schwarz SC	6.815206
Mean dependent	2.281481	Mean dependent	23.55926
S.D. dependent	0.622054	S.D. dependent	8.377821

Regression Analysis of Public Banks

Table.11 Private Banks Regression Model (ROA & ROE)

	ROA		ROE	
ROA(-1)	0.159465 (0.07475) [2.13330]	ROE(-1)	-0.010990 (0.01240) [-0.88596]
CAR(-1)	-0.175899 (0.06268) [-2.80651]	CAR(-1)	-2.291399 (0.68976) [-3.32202]
ASQ(-1)	-0.003758 (0.02737) [-0.13730]	ASQ(-1)	0.201186 (0.33520) [0.60020]
LQR(-1)	0.014092 (0.02112) [0.66722]	LQR(-1)	0.210385 (0.25819) [0.81483]
EFF(-1)	0.011738 (0.00626) [1.87403]	EFF(-1)	0.101110 (0.07647) [1.32225]
LSIZE(-1)	0.218892 (0.16384) [1.33604]	LSIZE(-1)	1.910642 (1.99692) [0.95680]
INF(-1)	0.007030 (0.02518) [0.27923]	INF(-1)	0.097460 (0.30819) [0.31623]
GRT(-1)	-0.068749 (0.05081) [-1.35318]	GRT(-1)	-0.296028 (0.59497) [-0.49755]
C	-0.694600 (2.84356) [-0.24427]	C	-12.13275 (34.4428) [-0.35226]

	ROA		ROE
R-squared	0.190693	R-squared	0.207094
Adj. R-squared	0.100770	Adj. R-squared	0.118993
Sum sq. resids	234.7442	Sum sq. resids	34847.35
S.E. equation	1.805640	S.E. equation	21.99979
F-statistic	2.120623	F-statistic	2.350645
Log likelihood	-158.0279	Log likelihood	-360.5375
Akaike AIC	4.124147	Akaike AIC	9.124382
Schwarz SC	4.390197	Schwarz SC	9.390432
Mean dependent	1.582716	Mean dependent	13.35802
S.D. dependent	1.904126	S.D. dependent	23.43845

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Table 12 Private Banks Regression Model (ROA & ROE) with Dummy

	ROA		ROE	
ROA(-1)	0.169276 (0.07715) [2.19401]	ROE(-1)	-0.011465 (0.01253) [-0.91486]	
CAR(-1)	-0.173528 (0.06312) [-2.74908]	CAR(-1)	-2.341033 (0.70448) [-3.32305]	
ASQ(-1)	-0.006192 (0.02785) [-0.22232]	ASQ(-1)	0.219033 (0.34001) [0.64419]	
LQR(-1)	0.013364 (0.02126) [0.62850]	LQR(-1)	0.217219 (0.26025) [0.83465]	
EFF(-1)	0.012070 (0.00632) [1.90918]	EFF(-1)	0.098864 (0.07711) [1.28204]	
LSIZE(-1)	0.207115 (0.16598) [1.24781]	LSIZE(-1)	2.005709 (2.02220) [0.99185]	
INF(-1)	0.004252 (0.02579) [0.16492]	INF(-1)	0.122540 (0.31609) [0.38768]	
GRT(-1)	-0.055178 (0.05658) [-0.97525]	GRT(-1)	-0.428812 (0.68197) [-0.62878]	
DUMMY(-1)	0.365845 (0.65757) [0.55636]	DUMMY(-1)	-3.184028 (7.84183) [-0.40603]	
C	-0.618526 (2.86056) [-0.21623]	C	-12.41369 (34.6512) [-0.35825]	

	ROA		ROE
R-squared	0.194206	R-squared	0.208930
Adj. R-squared	0.092063	Adj. R-squared	0.108654
Sum sq. resids	233.7253	Sum sq. resids	34766.62
S.E. equation	1.814361	S.E. equation	22.12850
F-statistic	1.901315	F-statistic	2.083544
Log likelihood	-157.8518	Log likelihood	-360.4436
Akaike AIC	4.144488	Akaike AIC	9.146755
Schwarz SC	4.440099	Schwarz SC	9.442366
Mean dependent	1.582716	Mean dependent	13.35802
S.D. dependent	1.904126	S.D. dependent	23.43845

Regression Analysis of Foreign Banks

Table.13 Foreign Banks Regression Model (ROA & ROE)

	ROA		ROE
ROA(-1)	-0.026119 (0.04757) [-0.54907]	ROE(-1)	0.119198 (0.05101) [2.33664]
CAR(-1)	0.062724 (0.02469) [2.54030]	CAR(-1)	0.124535 (0.14824) [0.84007]
ASQ(-1)	0.013599 (0.02290) [0.59397]	ASQ(-1)	-0.001183 (0.14172) [-0.00834]
LQR(-1)	0.041279 (0.01827) [2.25961]	LQR(-1)	-0.032586 (0.11312) [-0.28807]
EFF(-1)	0.003801 (0.00193) [1.97328]	EFF(-1)	0.018968 (0.01188) [1.59600]
LSIZE(-1)	0.473406 (0.19572) [2.41879]	LSIZE(-1)	3.662553 (1.21356) [3.01802]
INF(-1)	0.049209 (0.01605) [3.06685]	INF(-1)	0.337512 (0.09881) [3.41582]
GRT(-1)	0.124174 (0.04485) [2.76885]	GRT(-1)	0.469378 (0.28039) [1.67401]
C	-7.239121 (2.10168) [-3.44445]	C	-30.21755 (12.8724) [-2.34747]

R-squared	0.314569	R-squared	0.246812
Adj. R-squared	0.263797	Adj. R-squared	0.191020
Sum sq. resids	503.0216	Sum sq. resids	19235.48
S.E. equation	2.158149	S.E. equation	13.34565
F-statistic	6.195644	F-statistic	4.423804
Log likelihood	-251.3357	Log likelihood	-464.5026
Akaike AIC	4.450182	Akaike AIC	8.094061
Schwarz SC	4.662657	Schwarz SC	8.306536
Mean dependent	1.967521	Mean dependent	9.263248
S.D. dependent	2.515258	S.D. dependent	14.83784

Table.14 Foreign Banks Regression Model (ROA & ROE) with Dummy

	ROA		ROE
ROA(-1)	-0.019480 (0.04795) [-0.40625]	ROE(-1)	0.118035 (0.05146) [2.29365]
CAR(-1)	0.061449 (0.02471) [2.48722]	CAR(-1)	0.125489 (0.14895) [0.84251]
ASQ(-1)	0.015618 (0.02296) [0.68022]	ASQ(-1)	-0.004119 (0.14286) [-0.02883]
LQR(-1)	0.042191 (0.01828) [2.30833]	LQR(-1)	-0.034141 (0.11380) [-0.30002]
EFF(-1)	0.003995 (0.00193) [2.06607]	EFF(-1)	0.018674 (0.01200) [1.55639]
LSIZE(-1)	0.456186 (0.19627) [2.32425]	LSIZE(-1)	3.685074 (1.22244) [3.01452]
INF(-1)	0.046444 (0.01625) [2.85890]	INF(-1)	0.341645 (0.10070) [3.39256]
GRT(-1)	0.152893 (0.05233) [2.92159]	GRT(-1)	0.428580 (0.32832) [1.30538]
DUMMY(-1)	0.671690 (0.63185) [1.06305]	DUMMY(-1)	-0.945322 (3.91044) [-0.24174]
C	-7.457128 (2.11040) [-3.53351]	C	-29.87086 (13.0082) [-2.29632]
R-squared	0.321733	R-squared	0.247223
Adj. R-squared	0.264682	Adj. R-squared	0.183905
Sum sq. resids	497.7645	Sum sq. resids	19224.98
S.E. equation	2.156851	S.E. equation	13.40420
F-statistic	5.639435	F-statistic	3.904481
Log likelihood	-250.7211	Log likelihood	-464.4706
Akaike AIC	4.456770	Akaike AIC	8.110609
Schwarz SC	4.692854	Schwarz SC	8.346692
Mean dependent	1.967521	Mean dependent	9.263248
S.D. dependent	2.515258	S.D. dependent	14.83784