**KARADENIZ TECHNICAL UNIVERSITY*INSTITUTE OF SOCIAL SCIENCE**

**DEPARTMENT OF BUSINESS ADMINISTRATION**

**PhD PROGRAM IN BUSINESS ADMINISTRATION**

# THE IMPACT OF BANK SPECIFIC AND MACROECONOMIC FACTORS ON THE CAPITAL STRUCTURE OF BANKING SECTOR IN TURKEY

**PhD DISSERTATION**

**Semira Hassen ALI**

**JUNE - 2019**

**TRABZON**

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Thesis advisor: Prof. Dr. Halil İbrahim BULUT

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TRABZON

## APPROVAL

Upon the submission of the dissertation, Semira Hassen ALI has defended the study "The Impact of Bank Specific and Macroeconomic Factors on the Capital Structure of Banking Sector in Turkey" in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Business Administration at Karadeniz Technical University, and the study has been found fully adequate in scope and quality as a thesis by **unanimous/ majority** vote on 28/06/2019

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Approval of the Graduate School of Social Sciences

Prof. Dr. Yusuf SÜRMEN
Director

## DECLARATION OF ORIGINALITY

I Semira Hassen ALI, hereby confirm and certify that;

- I am the sole author of this work and I have fully acknowledged and documented in my dissertation all sources of ideas and words, including digital resources, which have been produced or published by another person or institution,
- This work contains no material that has been submitted or accepted for a degree or diploma in this or any other university,
- No data or finding in this dissertation has been falsified or embellished,
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**ACKNOWLEDGEMENT**

Most of the literature on the firms' capital structure indicates the existence of gap and argument between the theories and practices. After the influential paper of Modigliani and Miller, other theoretical and empirical studies carried out to determine the firms' optimal capital structure and determinates. This thesis aims to analyze the bank specific and macroeconomic factors that affect the capital structure of the banking sector in Turkey. The results obtained from this research make a great contribution to the bank managers and existing literature. Because of using broad and recent data, this work helps to observe the factors that affect the capital structure of banks in Turkey in recent periods.

First I would like to thank Allah Almighty for everything I have and I achieved. There were a number of difficulties in conducting this study. Fortunately, I could achieve the work by the support of my supervisor Prof. Dr. Halil İbrahim BULUT and by great cooperation and guidance of my instructor Prof. Dr. Hüseyin DAĞLI and my research committee members Prof. Dr. Seyfettin ARTAN and Assoc. Prof. Dr. Ahmet KURTARAN, there were always available and willing to help me. I would like to thank them from the bottom of my heart for their excellent guidance and hospitality.

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Semira Hassen ALI
June, 2019

## CONTENTS

**CHAPTER THREE**

## ABSTRACT

The purpose of this thesis is to investigate the bank specific and macroeconomic factors that affect the capital structure of banks in Turkey. The analysis is performed by using a panel data that is collected from 42 banks operating in Turkey from the year 2003 to 2017. With the objective of determining whether the factors have different effects on the capital structure before and after the 2008 global financial cries, the full period is broken into two sub-periods. In Addition to the period classifications, a regression is computed by classifying banks as commercial banks, development and investment banks, domestic and foreign banks. In this study three leverages ratios; total debt ratio, long term debt ratio and short term debt ratio are used as a proxy to measure the capital structure.

Considering the results of the full period, bank size, growth opportunity, interest rate, and exchange rate have a positive effect on the three leverages, while profitability has a negative effect. On the other hand, asset tangibility, net interest margin, and liquidity ratio have a negative effect on total debt and short term debt ratios. While the inflation rate and the real GDP growth rate positively affect the total and short term debts ratios. The regression results that are computed based on the data of the two sub-periods indicate that, in the first sub-period, profitability, net interest margin and unemployment rate negatively affect the total debt ratio, while the bank size, growth opportunity, and interest rate have a positive effect. In the second sub-period, the effect of net interest margin, growth opportunity, unemployment rate and exchange rate on the total debt ratio is positive, while the effect of liquidity ratio on the short term debt ratio is negative.

Regarding the results of the analysis that is made based on classified banks, the inflation rate has a negative impact on the total debt ratio of development and investment banks but not for commercial banks. Growth opportunity has a positive impact on the three leverages of domestic and foreign banks however it seems has no statistically significant effect on all leverages of foreign banks. Liquidity ratio has a negative and statistically significant effect on the short term debt ratio of domestic and foreign banks, but it has no effect on the total debt and long term debt ratios of domestic banks and on the long term debt ratio of foreign banks. Generally, the overall results of the analysis indicate that the pecking order theory has better predictions for the capital structure of the Turkish banking sector.



**Keywords:** Turkish Banking Sector, Capital Structure, Leverage, Panel Data

## ÖZET

Bu çalışmanın amacı, Türkiye'de faaliyet gösteren bankaların sermaye yapısını etkileyen bankaya özgü ve makroekonomik faktörleri belirlemektir. Çalışma 2003-2017 zaman aralığında Türkiye'de sürekli olarak faaliyet gösteren 42 bankayı kapsamaktadır.Çalışmada panel veri analizi kulanılmıştır. Analizlerde ilk olarak tüm dönem ele alınmış, daha sonra çalışma dönemi 2008 küresel kriz öncesi ve sonrası olmak üzere iki alt döneme ayrılmıştır. Buna ilaveten incelenen bankalar mevduat, kalkınma ve yatırım ile yerli ve yabancı bankalar olmak üzere ayrı ayrı analize tabi tutulmuştur. Çalışmada, sermaye yapısının belirlenmesinde toplam borç oranı, uzun vadeli borç oranı ve kısa vadeli borç oranı olmak üzere üç kaldıraç oranı kullanılmıştır.

Analiz sonuçları, ele alınan tüm dönem için; banka büyüklüğü, büyüme fırsatı, faiz oranı ve döviz kurunun kaldıraç oranları üzerinde pozitif, karlılığın ise negatif etkisinin olduğunu göstermiştir. Diğer taraftan, varlık yapısı, net faiz marjı ve likidite oranının toplam borç ve kısa vadeli borç oranlarını negatif; enflasyon oranı ile ekonomi büyümenin ise pozitif yönde etkilediği belirlenmiştir. Alt dönemler için yapılan analiz sonuçlarına bakıldığında; birinci alt dönemde karlılık, net faiz marjı ve işsizlik oranının toplam borç oranını negatif; banka büyüklüğü, büyüme fırsatı ve faiz oranının pozitif yönde etkilediği görülmüştür. Bunun yanı sıra, ikinci alt dönemde net faiz marjı, büyüme fırsatı, işsizlik oranı ve döviz kurunun toplam borç oranı arasında pozitif yönde; likidite oranının ise kısa vadeli borçları negatif yönde etkilediği tespit edilmiştir.

Diğer taraftan, banka türlerine göre yapılan analizlere göre; enflasyon oranı, kalkınma ve yatırım bankalarının toplam borç oranını negatif yönde etkilerken; mevduat bankalarınınkini pozitif yönde etkilemektedir. Büyüme fırsatı, yerli ve yabancı bankaların kaldıraç oranları üzerinde pozitif etkiye neden olurken, yabancı bankalar için kaldıraç oranlarının hiçbirisinin büyüme fırsatı üzerinde istatistiki olarak anlamlı bir etkisi görülmemiştir. Likidite oranının, yerli ve yabancı bankaların kısa vadeli borç oranları üzerinde negatif ve istatistiksel olarak anlamlı bir etkisi bulunurken yerli bankaların toplam borç ve uzun vadeli borç oranları ile yabancı bankaların uzun vadeli borç oranı üzerinde hiçbir etkisinin olmadığı gözlenmiştir. Ayrıca, analizlerden elde edilen bulgular, Türkiye'de faaliyet gösteren bankaların sermaye yapılarının oluşumunda finansman hiyerarşisi teorisinin geçerli olduğunu göstermektedir.



**Anahtar Sözcükler:** Türkiye Bankacılık Sektörü, Sermaye Yapısı, Kaldıraç, Panel Veri

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| | |
|---|---|
| BAT | : The Bank Association of Turkey |
| BCBS | : Basel Committee on Banking Supervision |
| BRSA | : Banking Regulation and Supervision Agency |
| CBRT | : Central Bank of the Republic of Turkey |
| CET1 | : Common Equity Tire 1 |
| CMB | : Capital Market Board |
| CPI | : Consumer Price Index |
| DEXCH | : First Difference of Exchange Rate |
| DTANG | : First Difference of Asset Tangibility |
| DLIQU | : First Difference of Liquidity |
| EU | : European Union |
| EXCH | : Exchange Rate |
| FSA | : Financial Service Authority |
| FTSE | : Financial Times Stock Exchange |
| G20 | : The Group of twenty Countries |
| G7 | : The Group of seven countries |
| GCC | : Gulf Cooperation Council |
| GDP | : Gross Domestic Product |
| GMM | : Generalized Method of Moments |
| GROW | : Growth Opportunity |
| IMF | : International Monetary Fund |
| INF | : Inflation Rate |
| INT | : Interest Rate |
| ISE | : Istanbul Stock Exchange |
| LEV 1 | : Total debt ratio |
| LEV 2 | : Long term debt ratio |
| LEV 3 | : Short term debt ratio |
| LIQU | : Liquidity |
| LNGDP | : The Natural Logarithm of the Real Gross Domestic Product Growth Rate |

LNUNEMP : The Natural Logarithm of Unemployment Rate
LSE : London Stock Exchange
MM : Modigliani and Miller
NIM : Net Interest Margin
OLS : Ordinary Least Square
PROFT : Profitability
ROE : Return On Equity
RWA : Risk Weighted Assets
SDIF : Savings Deposit Insurance Fund
SIZE : Firm Size
SPI : Swiss Performance Index
STD : Short Term Debt
TANG : Asset Tangibility
TSE : Tehran Stock Exchange
TSI : Turkish Statistical Institute
U.K. : United Kingdome
U.S. : United States
VIF : Variance Inflation Factor

## INTRODUCTION

Firm's decisions concerning the choice of financing have a significant impact on its operation. Firm managers make decisions related to sources of capital based on the cost-benefit of the company. Broadly speaking firms can get capital from two sources, namely debt and equity. Many scholars define the capital structure of firms in different ways. According to Myers (2000: 2), capital structure is a mix of debt and equity used to fund real investments and it shows the financing strategy of firms' and their financing tactics. As defined by Brealey et al., (2011:418) it is a comprised of debt, equity or hybrid of securities issued by the firm. The definition given by Vu Thi and Huang (2003: 20) generally when firms make new investments they get fund from three financial sources; fund obtained from internal sources (retained earnings), by issuing securities or by borrowing through debt instruments. The mix of these components creates the capital structure of a firm and indicates the firms' ownership structure. Based on the definitions given by a number of previous works, the capital structure can be defined as a preference of firms from internal and external financing.

Following to the influential seminar paper on capital structure theory by Modigliani and Miller (1958: 261-297) which explained that the total market value of a firm has no association with the capital structure decisions under the assumptions of no tax, no transaction cost, no bankruptcy cost, symmetry of market information and equivalence in cost of borrowings for both investors and companies, other theoretical and empirical theories like pecking order and trade-off theories developed by relaxing the assumptions of Modigliani and Miller. After the capital structure of firms become the critical issue of corporate, most empirical papers investigated factors that affect the choice of financing like firm-specific factors including firm size, profitability, growth opportunity and others (Alom, 2013: 327; Harris and Raviv,1991: 303; Booth et al., 2001: 99-102) and several macroeconomic and market factors such as Gross Domestic Product (GDP), inflation government policies, share price and others (Frank and Goyal,2009: 11; Antoniou et al., 2002:5; Bokpin, 2009).

When the capital structure of financial sector especially the banking industry observed, there are some unique features that make the capital structure of banks different from non-financial firms. The leverage of banks includes both debt and non-debt liabilities such as deposits, and it is subjected to extensive regulations. One of the rules expected to be followed by banks is having a minimum capital requirement and deposit insurance. According to Demirgüç- Kunt and Edward (2002: 176) deposit insurances decrease the motivation of depositors to control

banks and it can also make banks to take more risks. Banks can pay high interest rates to depositors and they attempt to generate money to pay these high interest rates by making risky loans. As a result of these actions, banks and depositors can careless because they know the insurance protect their money. Obviously, one of the major features that make banks different from other non-financial firms, deposits is considered as one of the cheapest sources of fund. Generally, regardless of the choice of debt and equity, banks relay more on debts to finance their operation.

The special features of the banking sector also originated from the outsiders estimation about the asset values of banks. The study conducted by Flannery (1994: 325) states that because of many bank loans entail high information costs, outside investors can not verify the true bank assets risk and they estimate asset values with error. This leads to truly insolvent banks allowed continuing operation while true solvent banks may unable to issue new debt. The researcher also points out that banks prefer high leverage for managerial controlling.

Generally, when banks compared with non-financial institutions, banks are more leveraged. Since many empirical works indicated that a higher level of debt related to the risk of financial distress, any bad economic conditions may seriously affect the negative side of any financing decisions. This has been proved by a global financial crisis that began in 2007 in the American mortgage market and continued up to the end of 2008. That period was the worst time for banks all over the world. During the crisis period, one of the big problems faced by banks was a liquidity issue (Cornett et al., 2011: 311). In addition to this issue, the function of the credit market was adversely affected. According to Almeida et al., (2011: 11) during the crises, the number of securities issued by banks significantly decreased and it became difficult to issue long term securities and the preferability of short term securities increased.

Turkey also one of the countries significantly affected by the crisis. This was observed by the declining of credit supply, which was due to the increased cost of the banking sector's international funding source. In addition to this problem, the demand for credit fall and non-performing loans increased because of a slowdown in economic activity (Aras, 2010: 116).

In present days investigating the determinant of firms' capital structure is the intention of many researchers. Since debt is one of the most critical factors in financial reports of firms and it is one of the important criteria used by investors to determine the firm's condition. However, the existence of debt in financing structure is a debating issue in capital structure theories. The puzzle on capital structure sourced from the searching the answer for whether debt is a condition for firms to use for their operation so as to meet a target profit or it is simply a policy for another purpose. In addition to this issue, a question on the topic of financing structure started from achieving optimal financial structure without affecting the value of the firm during the choice of financing (Pontoh, 2017: 129; Myers, 1984: 574-592; Prasad et al., 2001). The increasing of the puzzle on the subject

of capital structure develops different types of capital structure theories such as trade-off and pecking order theories.

Even though many empirical studies carried out on capital structure choices, most of them focused on developed countries and non-financial firms. The study done by Rajan and Zingales (1995: 1422) tried to investigate whether factors that influence the choice of capital structure in the U.S. have a similar influence on other countries' capital structure choice. Their study covers five years of data from 1987 to 1991 and a monthly stock price of all the G7 countries; namely United States (U.S.), United Kingdom (U.K.), Italy, Canada, Germany, France, and Japan. But in their study, banks and insurance companies were excluded from the sample because leverages of these firms are affected by government regulations. They concluded that factors related to firm leverage in the United States are similarly related in other countries as well. Thereafter, with the objective of determining factors affecting the capital structure in developing countries, Booth et al., (2001: 118) analyzed by taking data from 10 countries. The researchers concluded that irrespective of the difference in institutional factors, variables that explain the capital structure in developed countries are also relevant in developing countries.

The capital structure of financial institutions especially banks is investigated by a small number of studies. The special nature of banks, such as the degree of leverage in banking, the type of deposit contract and the regulatory requirements imposed on financial institutions make studies on banks' capital structure under-explored than empirical works on the capital structure of non-financial firms.

In the case of Turkey, there are very few empirical studies about the capital structure of banks. In these studies the determinants of banks' leverage investigated by selecting firm-specific and some of the macroeconomic factors like GDP and inflation rate by making total debt ratio and equity ratio as a measure of leverage. Even though these studies attempt to examine the firm-specific and macroeconomic factors, they did not study the impact of macroeconomic factors on the three debt ratios of banks. Additionally, as bank specific factors, the impact of net interest margin on a capital structure that is considered as the basic measure of banking operation and the three macroeconomic factors namely unemployment rate, interest rate, and the exchange rate has not been observed in the previous works conducted in Turkey. Therefore in addition to following the existing literatures and using of the most recent data, investigating the unobserved variables in the past studies on Turkish banks (net interest margin, unemployment rate, interest rate and exchange rate), and using of the three debt ratios (total debt ratio, long term debt ratio and short term debt ratio) as a proxy of leverage makes this thesis different from the studies conducted in Turkish banking sector.

In addition, with the objective of determining whether the factors have a different effect on banks leverage[1], the paper also identifies two sub-periods: before and after the 2008 global financial crisis. Furthermore, the paper demonstrates whether there is differentiation on the determinants of the capital structure based on different conditions, additional analysis is made by classifying banks as commercial banks, development and investment banks domestic and foreign banks. The paper also tries to verify if the capital structure of the Turkish banking industry provides empirical support for the existing capital structure theories conducted in other countries.

Following the introduction part, this thesis is organized into three chapters. The first chapter begins by presenting about the overview of Turkish banking sector then followed by the theoretical and empirical explanations of capital structure, bank capital structure and regulatory requirements in the world as well as in Turkey. Lastly, it provides empirical literature related to the determinants of capital structure. The second chapter presents the research methodology, research design, data collection, sampling, description of dependent and independent variables and their measurement, hypothesis, and model developments. In the third chapter, the results of the panel unit root test, the test of heteroscedasticity and autocorrelation are presented, then all regression results demonstrated and the findings are discussed. Finally, the conclusions on the result of the study and recommendations are given.

[1] Throughout this paper, the term leverage is used to indicate the financial leverage, refers the use of debt to finance assets.

# CHAPTER ONE

## 1. OVERVIEW OF CAPITAL STRUCTURE THEORIES AND BANK CAPITAL STRUCTURE

This part of the thesis begins by presenting the overview of Turkish banking sector then followed by theoretical explanations for capital structure and regulatory requirements in the world as well as in Turkey. Lastly, it provides empirical literature related to the subject matter. Even though many types of research conducted on the capital structure, most of them focused on non-financial firms. The capital structure of financial institutions especially banks is investigated by some researchers. Thus, the literature concerned about the capital structure of banks is limited. This study is tried to collect the literature concerned about the bank's capital structure from the existing some studies.

### 1.1. Overview of the Turkish Banking Sector

In the history of the Turkish banking sector, the first banking activity begins in early of the 1800s by money chargers that perform all quasi-banking activities and Galata bankers who are ethnic minorities lived in Istanbul. After the Crimean war in 1853 because of financial deteriorations and the high demand of external fund by Ottoman Empire, several branches of foreign banks enter to Istanbul in order to provide credit to the empire. In 1856 the Ottoman Bank was established with its head office in London and served as the central bank and a facility for business and investment until the 1930s (Shalebek, 2015:14).

In 1923 the first economic congress on the issue of the economy, banking and credit service conducted in Izmir province had a significant impact on the government's overall strategy. Especially between 1923 and 1932 in addition to encouraging privet investors to establish private banks, the government directly involved to the market by providing initial capital for the process of establishing new banks. Because of these actions, the number of banks increased to 60 of which 43 were nationals. Because of the global great depression that decreased that economy and the advent of the second world war many privet banks closed and the number of banks reduced to 40. These problems make public banks to be dominant in the banking sector (Akinci, 2000:3-5).

On the second half of the 19th century, Turkey started remarkable progress in the financial sector. During that period, a number of structural changes have been made in the banking and finance sector including, Central Bank of Republic of Turkey (CBRT) licensed to do open market operations, interbank money market was set up, Capital Markets Board (CMB) and Istanbul stock exchange (ISE) was formed and ceiling interest rate was eliminated. Not only the above structural changes but also strategic borrowing mechanisms such as Treasury bond and bills were established by CBRT (Yayla et al., 2008: 13).

Since 2002, the political stability and the outstanding performance of the economy and the regulatory developments have made a positive contribution to the growth of the Turkish banking sector. As a result of these changes, the interest of foreigners increased to increase their shareholdings in the banking sector. This was evidenced by a significant amount of flows (around $14 billion) to the banking sector form a historical amount of investment flow from foreigners since 2001 (Olgu, 2013:70).

Currently, Turkey is one of the bank-based financial systems in the world. Anbar and Alper (2011: 139) stated that in the financial system of Turkey banks occupied an important position which is based on universal banking structure, which means commercial banks to give different types of service in one roof. According to the report of the International Monetary Fund (IMF) (2017: 10), over 90% of the Turkish financial sector's total asset is occupied by banks. The majority market share of the Turkish banking sector is dominated by the conventional commercial banks that are authorized to accept deposits, provide loans, and perform different types of functions related to financial products, such as certificates of deposits and fund transfers. The development and investment banks are not authorized to collect deposits but they may provide services related to leasing operations besides to the normal operations as performed by the deposit banks. Additionally, the number of participation banks is also increasing after the 1985 first year of establishment. The ownership structure of the sector is not limited to the country's nationals but it is open to external competition.

The Banks Association of Turkey (BAT) is a professional organization that regulates the banks established in 1958. All deposit and development and investment banks required to be a member of this association after a month they get their permission for operation. The Turkish banking sector is highly and seriously regulated by the Banking Regulation and Supervision Agency (BRSA) and CBRT. According to the report of BRSA (2018:1) in 2018, there were about 52 banks operating in the country, 34 of them were deposit banks, out of this deposit banks 3 of them were state-owned while the remaining 31 were privately-owned banks. Additionally, there were 13 development and investmenti banks and 5 participation banks. The following Table 1 shows the number of banks in the country from the year 1985 to 2018.

**Table 1: The Number of Banks in Turkey**

| Share in sector | 1985 | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Deposit banks** | 47 | 56 | 55 | 61 | 34 | 32 | 32 | 34 | 34 | 34 |
| State-owned | 12 | 8 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| Privately- owned | 20 | 25 | 32 | 28 | 17 | 11 | 8 | 9 | 9 | 9 |
| Foreign banks | 15 | 23 | 18 | 18 | 13 | 17 | 21 | 21 | 21 | 21 |
| **SDIF**[2] | | | | 11 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Development and Investment banks** | 3 | 10 | 13 | 18 | 13 | 13 | 13 | 13 | 13 | 13 |
| **Participation banks** | | | | | 4 | 4 | 5 | 5 | 5 | 5 |
| **Total** | **50** | **66** | **68** | **79** | **51** | **49** | **51** | **52** | **52** | **52** |

**Source:** BAT's studies 2016:6 and 2018:6

The financial crises that started in the U.S. in late 2007 due to the housing market collapse severely slowdowns the global economy. As a result of globalization, it swiftly spread to other countries including Turkey. It dramatically slowed domestic demands and sharply decrease the access to external financing and output growth of most countries. According to Goldstein and Xie (2009: 1-4), the real GDP of emerging market and developing economies decline from 8.3% in 2007 to 6.1% in the year of 2008 and 2.4% in 2009. As a result of the crisis, in 2010 the GDP of emerging and developing countries was likely to be about $1.3 trillion less than was being estimated in 2007, and the loss of cumulative output from the year 2008 to 2010 was $2.6 trillion (Dolphin and Chappell, 2010: 4).

According to Atici and Gursoy (2011:75), the Turkish banking sector has experienced a considerable crisis in history such as in 1991, 1994, 1998, 2001 and 2008. Following to the 2000-2001 shocking financial crises, the rehabilitation procedure and the restructuring program of the banking sector that was established by BRSA produced a very positive result and brought financial stability in the country (Yayla et al., 2008: 15). Following the above brief descriptions about the Turkey banking sector, since the main objective of this thesis is about the capital structure of banks in Turkey, capital structure theories and bank capital structure are discussed below.

[2] In Turkey Savings Deposit Insurance Fund (SDIF) is a public legal entity established to protest the rights and interests of account owners. The functions of SDIF are: to insure saving deposits in the bank, monitoring the insured accounts, managing and apprising assets and resources under its control and undertaking management and audit of banks which have revoked operating license (Savings Deposit (n.y.), https://www.igi-global.com/dictionary/savings-deposit-insurance-fund-sdif/47178)

## 1.2. Capital Structure Theories

There are many competing capital structure theories that discuss the debt-equity structure and the market value of firms. Some of these theories suggest the existence of a firm's optimal capital structure while other theories oppose this idea. Some of these theories such as Modigliani-Miller theory (MM), trade-off theory, pecking order theory and agency cost theory are discussed below.

### 1.2.1. MM Theory

The MM theorem[3] (1958: 261-297) proposes that the value of a firm does not influenced by its capital structure in a market without corporate taxes, information asymmetry, transaction costs, bankruptcy costs and agency costs. Therefore, the theorem is also called the capital structure irrelevance principle as it is irrelevant whether a firm is highly leveraged or not because the value of the firm is affected by its ability to earn and the risk of the underlying assets. One of the weaknesses of the MM theory was its restrictive assumptions to apply in the imperfect world. In 1963, MM introduced corporate tax and transaction costs into their earlier model. They argued that firms can obtain an optimal capital structure if it is financed by debt only to get a benefit brought by tax shield.

There is still no proof about the applicability of MM theory to banks. The answer of Miller (1995: 483) was Yes and No when he was asked about the applicability of MM theory to banks. The subject on the applicability MM propositions to banks is demonstrated through comparison of securities with deposits. He notified that even in the presence of market imperfections the MM propositions can be applied to banks and he suggested that it is difficult to think anything about demand securities so special to not to apply MM propositions in the banking sector.

Chesnokova (2015: 11) takes issue with the notation that MM theory as it applied to the banking sector. The finding of the study claimed that the initial assumptions of MM theory, especially the two frictions of the assumptions (no bankruptcy cost and no agency cost) make the theory impossible to apply in the banking industry in the real economy. In Aboura and Lépinette (2015: 2) MM propositions are about having equity not raising equity. Since banks are more leveraged firms replacing debts by equity make a loss on tax deduction which is considered as free money. Even though the bankruptcy cost brings deadweight losses such as legal fee, loss of reputation, etc, the compensation up to some level benefit the firm. They investigate the MM theory by comparing guaranteed firms like banks along with unguaranteed firms. In their model, the implicit guarantee is taken as a free put option on banks debt granted by the government to the bank's debt holder. They concluded that since leverage is the optimal capital structure for banks and

[3] In this thesis, the words theory and theorem and the terms Turkey and Turkish are used interchangeably.

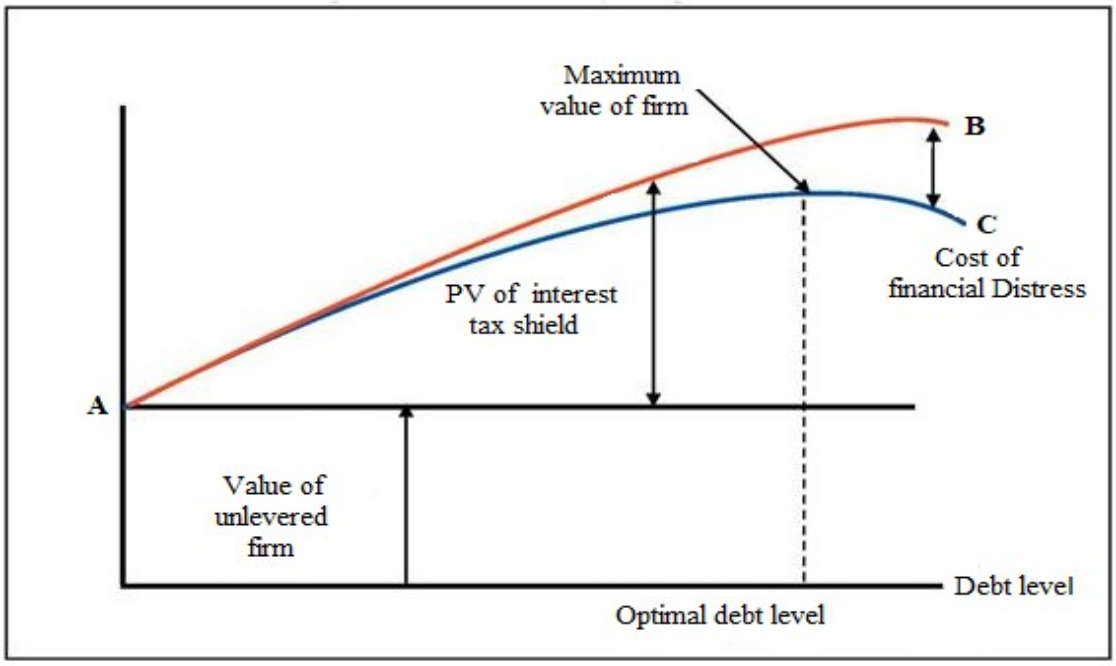
they get benefit from it by being guaranteed firm, MM theory become irrelevant and banks should not be considered as unguaranteed firms. To apply the MM theory in the banking sector, the guarantee should be sold at normal actuarial rate. In addition, banks can get agency benefit as a result of debt financing. After the seminar paper of MM other capital structure theories and empirical works introduced by focusing on the concept of whether the decisions related to the capital structure have an effect on the value of firms if the MM assumptions are ignored.

### 1.2.2. Trade-Off Theory

According to Frank and Goyal (2007: 6), different authors used the name trade-off theory to explain a group of similar theories. In all of these theories, managers plan leverages by evaluating the cost and benefits of different alternatives and by assuming to balance the cost and the benefits. The concept of trade-off theory emerges from the puzzle on the assumptions of MM theorem. When the no tax assumption of MM theory ignored, firms can get benefit from debts in the form of deductions from tax. Thus the main concept of the trade-off theory is, firms would select the optimal capital structure by balancing the tax benefit and the cost of debt. High Leverage uses to increase tax deductibility on interest paid that leads to increasing of firms' value with the value of tax shield. However, raising the level of debt can increase the risk of bankruptcy or cost of financial distress and agency costs due to conflict of interest between the managers and shareholders (Ghazouani, 2013: 626).

The argument of trade-off theory can be summarized graphically. As it can be demonstrated from the following Figure 1 the horizontal line indicated by letter "A" is the value of a firm if it is only financed by equity. Then the present value of tax shield indicated by letter "B" initially rise as the firm borrows more until the additional debt creates the risk of financial distress that is indicated in the figure as the difference between "B" and "C". Generally, this cost of financial distress is expected to increase with the debt level. The curve represented by the letter "C" indicates the value of the leveraged firm. According to this graph, optimal debt policies of firms' exist that maximize firm value.

**Figure 1: The Trade-off Theory**




**Source:** (The trade-off (n.y.) https://ebrary.net/735/business_finance/tradeoff_theory_capital_structure)

### 1.2.3. Pecking Order Theory

The pecking order theory is another alternative theorem developed by Myers and Majluf (1984: 127-221). This theory argues that the choice of financing is created to decrease inefficiencies caused by informational asymmetries. One of the problems caused by asymmetric information is adverse selection. This problem arises when the firm offers to issue equity the market investors request the reason for issuing. Most of the time managers of an overvalued firm will be glad to issue equity whereas, the managers of undervalued firms will not (Frank and Goyal 2007: 19). So as to avoid the problems arise from information asymmetry managers prioritize financing that requires the least amount of information. The theory assumes that firm insiders or managers have access to get firms' private information than outsiders. Therefore by utilizing fewer information firms have a preference to use internal financing (retained earnings) first. Then when the internal funding exhausted the next preference will be debt financing then they use equity financing as a last resort.

### 1.2.4. Agency Cost Theory

This theory mentions that firms should set a capital structure that can minimize the potential conflict of interest between managers, shareholders and debt holders. The developers of the theorem Jensen and Meckling (1976: 333) proposed the theory to argue the probability distribution

of a firm's cash flow is not independent of its ownership structure. The theory considers debt financing as a necessary tool to reduce agency cost between manager and shareholders. By reducing free cash in the firm that could be used by managers for personal benefit, the conflict between managers and owners may be solved.

The two types of agency cost that can be faced by firms have been explained by Ashbaugh et al., (2004: 2). These are the conflict between managers and shareholders, and shareholders and bondholders. The first conflict arises when managers use different mechanisms that can benefit them at the expense of shareholders. Usually, managers take less debt financing to avoid risks related to using of debts. The letter conflict (between bondholders and shareholders) is the other issue of the agency cost theory. Stockholders have a better incentive to take riskier projects that increase their value with dividend payouts whereas; bondholders prefer projects that maximize the chance of getting back their investment with interest. In the literature, it is indicated that highly leveraged firms especially banks can minimize agency cost. The logic behind is highly leveraged firms required to make periodic interest payments. These periodic payments provide a discipline on management by reducing the firm's cash available for managers to use it for personal interest. (Gertler et al., 2010: 9).

### 1.2.5. Other Theories

In addition to the main capital structure theories in the literature presented above, there are other theories that are not mentioned in this paper. For instance, the market timing theory is a theory that explains capital structure as a cumulative outcome of various past decisions made by firms over time (Baker and Wurgler 2002:3). This theory does not suggest an optimal capital structure of firms. The other capital structure theory based on asymmetrical information between firm insiders and investors is the signaling theory. According to this theory, insiders of the firm have more information than outside investors, and they have a motive to convey messages to external investors so that the stock price will rise.

## 1.3. Bank Capital Structure and Regulatory Requirements

Capital structure theories try to find how firms raising capital by mixing debt and equity in order to continue their operation. When firms make decisions related to financing there are many factors that should be taken into consideration. Banks are firms that have unique features which make them directly or indirectly to involve in a regulated environment. Biggar and Heimler (2005: 2) pointed out activities that demonstrate the existence of regulatory provisions. These include preventing on branching and new entry, controls on pricing, protection on ownership structure, controls on the portfolio of an asset, mandatory deposit insurance, capital requirement, and lender of last resort and restrictions on merger and liquidation events.

The intention of regulators is to protect firms against systematic risk. In a market, if some banks fail, wrong information about the banks transferred to the public and may create panic runs, as a result, other banks may be considered as unstable by the public and it may create bank run (Rehncrona, 2011: 22). This situation can affect the whole monetary system of the country. Systematic risks of the banking system are the risk of the countries as the whole. Even though the shareholders and the managers of the firms are working and focusing on the sustainability of their own firm, they do not take into consideration the adverse consequence to the country as a whole. This problem is the basic reason for regulators or government to control the banking activity and setting of capital requirements. Kaufman (1996: 2) also showed the failure of one bank, like any type of other firms in the country leads to the loss or reduction in the value of assets held by its shareholders. If this loss is big enough the shareholders may in turn fail.

There are different kinds of literature that discuss whether these regulations and interferences of other parties have an impact on the capital structure decisions in banks. For example, Berger et al., (1995: 424) identified legal requirements that are significant on the capital structure of financial institutions. They call it safety net, refers all actions and plans of the government to have a sound banking system. This includes payment guarantees, access to the discount window during liquidity shortage, deposit insurance and others. They proved that the existence of these protections affects banks by separating from potential market discipline. For instance, deposit insurances protect banks from price and quantity reactions by insured depositors. Besides to this, they stated that if the safety net obligates banks to take on less portfolio risk than they would, it may lessen market capital requirements and that is why banks commonly have lower capital than other firms including financial institutions with similar portfolios that are not related to the safety net.

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With the objective of protecting banks and creditors from risk, regulators all over the world have been intended to involve in banking operations. In 1988 Basel Committee on Banking Supervision (BCBS)[4] issued the first accord what is called Basel Capital Accord (Basel I). Basel I

[4] BCBS is a committee on banking supervisory authorities that was established in 1974 by the central bank governors of the group of ten countries. It is the primary global standard setter for the prudential regulation of banks and it provide a forum for regular cooperation on banking supervisory matters (The Basel Committee (n.y.),https://www.bis.org/bcbs/). The group of ten countries made up of eleven industrial countries (Canada, Italy, Japan, Germany, the Netherlands, Sweden, Switzerland, France, Belgium, U.K. and U.S.)

defined capital for a bank and classify the bank's asset-based on risk categories. The accord assigned a risk weight of 0%, 10%, 20%, 50%, and 100%. After the introduction of Basel I banks are expected a lower limit of capital adequacy 8% against risk-weighted assets. In the 1990s the accord was widely recognized and it was considered as an accepted worlds standard. As a result, the framework of the Basel applied by over 100 countries Roy et al., (2013:8).

Basel I criticized because of its one-size fits all approach application and it did not recognize risk sensitivity in estimating of capital requirements. Then in June 1999, the Basel Committee decided to introduce a better risk-sensitive framework. In 2004 Basel II came out with three reinforcing Pillars[5]: minimum capital requirements, the supervisory review process, and market discipline. Under Basel II the minimum capital requirement (8%) was not changed but in addition to credit risk which was developed under Basel I, operational and market risks were added to compute the Risk-Weighted Asset (RWA). Basel II defined capital into three Tiers[6]. Tier 1 includes shareholders equity and retained earnings, Tier 2 consists of revaluation reserves, general loan-loss reserves, hybrid capital instruments and subordinated term debt and undisclosed reserves. Tier, 3 made up of Tier 2 capital and short term subordinated loans (Julia, 2018).

Although the objective of Basel II was to motivate banks to apply the international banking regulations especially when they determine the capital level by taking in to account the credit, market and operational risks, it was not efficient to confront the global financial crises in 2008. In reaction to the weaknesses of financial regulations that is proofed by the 2008's financial sector crises, the members of the BCBS announced Basel III in 2010. It is the extension of the first two accords by adding new capital and liquidity standards that decrease leverage and increase liquidity (Diallo, 2014: 17-18).

Even though, in theories regulatory requirements indicated as a major factor of banks' capital structure, recent studies proved that the optimal capital structure of banks is realized by reacting to the influences from bondholders and shareholders in the same way of non-financial institutions. Flannery and Rangan (2008: 2) analyzed the capital build-up by taking data of 153 banks in the U.S. They conclude that the regulatory requirements will not always necessary in the capital determination of banks. Of course, in the 1980s the influence of regulatory requirements on the determination of banks capital structure has been true but, that is no longer correct. But instead, investors and market disciplinary pressures have a great effect on banks' capital ratio. The market

[5] The three pillars of Basel II are planned to be mutually reinforcing. Pillar I set out the minimum capital requirements intended to cover credit, market and operational risks faced by the banks. Pillar II is about supervisory reviews. Firms and supervisors are encouraged to require a view on the amount of capital buffer that should be held against Pillar I risks and for the risks that are not explicitly mentioned under Pillar I. Pillar III intends to improve market discipline by imposing disclosure requirements on banks. The banks are required to disclose details of their risks, capital and risk management practice (Basel II Background (n.y.),https://www.managedinitiatives.com/basel/basel-ii)

[6] A bank's total capital is calculated as a sum of Tier 1 and Tier 2.

discipline is when market investors have some information about operations and the prospects of firms, evaluate and integrate that information into their traded securities. The most important type of market discipline requires that the ability of investors to estimate likely future changes in bank risk and should have an impact on decisions made by managers and shareholders of the bank (Flannery and Sorescu, 1996: 1347).

In O'Connor-Close and Austin (2016: 1) the influences and controls of investors and depositors on financial institutions indicate effective market discipline. They control the bank by adjusting the interest rate, by deciding whether to provide the fund or not and by withdrawing all their funds. Pillar 3 of Basel II recognizes the role of market discipline as it has the potential to reinforce minimum capital requirements and supervisory review process and promote safe and sound banking system. Market discipline encourages banks to carry out their operation in safe, sound and efficient way and it provides incentives to the banks to have a strong capital base so as to be safe from future losses arising from the risk exposure (BCBS, 2001: 1).

Flannery and Rangan (2002: 3) also point out, market forces and pressures originated from market discipline exert a big influence and almost replace the effects of regulatory supervision on banking leverages. As highlighted by Hamid and Yunus (2017: 32), depositors can control the bank either by demanding higher interest rates as compensation for the higher risk exposed by the bank or by decreasing deposit. Other researchers like Diamond and Rajan (2000: 1) and Allen et al., (2009: 23) demonstrate that regularly requirements are not the necessary factors in determining the optimal capital structure of banks. In Diamond and Rajan (2000:1) the optimal capital structure of banks is the outcome of trade-off effects on liquidity creation, cost of financial distress and the ability to collect borrower repayments.

Recently many researchers tend to conclude the similarities of the factors affecting the capital structure of financial firms and non-financial firms. Gropp and Heider (2009: 9) tried to analyze the determinant bank capital structure by gathering the 14 years of data from 16 different countries (15 EU members and the U.S.). They showed that regulatory requirement is not the major important of bank equity and it may only be the second-order important in the determination of banks capital structure. They also find evidence that there are similarities in the factors that affect the capital structure of banks and non-financial firms. In other words, the capital structure of banks and corporates are ultimately determined by the same drivers. This conclusion received additional support from the recent study made by Baltaci and Ayaydin (2014: 55). They used 39 sample banks from Turkey banking sector over the period between 2002 and 2012. Furthermore, a study carried out by Barber and Lyon (1997: 875) evidenced that the bank specific indicators that affect bank capital structure are similar to the factors that influence the capital structure of non-financial firms. Similarly, Sha'ban et al., (2016: 35) also tried to show the similarity between the capital structure determinants of banks and non-financial firms.

### 1.3.1. The Minimum Capital Requirements of Banks in Turkey

With regard to Basel norms, BRSA has been active by applying necessary changes in the step of Basel I to Basel II. In 2012 the BRSA introduced the Basel II rules for credit risk-standardized approach and the Pillar 3 disclosure requirements. In 2014 and 2015 the BRSA issued new and amended regulations that include the definition of capital, leverage ratio requirements and the liquidity coverage ratio. In 2009 BRSA declared that the capital adequacy of Turkish banks will be calculated based on Basel II rules.

The Basel accord determined a minimum capital ratio of 4.5% for Common Equity Tier 1 (CET1)[7], 6.0% for Tire 1 and 8.0% for risk-weighted assets. Beside to applying the Basel minimum capital requirement, the BRSA set a higher total target capital ratio of 12% (Diallo, 2014: 30). In Turkey all banks required to meet minimum capital adequacy flat rate of 12%. There are some countries that set minimum capital requirements based on bank type. For instance, the Financial Service Authority (FSA) of U.K. sets individual capital requirements for banks in the U.K. and building societies in excess of the 8% Basel target ratio (Alfon et al., 2005: 9). Similarly, Wong et al., (2008:21) indicated that in Hong Kong regulatory authorities set individual capital requirements as minima with the expectation of banks normally hold more capital adequacy ratio over the enforced minimum ratio.

According to the report of BRSA (2018: 21), in 2015 the banking sector of Turkey has a minimum capital adequacy ratio of 15.5% and then, this figure improved in 2017 to 17% which was above the 12% targeted ratio. This figure was not only high in the history of the Turkish banking sector, but it was also better than most of the G-20[8] countries in the previous 8 to 10 years. This performance helped the country to have better financial management especially during the 2008 global financial crisis that has hardly slowdowns the economy of emerging and developing countries. The Turkish banking sector was better compared to its counterparty in Europe and it was the first group that could able to recover from the crisis. When the performance of the sector compared with the EU banking sector, its Return On Equity (ROE) was 21.7% in the year 2007 and then in 2008 and 2009 it was 16.8% and 20.2% respectively, whereas in the same periods the EU banking sector has experienced 15%, -3% and 0.3% respectively (Atici and Gursoy, 2011:72).

## 1.4. Review of Empirical Literatures

[7] CET is a component of Tier 1 that consists mostly of common stock held by a bank or other financial institution.

[8] The group of Twenty (G-20) consists of the G-7 plus other developing countries ( China, India, Brazil and Russia, Turkey, the European union, Indonesia, Mexico, Saudi Arabia, South Africa, South Korea, Argentina and Australia)

There are some researchers conducted on the capital structure of the Turkish banking sector. Such as a study conducted by Asarkaya and Özcan (2007: 91) investigated the determinants of the capital structure of the Turkish banking sector by employing a panel data set covering the period from 2002- 2006. Their findings suggest that there is a positive association between capital adequacy ratio and economic growth, portfolio risk, ROE and the capital level of the sector, whereas the relation with the share of deposits is negative. Caglayan and Sak (2010: 64) tried to analyze the determinant of bank capital structure in Turkey and to explain the capital structure theory that can explain the financing choice of banks. Their sample comprises 25 deposit banks over the period between 1992 and 2007. They concluded that firm size and market-to-book ratio positively related with the book leverage. On the other hand, tangibility, and profitability negatively related to leverage. Their findings indicate some evidence about the consistency of their results with the expectation of pecking order theory.

A study on whether leverage is procyclical in the Turkish banking sector is examined by Binici and Köksal (2012: 23). They used the asset to equity ratio as a leverage measurement by utilizing monthly data over the period of December 2002 to August 2011. Their findings showed that leverage is procyclical in the Turkish banking sector. Moreover, they believed in the existence of a positive relationship between the size of the bank and leverage. In addition, they witnessed the balance sheet size and profit is significantly affecting the leverage. In a recent paper, Baltaci and Ayaydin (2014: 54) tried to look at the significance of firm-specific, country and macroeconomic factors by using a total of 39 sample banks from the Turkish banking sector. Their findings indicate that positive and significant relation between Banks' leverage and firm size, average industry leverage and GDP growth. Besides these results, they found a significant and negative association of tangibility, profitability, inflation and financial risk with leverage. In addition, they noticed tangibility, profitability and GDP are consistent with pecking order theory predictions whereas, firm size is similar to the expectation of trade-off theory.

The recent study conducted by Oliveira and Raposo (2016: 40) observed the determinants of European bank's capital structure on 494 banks from 21 EU countries in the period 2000-2012. For a better and more complete conclusion of the European banking sector, they extended the sample of Groop and Heider's (2010) work by including private and small and medium-size banks. They concluded that leverage is positively associated with firm size and collateral and it is negatively correlated with profit, market-to-book and financing risk. Similarly, Sha'ban et al., 2016 also tried to study the determinant of bank capital structure by focusing on 28 EU countries. The sample includes 149 listed commercial banks and bank holding companies for the time horizon 2005 and 2014. The findings of the study indicate that, except the firm size other variables namely, profit, market-to-book ratios, and dividend are positively related to equity capital. With regard to

macroeconomic variables, the market equity capital tends to be related to higher GDP growth and lower inflation rate.

By using panel regression model Amidu (2007: 6) investigates the dynamics involved in the capital structure determination of Ghana banking sector. He used 19 banks as a sample during the period 1998 to 2003. The significant findings of the study indicate that corporate tax, growth opportunity, asset structure, bank size and profitability have a significant impact on the financing choices of banks. Furthermore, the study proves that the majority of banks asset financed by debt which represents more than 87% and out of this percentage short term debts appears to constitute more than three-quarter of the capital of the banks. This indicates the importance of short term debts over long term debts in the Ghanaian banking sector. The capital structure of Taiwan banking sector is analyzed by Yu (2000: 109). The researcher classified the banks into three groups, large medium and small based on asset size. In his model five independent variables used (bank size, profitability, liquidity, money market fund and intermediation spreads). The empirical results have found that liquidity, bank size and profitability are the main determinates of capital structure.

A study on the determinants of bank capital structure was also conducted by Nguyen and Kayani (2013:45). They collected data from 10 Asian countries from the year 2000 to 2012. Their results proved that the difference in the capital structure of banks depend on the economic growth of the country in which they operate. They come up with the result that, in developing countries, profitability seems the major factor of banks capital structure, whereas in developed countries collateral is found to be a significant determinant. In addition to these factors, they include macroeconomic factors in their model. Most interestingly, the result showed that tax is the only determinant that demonstrates the capital ratio of banks in emerging economies, whereas, GDP growth rate, market risk and term structure spread have shown to be more impactful on banks' capital structure in advanced countries. Abdullah and Naser (2015: 959) collected data from 47 commercial banks listed on the Gulf Cooperation Council (GCC) to investigate factors that affect leverage in the period between 2001 and 2010. The results of the study indicate that leverage is negatively and significantly correlated to profitability, tangibility, and firm size, whereas it is positively related to growth opportunity and firm age.

Shah et al., (2017: 98-99) examined the determinants of financing structure in the Islamic banking industry of Pakistan; using unbalanced data set over the year 2006 to 2012. In addition, the study aimed to explore the impact of macroeconomic conditions and policy variables on the sector. The estimated results of the study show that, with the exception of profitability, liquidity and capital adequacy ratio, all other bank specific variables, namely asset tangibility, growth opportunity and bank size are positively associated with banks' capital structure. With respect to macroeconomic factors, inflation rates and interest rates are negatively correlated to the financing decisions of the Islamic banking industry while industrial production index has a positive impact.

Vidal (2009: 49) investigated whether macroeconomic conditions have an impact on the capital structure of the Nordic banking sector by using 6 years data of the 30 banks collected from Nordic countries except Iceland. In order to analyze the collected data, he used a regression and correlation analysis. In the regression model debt-to-equity ratio is used as a dependent variable and change in the effective tax rate, GDP growth rate and interest rates as a proxy of macroeconomic factors taken as explanatory variables. The results of the study revealed that macroeconomic factors have an effect on financing decision of banks but it is not highly significant.

With the main objective of assessing the association between capital structure and asset liquidity Sibilkov (2009: 1173) performed a multivariate regression on a sample of U.S. public companies. In the study, the level of book leverage is used as a dependent variable and the liquidity index served as the primary independent variable. Besides to this variables, firm size, the ratio of research and development expense to sales, the market- to- book ratio, tax rate, the ratio of earnings before interest and tax and depreciation to total book asset are included as other explanatory variables in the model. The result of the study indicated that except asset liquidity the remaining all explanatory variables have a negative effect on leverage. However, the impact of asset liquidity is positive and significant. By employing cross-sectional data Akdal (2011: 42) examined the determinants of the firm-level capital structure of 202 companies listed in London Stock Exchange (LSE). The result of the study revealed that profitability and asset liquidity have a negative and statistically significant relation with leverage, whereas asset tangibility is positively related.

**Table 2: The Summary of Literature on the Capital Structure**

| Author | Study purpose | Sample and period | Method | Finding |
|---|---|---|---|---|
| Drobetz and Roger (2003) | Investigating the determinants of capital structure evidence from Switzerland | 124 firms, 1997-2001 | Dynamic panel model | Profitable firms and firms that have more investment opportunity hold less leverage |
| Rajan and Zingales (1995) | Investigating the capital structure determinates in major industrialized countries. | 8,000 non- financial companies 1987-1991 | Ordinary Least Square (OLS) | The Factors that affect the firm's capital structure in the U.S. affect the capital structure of firms in other countries as well |
| Asarkaya and Özcan (2007) | Investigating the determinants of capital structure of financial institutions in Turkey | 2002-2006 | Panel regression analysis with generalized method of moments(GMM) | The capital adequacy ratio is affected positively by portfolio risk, economic growth, average capital level of the sector and ROE, whereas negatively by share of deposits |
| Amidu (2007) | Analyzing the dynamics involved in capital structure determination of Ghanian banks | 19 banks, 1998-2003 | Panel regression model | Profitability, asset structure, corporate tax, bank size, and growth opportunity significantly affect the bank's capital structure |
| Frank and Goyal (2009) | Investigating the important factor for capital structure decisions | U.S. firms 1950-2003 | Univariate and Multivariate Regression | The market leverage is positively affected by median industry leverage, tangibility and expected inflation whereas, it negatively affected by profit and market-to-book assets ratio. On the other hank the impact of market-to –book ratio, inflation and firm size on the book leverage is not reliable. |

**Table 2: (Continued)**

| Author | Study Purpose | Sample and Period | Method | Finding |
|---|---|---|---|---|
| Vidal (2009) | Investigating the pattern of capital structure and macroeconomic conditions on Nordik banking sector | 30 banks, 2003-2008 | Multiple Linear Regression | The market value of leverage significantly affected change in GDP |
| Sibilkov (2009) | Investigating the relationship between asset liquidity and capital structure | 7,486 individual companies, 1982-2005 | Multivariate regression analysis | Asset liquidity is positively associated with leverage, furthermore secured debt is positively related to liquidity but the relation with unsecured debt is curvilinear |
| Groop and Heider (2010) | Investigating the determinants of bank capital structure | 15 EU member countries and the U.S., 1991-2004 | Pooled OLS | Capital regulations and mispriced deposit insurance are the second-order important in determining banks capital structure |
| Caglayan and Sak (2010) | Investigating the determinants of capital structure | 25 deposit banks, 1992-2007 | Panel regression analysis | Firm size and market to book positively affect whereas, profitability and tangibility negatively affect the book leverage |

**Table 2: (Continued)**

| Author | Study Purpose | Sample and Period | Method | Finding |
|---|---|---|---|---|
| Akdal (2011) | Analyzing the impact of firm characteristics on firm capital structure | 202 companies from FTSE 250, 2002-2009 | Multiple regression | Leverage is affected negatively and significantly by profitability and asset liquidity and positively by asset tangibility |
| Gungoraydinoglu and Oztekin (2011) | Analyzing firm and country-level determinants of corporate leverage from some international evidence | 15,177 firms from 37 countries, 1991-2006 | Dynamic panel model, Blundell and Bond's (1998) GMM | The institutional arrangement is an important factor in the determination of capital structure. The result on the relationship between country-level determinants and leverage is consistent with the prediction of both trade off and pecking order theory |
| Binici and Köksal (2012) | Analyzing whether the leverage of banks in Turkey procyclical or not | 2002-2011 | Regression analysis | In the Turkish banking sector leverage is procyclical, there is a positive relationship between asset growth and leverage |

**Table 2: (Continued)**

| Author | Study Purpose | Sample and Period | Method | Finding |
|---|---|---|---|---|
| Nguyen and Kayani (2013) | Comparing the developing and developed countries banks' capital structure determinants | 61 listed banks from 10 Asian countries (5 developing and 5 developed countries),2000-2012 | Regression analysis | In developing countries, the capital structure of banks significantly affected by profitability while in developed countries, collateral is the major determinant of capital structure |
| Baltaci and Ayaydin (2014) | Exploring the firm-specific, country and macroeconomic factors in the determination of leverage in banks in Turkey | 39 banks, 2002-2012 | Advance dynamic panel, Blundell and Bond's (1998) data, GMM | Leverage is positively and significantly associated with firm size, industry leverage, GDP growth whereas, it negatively and significantly related to profitability, tangibility financial risk and inflation |
| Köksal and Orman (2015) | Investigating the determinates of capital structure in major emerging market economy | 11726 firms from ISE, 1996-2009 | Fixed effect panel regression | For short term and long term debts asset tangibility and tax-related factors are the most economically important. Inflation seems the most economically significant macroeconomic determinant of leverage |

**Table 2: (Continued)**

| Author | Study Purpose | Sample and Period | Method | Finding |
|---|---|---|---|---|
| Oliveira and Raposo (2016) | Analyzing the capital structure of Europian banks and investigating the role of regulatory requirements | 494 banks, 2002-2012 | Pooled OLS | Leverage is positively related to collateral and firm size, while the relationship with the market-to-book, financing risk and profit is negative |
| Pedrono and Aurelien (2017) | Examining the procyclicality of bank's leverage and investigating whether the currency diversification is necessary. | All Banks that have more than 800 million euro in a foreign currency, 1999-2015 | Panel regression analysis | The leverage of commercial banks is less procyclical than investment banks and the difference in procyclicality of leverage between the two types of banks occurred because of currency diversification |
| Pontoh (2017) | Investigating whether debt (capital structure) is a requirement or a policy for firm | 148 listed public firm in Indonesia Stock Exchange, 2011-2015 | Logistic regression analysis | Profitability tangibility, firm size , and share price affect the capital structure and, firms that hold higher total debt and long term prefer pecking order theory |

# CHAPTER TWO

## 2. RESEARCH METHODOLOGY

### 2.1. Research Design

This research analyzes the impact of bank specific and macroeconomic factors on the capital structure of the banking sector in Turkey. Most of the studies on the capital structure used a regression analysis to determine the relationship between determinants and capital structure. Therefore, in this study also panel data regression analysis is used. Regression analysis is made for the full period and then, with the purpose of analyzing whether the capital structure of banks affected by the 2008 global financial crises or not, the full period is divided into two sub-periods. The first sub-period is from the year 2003 to 2008 (represent a period before the financial crisis) while the second sub-period is running from 2009 to 2017 (represent a period after the financial crisis). Additionally, whether the factors have a different impact on the capital structure of banks in different conditions, additional regression analysis is made by classifying banks as commercial banks and development and investment banks, domestic and foreign banks.

### 2.2. Data Collection

All bank specific data used in this study are collected from statistical reports of the BAT. The macroeconomic data namely, real GDP growth rates, inflation rates, interest rates, unemployment rates, and exchange rates are collected from the statistical reports of the World Bank and finansalgoz. The data is collected based on year-end observation.

### 2.3. Sampling

In the Turkey banking sector, because of banks entry and exit, the series of some banks is not long. As a result, getting the data of selected variables is not available for all 52 banks presently operating in the sector. Because of these problems, the sample of this study covers 42 banks that have full annual basis data for each year from 2003 to 2017. The 42 banks comprise 21 domestic and 21 foreign banks. From the total sample banks 30 of them are commercial banks and the remaining 12 are development and investment banks.

## 2.4. Description of the Variables and Hypothesis Development

### 2.4.1. Dependent Variables

In this thesis capital structure is considered as a dependent variable. A number of studies used the debt structure or leverage ratio of a firm as a proxy to measure the capital structure. It is recommended that not only using total liability but dividing into short term and long term liability is appropriate to measure the financial leverage. This classification helps to show whether the firm is at default risk or not and it gives complete information of past financing choices (Titman and Wessles, 1988: 7; Rajan and Zingales, 1995: 9; Michaelas et al., 1999: 113; Hanousek and Shamshur 2011: 1363). In addition to these suggestions, pecking order and trade-off sometimes have different suggestions for the different types of debts. Firms with high total debt and long term debt ratios prefer the expectations of pecking order theory while, firms with a lower long term and total debt ratios prefer the expectations of trade-off theory (Pontoh, 2017: 138). As a result of these differences, in this research three measures of leverage are used. These are the total debt ratio (LEV1), long term debt ratio (LEV2) and short term debt ratio (LEV3).

### 2.4.2. Independent Variables

Different types of factors that affect the firm's capital structure have been defined by previous capital structure theories and empirical studies (Rajan and Zingales 1995: 1421-1460; Sibilkov, 2009:1173; Gropp and Heider, 2010: 14). For this study, the determinants of firms' capital structure in general and banks specifically are selected by following the existing literature. The independent variables include both bank specific and macroeconomic factors that are believed to be important on banks' leverage decisions. Generally, six banks specific factors (profitability, asset tangibility, firm size, net interest margin, liquidity, and growth opportunity) and five macroeconomic factors include, real GDP growth rates, inflation rate, unemployment rate, real interest rate, and exchange rate are used to get a total of 11 (eleven) independent variables. The detail explanations of these variables, the way of measuring the variables and the developed hypothesis regarding the relationship between leverages and each explanatory variable are discussed below.

#### 2.4.2.1. Profitability

The effect of profit on firms leverage is one of a controversial issue by previous capital structure theories. It uses to measure the earning power of the firm. According to trade-off theory, if corporate taxes are taken into account, a high level of profitability increase borrowing capacity of firms. Generally, profitable firms are required to pay more taxes than non-profitable firms. To deduct the amount of tax payment, they prefer issuing more debt so as to get the benefit of tax

shield on the interest payment. This strategy makes firms to have more debt than equity. Furthermore, agency costs theory recommends that profitable firms would increase the amount of debt in its capital structure in order to control the manager actions. All of these suggestions indicate the existence of a positive correlation between debt and profitability. This suggestion is supported by the study of (Gungoraydinoglu and Oztekin, 2011: 1471).

However, according to the prediction of the pecking order theory, firms have ordered preference to finance their operation. They prioritize using retained earnings first than debt. When firms are profitable, it is considered as having more retained earnings and makes them to hold a low level of debt. This justification shows a negative relationship between profitability and debt (Drobtez and Fix, 2003:24; Oliveira and Raposo, 2016: 40; Rajan and Zingales, 1995: 25; Chakraborty, 2013: 117). Based on the existing empirical literature, in this study to measure profitability, operating income over the total assets is used.

$Ha_1$: Profitability has a negative effect on leverage

#### 2.4.2.2. Asset Tangibility

In past literature, the asset structure of firms has a positive effect on their capital structure. If the larger percentage of firms assets is tangible, it increases the capacity of getting debt with a collateral agreement. Trade-off theory predicts a positive relationship between asset tangibility and leverage. The reason is, in the case of bankruptcy the losses on tangible assets is lower than the losses on other assets. This prediction supported by other empirical works. Drobtez and fix (2003: 32) collected data from 124 large firms listed on Swiss Performance Index (SPI) and they used a ratio of fixed assets to the total asset as a proxy of measuring asset tangibility. The findings of the work concluded that, a positive association between leverage and asset tangibility. Furthermore, (Titman and Wessles, 1988: 17; Gropp and Heider 2010: 45; Hanousek and Shamshur 2011: 1364) indicated that the significant correlation between tangibility and total debt. On the contrary, the pecking order theory assumes that firms that hold more tangible assets seem to rely on more internal funds earned from these assets. Therefore the theory estimates a negative relation of leverage with asset tangibility. Similarly, (Bas et al. 2009:14; Degryse et al., 2012:440) have found a negative effect of tangibility on short term debt ratio. Following the previous literature in this study, the ratio of fixed assets to the total asset is used to measure asset tangibility.

$Ha_2$: Asset tangibility has a positive effect on leverage

#### 2.4.2.3. Bank Size

Firm size is considered as one of the important factors of capital structure. A trade-off theory suggests a positive correlation between the size of the firm and leverage. The reason behind is, generally, large firms are seen as more diversified with stable cash flows than small firms. As a result, the probability of bankruptcy will be less and able them to borrow more than small firms. The study conducted by Chakraborty (2013: 117) indicated the existence of a positive relationship between firm size and capital structure.

The contradictory justification comes from a problem of asymmetry information. According to the pecking order theory, large firms are required to disclose more information to the public. As a result, these large firms potentially can offer informationally sensitive securities such as equity to the market. Therefore they prefer equity financing over debt. The implication is there a negative relationship between leverage and firm size. According to Titman and Wessels (1988: 17), small firms are in general have more short term debts than long term debts, and this makes them to have high transaction costs. Following the existing literature about measuring of firm size, in this study, the natural logarithm of total assets is used as an indicator of firm size.

$Ha_3$: Bank size has a positive effect on leverage

#### 2.4.2.4. Net Interest Margin

Banks' net interest margin is the difference between what the lenders ultimately receives and what the borrowers have to pay for their debt (Busch and Memmel 2016: 1). Net interest margin is defined as a rate that is financial institution generates as interest income from loans and other assets in specific time period minus the interest paid on debts to the average earning assets (Ongore and Kusa, 2013: 239). According to Hailu (2015: 5), net interest margin measures the profitability of the banks. If that is the case, the higher the net interest margin the higher profit generated by the bank, which indicates the stability and the effectiveness of the bank.

Even though the theories on capital structure did not clearly demonstrate the impact of net interest margin on the capital structure as the standard determinants of capital structure, almost all studies conducted on net interest margin indicated that it is the basic measure banks profitability. To measure the net interest margin of banks, different types of formulas have been used in the previous works. Khalil (2017: 33) used a formula of net interest income to total loan to customers ratio then, the researcher found a negative association of net interest margin with leverage. Hailu (2015: 8) by calculating interest income minus interest expense over the interest-earning assets, he got a negative relationship between net interest margin and leverage of banks in Ethiopia. A ratio of net interest income to total assets have been applied by Busch & Memmel (2016: 5) and Yuksel

& Zengi (2017: 185). In the other study conducted by Ongore & Kusa (2013: 244) the net interest margin is computed by dividing the net interest income to the average earning assets. Following the formulas in the literature, in this study, a formula of net interest income to total assets is used to measure net interest margin.

$Ha_4$: Net interest margin has a negative effect on leverage

#### 2.4.2.5. Growth Opportunity

Some empirical studies reported that, a negative relationship between growth opportunity and leverage. Because, growth opportunities are capital assets that increase the value of the company but do not produce taxable income and cannot be collateralized (Titman and Wessels, 1988: 4). In related to this description, trade-off theory states that firms with more growth opportunity prefer to retain debt financing as they might need to borrow in the future, and this makes them to decrease the amount of debt in their capital structure. Thus, the expected future growth opportunity should be negatively associated with debt. Some of the empirical works that identified a negative relationship between growth opportunity and leverage are: (Gaud, et al., 2005: 1; Chakraborty, 2013: 117; Goyal, 2002:57)

On the other hand, pecking order theory expects a positive relation between leverage and growth opportunity. The justification is, generally firms with more growth opportunity, because of the internal source of financing unlikely to be sufficient and holding of profitability fixed, they need external fund in the form of debt (Frank and Goyal, 2009: 37, Drobetz and Roger, 2003:32). Different ratios such as, annual growth rate in total assets (Titman and Wessels,1988:4), research and development expense over total asset (Graham, 2000:1909), and market- to -book ratio or price-to-book ratio (Gaud, et al., 2005: Rajan and Zingales, 1995: 23; Mayer, 1977) was used to measure firm growth opportunity. Since all the sample of my study is not non-financial firms and the annual growth rate in total assets of the company shows the past and present growth trends, it is taken as an indicator of growth opportunity.

$Ha_5$: Growth opportunity has a positive effect on leverage

#### 2.4.2.6. Liquidity

The liquidity of an asset indicates the degree of an asset can be easily traded in the market. The ratio of liquidity shows the firm's ability to accomplish its short term financial commitments. According to Demirgüç-Kunt (1989: 9) in order to determine the firm's exposure to liquidity risk and to assess the ability of banks to meet unexpected deposit outflows, assessors observe the

funding source banks and the asset liquidity. By using the liquidity index[9] that was proposed by Schlingemann et al., (2002: 128), Sibilkov (2009: 1173) conducted a study based on a sample of U.S. public companies. The study proved that there is a positive and statistically significant association of asset liquidity with leverage. Similarly, Shleifer & Vishny (1992: 21) predicted that, more liquid assets increase leverage. This finding suggests that, during financial distress because of having more debt in capital structure, firms have to make a decision between undervalued asset sales and costly financial restructuring. Because of illiquid assets are poor candidates for debt financing, to limit the cost of liquidation related to less liquid assets that could be sold less than the present value, firms reduce leverage in advance. Therefore, liquid assets served as better collateral and decrease the cost of financial distress. Therefore, it makes firms to take more debt.

Williamson (1988: 567) makes a similar conclusion about the relationship between liquidity and leverage, i.e firms with more liquid asset have more debt because the financing cost of these assets is not high. According to, Deesomsak (2004:9) managers in a high liquidity firm may manipulate the liquid properties in favor of shareholders than debt holders, and these situations increase the agency cost of the firm. The pecking order theory expects a negative correlation between leverage and liquidity. On the other hand, trade-off theory predicts a positive association of liquidity and leverage, justifying that higher liquidity ratio indicates the capacity of the firm to cover short term financial obligations and this may encourage firms to have high debt ratio (Masoud, 2013:16). The effect of liquidity on the capital structure of Croatian firms is investigated by Šarlija and Harc (2012:34). They conducted a study based on the data of 1058 Croatian firms. Their findings suggested that, the relation of liquidity with short term leverage is stronger than the relationship with long term leverage. But generally firms with more liquid assets the less leverage they have.

Similarly, by using the sample of U.K. companies from FTSE 250[10] Akdal (2011:12), presented a negative and statistically significant relationship between liquidity and leverage of the firms. Whether asset liquidity has a different impact on the long term and short term liabilities is investigated by Anderson (2002: 13-14). The findings of the test that is made by using of panel data sets from the U.K. and Belgian firms showed that, firms that relied on more long term debts tend to hold more liquid assets, while firms with a high short term liability tend to be associated with a low level of liquid assets. However, when the test is made on Belgian companies, there is a positive relationship between short term and liquid assets, while the relation with long term debts is

[9] This liquidity index is the value of the corporate transaction in an industry standardized by the total value of asset.This index is used to measure the asset liquidity.

[10] The Financial Times Stock Exchange (FTSE) 250 Index is a capitallisation-weighted index includes the 101st to the 350th largest company listed on the London stock exchange ( FTSE 250 Index (n.y.), https://en.wikipedia.org/wiki/FTSE_250_Index).

negative. Harris and Raviv (1990: 321) suggested that, in order to get information about firms' profitability, investors examine the ability of firms to meet contractual obligations at different levels and amounts of leverage and by making basic changes on operating policies of the company, then they make a balance between the expected cost of distress and the prospective progress of the company's policy. Thus, if the company increases the asset liquidity, the cost of distress will decrease. This indicates a positive relationship between leverage and liquidity, and it is similar to the prediction of the trade-off theory.

$Ha_6$: Liquidity has a negative effect on leverage

#### 2.4.2.7. The Real GDP Growth Rate

The real GDP growth rate is one of the basic factors to measure the health of the economy. It is a percentage that indicates the rate of change in the GDP of a country. Different types of studies indicated that the GDP growth rate is one of the macroeconomic factors of capital structure. (Muhammad, 1999: 732; Khanna, 2015: 970; Demirgüç-Kunt and Maksimovic, 1996: 15; Booth et al., 2001: 118; Mokhova and Zinecker, 2014: 535) are some of the studies. According to Köksal & Orman (2015:13) in a highly growing environment, firms have a shortage of tangible assets relative to the availability of investment opportunities and this makes them to lose their value at the time of distress. The trade-off theory estimates a negative relationship between leverage and a high growth environment. The theory suggests that firms in a growth environment have a probability of facing financial distress and a problem of debt overhang. The reason for this problem is, the new investment opportunities in a growing economy make the cost of debt higher than equity (Mayer, 1977: 147-175). This expectation is supported by the study of Demirgüç-kunt and Maksimovic (1996: 15).

In the study of Köksal and Orman (2015: 18) GDP has a negative association with the total debt and long term debts but not with short term debts. Similarly, in the study conducted by Muthama et al., (2013: 56) GDP growth rate has a negative correlation with the total debt and short term debt ratios, while the correlation with long term debt ratio is positive. On the contrarily, the pecking order theory suggests a positive relationship between economic growth and leverage. Firms in a high growth environment tend to prefer external financing through debt than equity. A positive relationship between GDP growth rate and leverage is also found by Magwai (2014: 71) and Muthama et al., (2013: 57). Following the common practice of other studies, in this study, the real GDP growth rate is used as one of the macroeconomic factors. It is defined as the percentage change in the annual real GDP growth rate. In the analysis, the natural logarithm of the rate is used. In analyzing the full period, since the data of the real GDP growth rate in the sample period has a negative value, with the objective of getting full data, a constant value (1) is added to convert the data to the natural logarithm. As far as the analysis of the two sub-periods, in the first-sub period

because of not having a negative value, the data of the real GDP growth rate it is converted to the natural logarithm without adding a constant value, while in the analysis of the second sub-period, because of having a negative value, the data of the real GDP growth rate is converted to the natural logarithm after adding a constant number (1) and after converting the added constant value is subtracted.

$Ha_7$: Real GDP growth rate has a negative effect on leverage

#### 2.4.2.8. Inflation Rate

Inflation can be defined as a rate in which raising the price level of goods and service in a country over time. In other means, the purchasing power of currency becomes week. According to Muthama et al., (2013: 45) even though the impact of inflation on a firm is not determined in the same way for a firm in a different competitive environment, generally low and medium level of inflation rate can encourage production. Hence, it would have a positive effect on the business sector as well as on the economy. However, a high rate of inflation hurt firms negatively by affecting the cost of inputs and outputs.

Theories on the capital structure have different perspectives on the relationship between leverage and inflation. Trade-off theory expects a positive relation between leverage and expected inflation rate. In related to this prediction, Taggart (1985: 48) indicated that in the U.S. the features of the tax code make the real value of interest tax deductions to be low during high expected inflation rate. In the study of Hortlund (2005: 23), it is proved that especially for banks, a high inflation rate automatically increases leverage.

The positive relationship between inflation rate and leverage is also concluded by different researchers (Noguera, 2001; Mokhova and Zinecker, 2014: 535; Frank and Goyal, 2009: 36). These studies revealed that high inflation rate creates a high demand for corporate bonds. On the other hand, the expectation of pecking order theory about the relationship between inflation rate and leverage is not clear. A number of empirical works found a negative relation between leverage and inflation. Higher inflation rate increases the demand for stocks than bonds. As a result, the leverage of the firms that is measured by the debt to equity ratio tends to decrease (Dammon, 1988). Booth et al., (2001: 98) noted that the total debt and long term debts of firms decrease with the increase in the inflation rate. Joeveer (2013:306) also found a negative relationship between the inflation rate and leverage.

$Ha_8$: Inflation rate has a positive effect on leverage

#### 2.4.2.9. Interest Rate

Interest rate is the cost of borrowed funds for a given period of time. Generally, the interest rate is divided into nominal and real interest rates. To explain the difference between these two types of interest rates, Irving Fisher, (1930) develops a Fisher equation. In this equation, the nominal interest rate is a combination of real interest rate and inflation rate, which means the real interest rate is the nominal interest rate minus the expected inflation rate. Different studies examined the impact of interest rate on the capital structure of firms. Jalilvand and Harris (1984: 127), Gau and Wang (1990: 501) and Gropp and Heider (2007: 44) are some of the studies that found interest rate as one of the important determinants of firms leverage.

According to trade off theory and Frank and Goyal (2009: 47), the tax benefit of debt makes firms to hold more debt. Therefore by taking the bankruptcy risk into account, the high cost of debt is an important reason for adjusting the capital structure of firms. This description indicates that, the positive association of interest rate and leverage. A study conducted by Bokpin (2009: 129) indicated that, a significant and positive link between the interest rate and leverage. On the other hand, Mokhova and Zinecker (2014: 534) found a negative relationship between the interest rate and leverage. Dell'Ariccia et al., (2014: 24) noted that, when banks are poorly capitalized and if the leverage of banks' cannot easily be adjusted in response to change in the risk-free rate, the relation between leverage and real interest rate need no longer be negative. However, if the capital structure of banks is not fixed and can be easily adjusted, a decrease in real interest rates increases the leverage.

Unexpected changes in interest rates have a significant impact on the value of the firm's leverage. For instance, unexpected increase in interest rates decreases the market value of long term debts, while the short term debts and the book value of long term debts are not affected (Gordon and Shoven, 1982: 477). In this study, the real interest rate is used as a proxy of the interest rate.

$Ha_9$: Interest rate has a negative effect on leverage.

#### 2.4.2.10. Unemployment Rate

As stated by Magwai (2014: 26) in countries with a high rate of unemployment, it is possible to expect firms to be labor incentive and it would make them to hold a lower level of leverage. Trade-off theory assumes, firms can reach optimal capital structure by balancing the tax benefit of leverage from interest payments and the costs of financial distress. In the event of firms filing bankruptcy, costs related to employment is one of the highest costs. Generally, employees need to be safe in working environment and getting incentives and feeling confident in the firm they are

working in. As a result, the financial condition and the capital structure of firms can play a great role. Customers and shareholders are reluctant to work in highly leveraged firms and firms that are likely to fail. Because of these reasons, highly leveraged firms spent more expense to pay wages of employees and it could be difficult to hire works by low cost relative to the labor market (Maksimovic and Titman 1991: 176).

Even though the literature on the relationship between the unemployment rate and firms' capital structure is limited, there is some empirical evidence that shows the relationship between the unemployment rate and leverage. Mokhova and Zinecker (2014:535) analyzed the influence of unemployment rate on the corporate capital structure of non-financial firms based on the data from 7 European developed countries and emerging market. The study showed a positive relationship between the unemployment rate and capital structure. Additionally, it is pointed out, the relation is significant in only one of the 7 countries they sampled out, while in the other six countries the relationship is not significant. This evidence is supported by other studies (Akyol and Verwijmeren, 2013: 480). On the other hand, Kalaleh (2015: 432) investigated the association between leverage and unemployment rate on the sample of 95 companies listed in Tehran Stock Exchange (TSE). In his the study, he found a negative link between leverage and the unemployment rate. In this study, the natural logarithm of the percentage change in the total labor force is used as the measure of the unemployment rate.

$Ha_{10}$: Unemployment rate has a positive effect on leverage

#### 2.4.2.11. Exchange Rate

Exchange rate is the price of a country's currency in terms of another country currency. According to Francis and Hunter (2012: 5-6), change in the exchange rate has an economically significant effect on firms' cost of debt, and it could increase the conflict of interest between shareholders and debt holders. The reason for this conflict is clarified by Jensen and Meckling (1976: 337), the justification is, because of stockholders hold a call option on the value of the leveraged firm, they want to increase the risk of the leveraged firm with the intention of increasing the value of equity if the option expires in the money. However, if the option expires out of the money the debt holders bear the major part of the cost. If banks have both domestic and foreign assets, their leverage is affected by the international financial cycle and exchange rate fluctuations.

With the objective of investigating whether the banks' leverage is procyclical or not Pedrono and Aurelien (2017: 4) conducted a study on banks located in France for a period of between 1999 and 2015. They found that the leverage of commercial banks is less procyclical than the leverage of investment banks and this difference is captured by currency diversification. Furthermore, about the procyclity of banks' leverage, similar results showed by (Balglioni et al.,

2013: 10; Andrian and Shin, 2013: 1; Kalemli-Ozcan et al., 2012: 3 and Binici and Köksal, 2012: 13).

The empirical literature that tried to examine the relationship between exchange rate and capital structure found mixed results. With the purpose of determining the effect of the exchange rate and financial flexibility on the leverage of the listed companies of Tehran Stock Exchange, Mahmoodabadi et al., (2013: 38) indicated that no significant relationship between leverage and exchange rate changes. On the other hand, by analyzing the capital structure determinates of the large listed Norwegian and foreign public companies for a period from 2011 to 2015, Mohsin (2016) found a significant positive effect of exchange rate on leverage, whereas M Zein and Ångström (2016: 33) are found a negative association.

$Ha_{11}$: Exchange rate has a positive effect on leverage

Based on the literature regarding the determinants of capital structure, the above eleven (11) developed hypotheses about the effect of selected variables on the leverage of banks are summarized as follows:

$Ha_1$: Profitability has a negative effect on leverage
$Ha_2$: Asset tangibility has a positive effect on leverage
$Ha_3$: Bank size has a positive effect on leverage
$Ha_4$: Net interest margin has a negative effect on leverage
$Ha_5$: Growth opportunity has a positive effect on leverage
$Ha_6$: Liquidity has a negative effect on leverage
$Ha_7$: Real GDP growth rate has a negative effect on leverage
$Ha_8$: Inflation rate has a positive effect on leverage
$Ha_9$: Interest rate has a negative effect on leverage
$Ha_{10}$: Unemployment rate has a positive effect on leverage
$Ha_{11}$: Exchange rate has a positive effect on leverage

**Table 3: The Definition of Variables**

| Variable | Model Name | Definition |
|---|---|---|
| **Dependent Variable** | | |
| **Debt ratio** | | |
| Total Debt Ratio | $LEV1_{it}$ | Total Debt/Total Assets |
| Long Term Debt Ratio | $LEV2_{it}$ | Long Term Debt/Total Assets |
| Short Term Debt Ratio | $LEV3_{it}$ | Short Term Debt/Total assets |
| **Independent Variable** | | |
| Profitability | $PROFT_{it}$ | Operating Income/Total Asset |
| Asset Tangibility | $TANG_{it}$ | Fixed Assets/Total Assets |
| Bank Size | $SIZE_{it}$ | The Natural Logarithm of Total Asset |
| Net Interest Margin | $NIM_{it}$ | (Interest Income-Interest Expense)/Total Assets |
| Liqudity | $LIQU_{it}$ | Current Assets/Current Liabilities |
| Growth Opportunity | $GROW_{it}$ | The Annual Growth Rate in Total Asset |
| The Real GDP Growth Rate | $GDP_{it}$ | The Natural Logarithm of the Percentage Change in Annual Real GDP Growth Rate |
| Inflation Rate | $INF_{it}$ | The Percentage Change in the annual Consumer Price Index (CPI) |
| Interest Rate | $INT_{it}$ | Real Interest Rate |
| Exchange Rate | $EXCH_{it}$ | Exchange Rate (Turkish Lira to American Dollar) |
| Unemployment Rate | UNEMPit | The Natural Logarithm of the Percentage Change in the Total Labor Force. |

## 2.5. Model Development

According to Baltagi, (2008:4-6) panel data is a data set that contains time series observations across different cross-sectional units like individual, firms, country, state or any collection of units. It is also good to estimate and identify complex behavioral models that are not detected by using pure cross-sectional and time series data alone. By combing the characteristics of both cross-sectional and time series data, it enables to use of more reliable research method. Hence, in this study, panel data regression analysis is used. Because of having three dependent variables, based on each dependent variables three models are developed for the full period.

**Model 1**: $LEV1_{it} = \beta_0 + \beta_1 PROFT_{it} + \beta_2 TANG_{it} + \beta_3 SIZE_{it} + \beta_4 NIM_{it} + \beta_5 GROW_{it} + \beta_6 LIQU_{it} + \beta_7 LNGDP_{it} + \beta_8 INF_{it} + \beta_9 INT_{it} + \beta_{10} LNUNEMP_{it} + \beta_{11} EXCH_{it+} e_{it}$.....**(1)**

**Model 2**: $LEV2_{it} = \beta_0 + \beta_1 PROFT_{it} + \beta_2 TANG_{it} + \beta_3 SIZE_{it} + \beta_4 NIM_{it} + \beta_5 GROW_{it} + \beta_6 LIQU_{it} + \beta_7 LNGDP_{it} + \beta_8 INF_{it} + \beta_9 INT_{it} + \beta_{10} LNUNEMP_{it} + \beta_{11} EXCH_{it+} e_{it}$.....**(2)**

**Model 3**: $LEV3_{it} = \beta_0 + \beta_1 PROFT_{it} + \beta_2 TANG_{it} + \beta_3 SIZE_{it} + \beta_4 NIM_{it} + \beta_5 GROW_{it} + \beta_6 LIQU_{it} + \beta_7 LNGDP_{it} + \beta_8 INF_{it} + \beta_9 INT_{it} + \beta_{10} LNUNEMP_{it} + \beta_{11} EXCH_{it+} e_{i}$.....**(3)**

The definition of dependent and independent variables is presented in the previous Table 3. In the model the $\beta_0$ indicates the coefficient of regression, $\beta_1, \beta_2, \beta_3$ is to indicate the coefficient of explanatory variables, $e_i$ shows the error, i implies the bank in the same cross-section and the period of time is indicated by t.

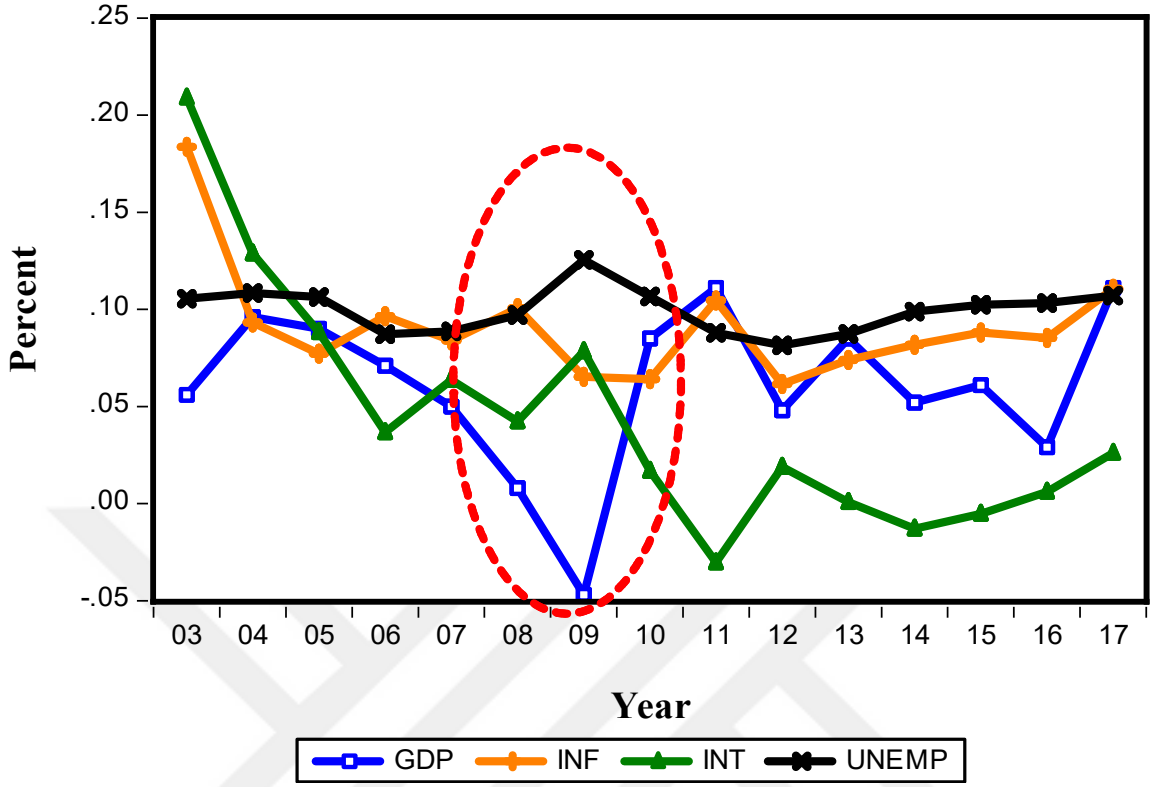
# CHAPTER THREE

## 3. RESULTS AND DISCUSSIONS

In this section of the thesis, the collected data is analyzed and the results of the regressions are discussed. The data sets cover 15 years from the year 2003 to 2017. Since the main purpose of this study is to investigate the impact of bank specific and macroeconomic factors on the capital structure of banks, capital structure is used as a dependent variable. In this study, capital structure is measured by total debt ratio (LEV1), long term debt ratio (LEV2) and short term debt ratio (LEV3). In order to test the impact of eleven (11) explanatory variables on the three dependent variables, three regression models are computed for the full period. Additionally, to test whether the factors have a different impact on the capital structure of banks before and after the 2008 global financial crises, the full period is broken into two sub-periods. By using similar dependent and explanatory variables of the full period, three regression models for the two sub-periods are separately computed. Moreover, to demonstrates whether the impact of the selected factors has differentiation on different types of banks, additional analysis is made by classifying banks as, commercial banks and development and investment banks, domestic banks and foreign banks. But before computing all regressions, the data break and diagnostic tests are performed so as to get a good model. The results are presented below.

As it was indicated in the first part of the thesis, one of the specific objectives of this study is analyzing whether the explanatory variables have a different impact on leverage before and after global financial crises. However, the 2008 financial crises might not affect all countries in the same way. If so, before computing the descriptive statistics and the regressions for the full period and the two sub-periods it is important to indicate the structural point so as to split the data into two sub-periods. The following Figure 2 demonstrates the trend of macroeconomic factors from 2003 to 2017 and where the break period is. As it can be easily observed from the figure, the trend of four economic indicators namely real GDP growth rates, inflation rates, interest rates, and unemployment rates, fluctuate from period to period. In the analysis part of this study, although the data of the real GDP growth rates and the unemployment rates are converted to the natural logarithm, to draw Figure 2 below, the data of these two variables is used before converting.

**Figure 2[11]: The Trend of Macroeconomic Indicators**




As it is demonstrated in Figure 2 above, the pattern of the real GDP growth rates starts declining from the year 2006 and then sharply dropped to around -0.05 in the year 2009. One of the expected reasons for the 2009 economic failure in Turkey was, the 2008 global financial crises were created fear on consumers about the course of future events and firms lost confidence in economic activity. Due to these problems, the private consumption expenditure decreased and in the second quarter year 2009 the export goods and service dropped by 6.5%. According to Hacioğlu and Dinçer (2017: 270), in 2007 the net financial flow was 7.2% of GDP, then in 2009, it decreased to 1.7 %. But in 2010, the economy of the country recovered rapidly. Based on Figure 2 above, in 2009 in addition to the fall of real GDP growth, the average unemployment rates also increased from 10.7% in 2008 to 14% in 2009. Especially in February of 2009, the youth unemployment rate reached 14.8%. This percentage was the highest rate ever Turkey experienced. Although most of the time, the inflation rates are expected to increase during the economic downturn, in 2009 the increasing pattern of inflation rates was not observed while the unemployment rates and real GDP growth rates had a bad trend. However, in 2008 the inflation rates increased to 10.4% from 8.4% in 2007 and it was higher than the average value of 9%. Similarly, the real interest rates decreased from 6.4% in 2007 to 4.2% in 2008, and then in 2009, it increased to 7.8%.

[11] To draw this figure the data of real GDP growth rates, unemployment rates and inflation rates are collected from the website of world bank and the data of interest rate(real) is collected from the website if finansalgoz.

In addition to demonstrating the break period based on the pattern of macroeconomic indicators, to make sure whether the selected break period is a right period, a structural break test is performed. To get the break period for each macroeconomic factors namely; the real GDP growth rates, inflation rates, interest rates unemployment rates, and exchange rates, Dickey-Fuller break point selection test is performed. The result of the tests indicates that, except for exchange rates, the year 2009 is a break point for the remaining four macroeconomic factors. On the year 2009, the macroeconomic factors show a significant change. To get the group structural break, Chow break point test is applied. The null hypothesis of this test is there is no break. When the probability values less than 0.05, the null hypothesis is rejected and the alternative hypothesis that states there is a break is accepted. The result of Chow breakpoint test is presented in the following Table 4.

**Table 4: The Result of Structural Break Test**

| Chow Breakpoint Test: 2009<br>$H_{a:}$ No Breaks at Specified Break points | | | |
|---|---|---|---|
| F-statistic | 9.976 | Prob. F | 0.005 |
| Log-likelihood ratio | 28.534 | Prob. $Chi^2$ | 0.000 |
| Wald Statistic | 39.906 | Prob. $Chi^2$ | 0.000 |

The result of Table 4 above shows that, the p-value of F statistic is significant (0.005). This result indicates that the null hypothesis of no breaks at specified breakpoints (2009) is rejected and the year 2009 is considered as a structural point. Therefore based on the result of structural break tests and trend of economic indicators, the full period is broken into two sub-periods. From the year 2003-2008 is the first sub-period and from the year 2009-2017 is the second sub-period.

### 3.1. Diagnostic Tests and Model Specification

In a regression analysis, the consequence of incorrectly specified statistical model can lead to wrong forecasts and statistical inferences. Because of these problems, many model diagnostic tests have been developed and most of the econometric literature focuses on the procedures and assumptions of the developed models. In this study, before making regression analysis some model diagnostic tests are performed. The results and the discussions of these tests are discussed below.

### 3.1.1. Panel Unit Roots

Even though testing stationarity of the variables is a general practice in time series analysis, recently testing for unit roots in a panel data become common as a result of shifting the application of panel data from large cross-sections (N) and small time series (T) to large cross-section(N) and large length of time (T) (Barreira & Rodrigues 2005:2). Therefore, because of the data of this study is panel data set, a panel unit root tests are performed. There are different types of tests used for unit roots. In this study, the Phillips-Perron (PP) Fisher Chi-Square panel unit root test is applied. The null hypothesis of this test is a variable possesses a unit root. The test is made for the full period, and for the two sub-periods as well as for the classified banks. The test is made with constant and constant and trend. The results of the test are presented in Table 5, 6 and 7 below.

**Table 5: The Result of Panel Unit Root Test for All Periods**

| | PP-Fisher Chi –square | | | | | |
|---|---|---|---|---|---|---|
| | Full Period | | First Sub-period | | Second Sub-period | |
| | Constant | Constant and Trend | Constant | Constant and Trend | Constant | Constant and Trend |
| PROFT | 313.60*** | 355.19*** | 228.22*** | 234.62*** | 220.91*** | 226.36*** |
| TANG | 95.26 | 84.55 | 147.32*** | 144.25*** | 79.12 | 68.84 |
| SIZE | 293.89*** | 97.27 | 129.46*** | 138.69*** | 156.63*** | 123.34** |
| NIM | 322.15*** | 353.90*** | 232.78*** | 194.94*** | 224.19*** | 265.91*** |
| GROW | 295.90*** | 403.84*** | 159.60*** | 220.73*** | 215.25*** | 254.23*** |
| LIOQ | 229.79*** | 229.19*** | 219.84*** | 227.54*** | 177.59*** | 288.77*** |
| LNGDP | 190.32*** | 105.08* | 9.18 | 279.15*** | 452.86*** | 724.38*** |
| INF | 1137.95*** | 870.23*** | 815.56*** | 435.79*** | 243.43*** | 683.89*** |
| INT | 491.34*** | 194.65*** | 501.58*** | 72.85 | 610.41*** | 414.96*** |
| LNUNEMP | 127.98*** | 56.94 | 104.96* | 17.45 | 157.82*** | 160.69*** |
| EXCH | 0.0002 | 0.003 | 83.32 | 286.12*** | 0.001 | 0.291 |
| **The First Difference of Variables** | | | | | | |
| DTANG[12] | 256.82*** | 208.80*** | | | 116.67** | 109.74* |
| DEXCH | 37.43 | 299.73*** | | | 26.58 | 404.95*** |

The ***,** and * denotes the significance level at 1%, 5%, and 10% respectively

Table 5 above reports the test result of panel unit roots for the full period and the two sub-periods. Based on the results presented in Table 5 above, in the full period except for asset tangibility and exchange rates, all the remaining variables have a p-value less than the critical value of 0.05. These results indicate, the null hypothesis of the tests that is, a variable has unit root is

[12] All first differenced variables are named by adding letter "D" before their model name. Therefore the first difference of tangibility and exchange rate is DTANG and DEXCH respectively.

rejected and these variables are stationary at level. Since the two variables i.e. asset tangibility and exchange rates have a unit root at level with both constant and constant and trend, both variables are first differenced. The first difference of asset tangibility has is stationary with trend and constant and trend. On the other had the first difference exchange rate is stationary with constant and trend. After these variables are first differenced, the variables are named as DTANG and DEXCH respectively.

Regarding the unit root test results of the variables for the two sub-periods, except the real GDP growth rate and exchange rates, all variables in the first sub-period are stationary at level with trend i.e. the p-value of all variables is less than the critical value of 0.05. But these two variables are stationary with constant and trend. The test results of the second sub-period indicate that, except asset tangibility and exchange rates all other variables have no unit roots at level and constant with constant and constant and trend. Then these two variables (asset tangibility and exchange rates) are first differenced and turned in to stationary data.

The results of the unit root test for commercial banks and development and investment banks presented in Table 6 below. In the result, except asset tangibility and exchange rates all variable of commercial banks and development and investment banks are stationary at level with constant. For the two banks, the two non-stationary variables are first differenced and the data of asset tangibility for commercial banks get stationary with trend and constant and trend, while for the development and investment banks, the first difference of the variable is stationary with trend. On the other hand, the first difference of exchange rates for the two banks is stationary with constant and trend.

**Table 6: The Results of Panel Unit Root Tests for Commercial Banks and Development and Investment Bank**

| | PP-Fisher Chi-square | | | |
|---|---|---|---|---|
| | **Commercial Banks** | | **Development and Investment Banks** | |
| | Constant | Constant and Trend | Constant | Constant and Trend |
| PROFT | 227.30*** | 269.37*** | 82.72*** | 83.61*** |
| TANG | 69.62 | 54.68 | 20.78 | 19.86 |
| SIZE | 278.98*** | 66.99 | 52.28** | 21.61 |
| NIM | 214.22*** | 273.39*** | 101.86*** | 80.90*** |
| GROW | 196.79*** | 302.43*** | 98.63*** | 101.95*** |
| LIQU | 169.28*** | 164.79*** | 60.51*** | 64.36*** |
| LNGDP | 135.82*** | 74.94 | 54.83*** | 29.9 |
| INF | 813.35*** | 625.88*** | 325.28*** | 248.88*** |
| INT | 350.84*** | 141.39*** | 128.96*** | 48.82** |
| LNUNEMP | 91.32** | 40.65 | 36.34* | 16.2 |
| EXCH | 0.00002 | 0.00003 | 3.46 | 0.46 |
| | **The First Difference of Variables** | | | |
| DTANG | 199.81*** | 170.30*** | 42.64** | 27.49 |
| DEXCH | 27.1 | 214.97*** | 9.46 | 77.77*** |

The ***,** and * denotes the significance level at 1%, 5%, and 10% respectively

Regarding the test results of unit roots for domestic banks and foreign banks, it is presented in the following Table 7. Based on the results of this table, except the exchange rates, all the other variables of domestic banks are stationary at level with constant. On the other hand, three variables (asset tangibility, liquidity and exchange rates) of foreign banks are not stationary with both constant and constant and trend, which means the p-value of these variables, is not less than 0.05. Therefore, these variables are first differenced to make them stationary.

**Table 7: The results of Panel Unit Root Tests for Domestic Banks and Foreign Banks**

| PP-Fisher Chi-Square | | | | |
|---|---|---|---|---|
| | Domestic Banks | | Foreign Banks | |
| | Constant | Constant and Trend | Constant | Constant and Trend |
| PROFT | 148.99*** | 193.98*** | 160.64*** | 161.20*** |
| TANG | 66.36** | 50.8 | 47.89 | 33.75 |
| SIZE | 170.02*** | 50.23 | 123.87*** | 47.69 |
| NIM | 176.39*** | 192.73*** | 145.76*** | 161.17*** |
| GROW | 157.31*** | 242.30*** | 138.58*** | 161.54*** |
| LIQU | 112.30*** | 92.93*** | 56.25 | 43.92 |
| LNGDP | 95.38*** | 52.75 | 94.94*** | 52.33 |
| INF | 569.25*** | 435.55*** | 568.69*** | 434.68*** |
| INT | 245.88*** | 93.21*** | 245.45*** | 101.44*** |
| LNUNEMP | 64.14** | 28.51 | 63.83** | 28.42 |
| EXCH | 0.00001 | 0.00001 | 0.00002 | 0.00003 |
| **The First Difference of Variables** | | | | |
| DTANG | | | 163.13*** | 168.42 |
| DEXCH | 18.07 | 148.32*** | 19.36 | 151.40*** |
| DLIQU | | | 124.83*** | 86.98*** |

The ***,** and* denotes the significance level at 1%, 5%, and 10% respectively

### 3.1.2. Model Selection

To identify the correct regression model, panel data analysis has a different test of data sets. In estimating the regression model the panel data provides three techniques, namely the pooled regression model, fixed effect model, and random effect model. In pooled regression or the constant coefficients model if there no significant cross-section and temporal error, it is possible to pool all the data and run ordinary least square with constant slopes and intercepts (Yaffee, 2003:3). It also called the common effect model.

In the fixed effect model, the unobserved variables have a correlation with the variables in the model. The fixed effect model controls the effect of the unobserved or omitted variables bias. But to use this model, the unobserved variables should have time-invariant values with time-invariant effect. On the other hand, in the random effect model, the omitted variables expected to be unrelated to all observed variables in the model (Williams, 2015:1). In this study to select between fixed effect and random effect model the Hausman test, with the null hypothesis of random effect model is applied and the results suggest that the fixed effect is an appropriate model. Furthermore, to make sure whether the model in this study is a common effect or fixed effect, the Chow test is

performed, that has a null hypothesis of common effect and the alternative hypothesis of fixed effect model. The following Table 8 presents the results of the Chow test for the three regressions of the full period and the two sub-periods.

**Table 8: The Results of the Chow Test**

| Effects Test | Full Period | | | First Sub-period | | | Second Sub-period | | |
|---|---|---|---|---|---|---|---|---|---|
| | LEV1 | LEV2 | LEV3 | LEV1 | LEV2 | LEV3 | LEV1 | LEV2 | LEV3 |
| Cross-section F | 23.4*** | 20.3*** | 16.7*** | 17.9*** | 8.3*** | 6.0*** | 14.2*** | 16.4*** | 21.7*** |
| Cross-section $Chi^2$ | 604.4*** | 551.1*** | 483.8*** | 389.7*** | 250.7*** | 202.5*** | 374.6*** | 407.7*** | 476.7*** |

The ***, ** and * denotes the significance level at 1%, 5%, and 10% respectively

Based on the results of Table 8 above, the p-value of the cross-section chi-square is less than the critical value of 0.05 for all three models of all period. These results indicate that the fixed effect model is a suitable model than the common effect. Regarding the results of model selection for the classified banks, in all models, the test results indicate the fixed effect as the right model for this study.

In the literature it is pointed out, the type of sampling procedure indicates the type the panel model that should be applied. According to Erlat (2015:11) if a sample that makes up the cross-sectional unit is not collected by using some random sampling method and if the panel is made up of observations that are selected based on specific criteria, a fixed effect model is appropriate. Therefore, the data of this study are collected from all banks that have full annual basis data for each year from 2003 to 2017, the fixed effect model is appropriate.

### 3.1.3. Autocorrelation and Heteroskedasticity

After making the unit roots test, to test whether there is a relationship among the values of the same variable at different time periods, the autocorrelation test is performed. The test is made by using Wooldridge (2002:176) test. The null hypothesis of this test is no serial correlation. This test is used for all estimated models. The results of the test revealed that there is autocorrelation in all models. For instance, the result of Wooldridge test in model 1 of the full period is, the F statistics is 50.95 with a p-value of 0.000, the test result of model 2 and model 3 of the full period are, in model 2, the F statistics is 45.36 with a p-value of 0.000 and in model 3 the F statistics is 87.26 with a p-

value of 0.000. Based on these results the null hypothesis of no serial correlation is strongly rejected.

In addition to the test of autocorrelation, to detect whether the variance of all observations in a data set are equal or not, the heteroskedasticity test is applied. The test is made by using the modified Wald and Breusch-Pagan tests. These tests are Chi-squared tests that reject the null hypothesis of homoskedasticity if the p-value is below the appropriate critical value of 0.0 and accept the alternative hypothesis of heteroskedasticity. The test is made for all models computed in this study. The results of Breusch-Pagan test for the full period is, with $chi^2$ of 49.01 and p-value of 0.000 for model 1, with $chi^2$ of 25.42 and p-value of 0.000 for model 2, and with $chi^2$ of 18.28 and p-value of 0.000 for model 3. The test results of the first sub-period are, for model 1, the $chi^2$ is 2.43 and p-value is 0.010, for model 2, the $chi^2$ is 4.25 and p-value is 0.039, and for model 3 the $chi^2$ is 0.03 and p-value is 0.058. The test results of the second-sub period are, the $chi^2$ is 32.10 with a p-value of 0.000 for model 1, for model 2, the $chi^2$ is 15.78 and the p-value is 0.000 and for model 3 the $chi^2$ is 3.43 and the p-value is 0.054. Since the p-values in all models are less than 0.05 level of significance, the null hypothesis is rejected and accepts the existence of the heteroskedasticity problem. The test results of the classified banks also show the lower p-values for all models. The test results of autocorrelation and heteroskedasticity for all estimated models are presented in the tables of regression results that are presented in Table 14, 15, 16, 17 and 18. Thus for the correct estimation a regression, the robust standard error is used. Thus, to solve the problem of autocorrelation and heteroskedasticity the Driscoll-Kraay standard error is computed that provide robustness to heteroskedasticity and serial correlation (Hoechle, 2007:29).

### 3.2. The Descriptive Statistics and the Correlation Coefficients of All Periods

After splitting the full period into two sub-periods, the descriptive statistics are calculated for the full period and for the two sub-periods. The result of the summary statistics of all dependent and independent variables for the full period and for the two sub-periods presented in the following Table 9 and 10 respectively.

**Table 9: Descriptive Statistics of the Full Period (2003-2017)**

| Full Period (2003-2017) | | | | | |
|---|---|---|---|---|---|
| | Mean | Maximum | Minimum | Std. Dev. | Observations |
| LEV 1 | 0.714 | 0.969 | 0.009 | 0.255 | 629 |
| LEV 2 | 0.305 | 0.917 | 0.001 | 0.217 | 629 |
| LEV 3 | 0.455 | 1.000 | 0.002 | 0.243 | 629 |
| PROFT | 0.023 | 0.895 | -0.632 | 0.071 | 629 |
| TANG | 0.563 | 0.999 | 0.002 | 0.255 | 629 |
| SIZE | 3.182 | 5.060 | 0.401 | 1.072 | 629 |
| NIM | 0.049 | 0.361 | -0.232 | 0.046 | 629 |
| GROW | 0.211 | 10.872 | -0.878 | 0.693 | 629 |
| LIQU | 7.173 | 463.7 | 0.018 | 32.6 | 629 |
| LNGDP | 0.054 | 0.105 | -0.048 | 0.037 | 629 |
| INF | 0.094 | 0.216 | 0.063 | 0.035 | 629 |
| INT | 0.044 | 0.209 | -0.030 | 0.060 | 629 |
| LNUNEMP | 2.352 | 2.646 | 2.219 | 0.110 | 629 |
| EXCH | 1.885 | 3.670 | 1.299 | 0.687 | 629 |

From the results of Table 9, the mean value of LEV1 is 0.71 with a standard deviation of 0.25. As far as the mean of LEV2 and LEV3 concerned, the mean value of LEV3 is higher than LEV3. This means in the full period, all banks have on average 0.30 long term debt and 0.45 short term debt ratios with a standard deviation of 0.21 and 0.24 respectively. When the standard deviations of the three leverages observed, the standard deviations of LEV 1 and LEV 3 are very close to each other.

The result of Table 9 shows, there is a large disparity between the maximum and the minimum values of the three leverages. The reason for this big difference may be, the sample covers both commercial and development and investment banks. Since these banks have different approach for short term and long term debts, it may increase the gap between the maximum and the minimum the values of leverage. The mean value of profitability is 0.023 with the maximum and minimum values of 0.89 and -0.63 respectively. This maximum value of profitability is experienced before the financial crises and this will be presented in the next Table 10. However, from the gap of maximum and minimum values of profitability, it is possible to understand the existence of great disparity between the banks in profitability.

The average value of asset tangibility is 0.56 with a standard deviation of 0.25. Since asset tangibility is measured by dividing fixed asset to total assets the result of Table 8 implying that, banks in Turkey hold the majority of their assets in the form of fixed asset and about 44% of total asset is in the form of current assets. The mean of bank size in the full period is 3.18 with a standard deviation of 1.07. In this period 5.06 and 0.40 is recorded as maximum and minimum

values. If the mean value is compared with the maximum value of bank size, the difference is not high (1.88). With regard to the mean value of net interest margin, which is measured by net interest income to total asset, the mean value is 0.05 with a standard deviation of 0.05. This standard deviation is the lowest figure relative to the standard deviation of bank specific variables.

The mean of growth opportunity of growth in assets of banks is 0.21. In the study period, the maximum value of growth opportunity ever recorded is 10.8, while -0.87 is the minimum value. The difference between the maximum and minimum values implying that, although the asset of all banks is not continuously increasing, the asset of some banks significantly increased. Regarding the higher standard deviation (0.69) of this variable, it indicates the existence of higher dispersion from the mean and the most volatility of the variable. The average value of liquidity is 7.13 with a standard deviation of 32.6. In relative to other variables the figures of liquidity is very high. This implies banks on average hold about 7.13 of the current assets in order to pay liabilities and other current obligations.

The real GDP growth rates experienced maximum and minimum growth rates of 0.10 and -0.05 respectively. The value of -0.05 is the lowest growth rate of real GDP Turkey ever experienced in the study period. The mean value of this variable is 0.053 with a standard deviation of 0.037. The mean value of inflation rates is 0.09 with a maximum and minimum value of 0.21 and 0.06 respectively. The maximum value of inflation occurred in 2003 and this rate automatically dropped in the following years up to the lower value of 0.06 in 2012. In this period not only the inflation rates, but the higher rate of real interest rates also experienced in 2003 (0.209). The mean of this variable is 0.04 with a standard deviation of 0.06. The mean value of the exchange rates is 1.88 with a standard deviation of 0.68. Based on the maximum and minimum values of the exchange rates presented in Table 8 above, it is possible to understand the devaluation of the Turkish lira against the American dollar in the sample period of this study. The mean value of unemployment rates is 2.35 with a standard deviation of 0.11.in the full period the highest value of unemployment rates is 2.64. The results of the descriptive statistics of the two sub-periods are presented in the following Table 10.

Based on the result of Table 10 below, the mean values of LEV1 in the two sub-periods are 0.69 and 0.72 respectively. Additionally, the standard deviation of LEV1 in the first sub-period (0.25) is very close to the standard deviation of LEV1 in the second sub-period (0.257). These results indicate that the significant percentage of banks total assets that is financed by loan and the dispersion of LEV1 from the mean is similar from time to time. In the two sub-periods, the mean value of LEV3 is higher than LEV2. In the first sub-period, the mean values of LEV2 and LEV3 are 0.29 and 0.46 respectively.

**Table 10: Descriptive Statistics of the Two Sub-periods (2003-2008 and 2009-2017)**

| The First Sub-period (2003-2008) | | | | | |
|---|---|---|---|---|---|
| | Mean | Maximum | Minimum | Std. Dev. | Observations |
| LEV 1 | 0.696 | 0.969 | 0.009 | 0.251 | 252 |
| LEV 2 | 0.294 | 0.917 | 0.000 | 0.202 | 252 |
| LEV 3 | 0.466 | 0.990 | 0.002 | 0.236 | 252 |
| PROFT | 0.027 | 0.895 | -0.632 | 0.102 | 252 |
| TANG | 0.540 | 0.916 | 0.015 | 0.237 | 252 |
| SIZE | 2.978 | 4.844 | 0.401 | 1.020 | 252 |
| NIM | 0.053 | 0.244 | -0.232 | 0.055 | 252 |
| GROW | 0.361 | 10.872 | -0.804 | 0.942 | 252 |
| LIQU | 5.866 | 211.5 | 0.140 | 22.7 | 252 |
| LNGDP | 1.588 | 2.262 | -0.223 | 0.845 | 252 |
| INF | 0.112 | 0.216 | 0.082 | 0.047 | 252 |
| INT | 0.095 | 0.209 | 0.037 | 0.060 | 252 |
| LNUNEMP | 2.329 | 2.380 | 2.230 | 0.049 | 252 |
| EXCH | 1.383 | 1.503 | 1.299 | 0.076 | 252 |
| **The Second Sub-period (2009-2017)** | | | | | |
| LEV 1 | 0.726 | 0.956 | 0.028 | 0.257 | 377 |
| LEV 2 | 0.312 | 0.916 | 0.000 | 0.226 | 377 |
| LEV 3 | 0.447 | 1.000 | 0.002 | 0.247 | 377 |
| PROFT | 0.021 | 0.188 | -0.259 | 0.037 | 377 |
| TANG | 0.577 | 0.999 | 0.002 | 0.265 | 377 |
| SIZE | 3.319 | 5.060 | 0.598 | 1.085 | 377 |
| NIM | 0.046 | 0.361 | 0.000 | 0.039 | 377 |
| GROW | 0.111 | 3.493 | -0.878 | 0.429 | 377 |
| LIQU | 8.047 | 463.8 | 0.018 | 37.9 | 377 |
| LNGDP | 0.051 | 0.105 | -0.048 | 0.041 | 377 |
| INF | 0.081 | 0.111 | 0.063 | 0.014 | 377 |
| INT | 0.011 | 0.078 | -0.030 | 0.029 | 377 |
| LNUNEMP | 2.367 | 2.646 | 2.219 | 0.134 | 377 |
| EXCH | 2.220 | 3.670 | 1.499 | 0.710 | 377 |

Even though the mean values of the three leverages of the two sub periods show a little change from the mean value of the full period leverages, the value of standard deviation is similar. The results of Table 10 also show the average value of LEV 3 is decreased in the second sub-period by 0.02. These results suggest that about 70% of banks' assets in Turkey is financed by debt and the number of short term debts more than long term debts in both sub-periods. The mean value profitability in the first sub-period is 0.03 with a maximum and minimum value of 0.89 and -0.63 respectively. On the other hand, in the second sub-period, the mean value of profitability is 0.02 with a range of 0.18 as a maximum and -0.26 as a minimum value. These results state that the profitability of banks in the first sub-period is better than the second sub-period and the maximum value of profitability (0.89) is experienced in the first sub-period.

The other results found from Table 10 above are, the increased mean value and standard deviation for both asset tangibility and bank size after the crisis period. In the first sub-period, the mean of asset tangibility is about 0.54 then in the second sub-period, this ratio increased by 0.04. This finding implying that the banking sector holds the majority of its asset in the form of fixed asset and after the financial crises the strategy of investing on fixed assets is increased. Similarly, in the second sub-period, the mean of bank size increased from the first sub-period by 0.34 with a maximum value of 5.06. As it was discussed before, the mean value profitability of banks was better in the first sub-period than the second sub-period. But as it is observed from the results the mean value of bank size is higher in the second sub-period than the first sub-period. In another mean, the two variables indicate opposite directions. Therefore, it is worthwhile to conclude that an increase in bank size may not increase profitability.

The mean of net interest margin in the first sub-period is 0.053 with a maximum and minimum range of 0.24 and -0.23 respectively. The results of Table 10 shows, the mean of net interest margin in the first sub-period is 0.053 which is greater than the mean of the second sub-period 0.048. However, the standard deviation of the net interest margin is higher in the first sub-period than the second sub-period. The higher maximum value of net interest margin is observed in the second sub-period. Since the higher net interest margin indicates the higher profit generated by the bank, the value is better in the first sub-period than the second sub-period, and this result is similar with the result of profitability which is a similar indicator with net interest margin.

A significant change in the mean value is observed on the growth opportunity of banks. When the mean values of growth opportunity in the two sub-periods observed, in the first sub-period the mean value of growth opportunity is 0.36 then in the second sub-period, the ratio declined to 0.11. Not only the mean value of growth opportunity is higher in the first sub-period, but the standard deviation is also higher in the first sub-period than the second sub-period. These findings show that, since the growth opportunity of firms measured by a percentage change in total assets, even though it is not in all banks, the total assets of some banks dramatically increase from period to period. Especially in the first sub-period, the growth of total assets of some banks is higher than the growth total assets in the second sub-period. The other variable that shows a significant increase in the mean value and the standard deviation is liquidity. In the first sub-period, the mean value of liquidity is 5.8 with a standard deviation of 22.7, and then these figures increased in the second sub-period to 8.04 and 38.9. When the percentage of increase in the mean and standard deviation observed the dispersion from the mean is higher in the second sub-period than the first sub-period.

With respect to macroeconomic factors, in the first sub-period, the mean of real GDP growth rates is 1.58 with a rage of 2.26 as maximum and -0.22 as a minimum. The result of Table 10 also demonstrates that after the financial crises the average value of real GDP growth rates

tremendously declines to 0.05 with a maximum and minimum value of 0.10 and -0.05 respectively. These results indicate that the 2008 global financial crises had a negative significant impact on the real GDP growth rates of Turkey. In the first sub-period, the mean of inflation is 0.11 with a range of 0.216 and 0.08 as maximum and minimum values . Whereas, in the second sub-period the mean value is decline to 0.08 and maximum and minimum values are 0.11 and 0.063 respectively. These findings indicate that the maximum value of inflation rate that is recorded in the first sub-period makes the mean value to increase. As it was discussed in the previous paragraph, even though the lowest level of GDP growth rate is recorded in the second sub-period it did not necessarily lead the inflation rates to be higher in the same period.

The mean value of the interest rates shows a great downward trend in the second sub-period. In the first sub-period, the mean value of this variable is 0.09 with a standard deviation of 0.06, while the second sub-period the mean value is going down to 0.01 with a maximum and minimum value of 0.07 and -0.03 respectively. The values of 2.32 and 2.36 indicate the mean value of the unemployment rates in the first and second sub-periods respectively. These results indicate that the global financial crises made unemployment rates to increase in the country. The mean of Exchange rates shows an upward pattern from the first sub-period (1.38) to the second sub-period (2.22). The disparity between the maximum and the minimum values of the exchange rates in the first sub-period is from 1.5 to 1.3. However, the second sub-period there is a big gap between the maximum value (3.67) and minimum value (1.29) of the exchange rates. This great dispersion presents, in the second sub-period the value of Turkish lira against the American dollar is devalued.

As far as the volatility or the dispersion of variables from the mean that is measured by standard deviation is, from the result of the descriptive statistics of Table 10 above, the standard deviations of inflation rates are low in both sub-periods with the value of 0.03 and 0.01 respectively. Followed by, the interest rates and profitability in the second sub-period with the standard deviations of 0.03 and 0.04 respectively. On the other hand, bank size is the most volatile variable in both sub-periods with a standard value of 1.02 and 1.08 respectively, followed by the exchange rates with a dispersion value of 0.7 in the second sub-period. The correlation between the variables in the full period is presented the following Table 11

**Table 11: The Correlation Coefficients of the Full Period (2003-2017)**

| | LEV1 | LEV2 | LEV3 | PROFT | TANG | SIZE | NIM | GROW | LIQU | LNGDP | INF | INT | LNUNEMP | EXCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEV 1 | 1 | | | | | | | | | | | | | |
| LEV 2 | 0.206*** | 1 | | | | | | | | | | | | |
| LEV 3 | 0.541*** | -0.262*** | 1 | | | | | | | | | | | |
| PROFT | -0.059 | -0.118** | 0.029 | 1 | | | | | | | | | | |
| DTANG | 0.265*** | 0.505*** | -0.119** | -0.078* | 1 | | | | | | | | | |
| SIZE | 0.632*** | 0.273 | 0.411*** | 0.036 | 0.407*** | 1 | | | | | | | | |
| NIM | -0.358*** | -0.090* | -0.222*** | 0.226*** | -0.148*** | -0.298*** | 1 | | | | | | | |
| GROW | 0.115** | -0.005 | 0.107** | -0.047 | -0.080* | -0.036 | -0.158*** | 1 | | | | | | |
| LIQU | -0.382*** | -0.083* | -0.330*** | -0.111** | -0.147*** | -0.220*** | 0.069 | -0.075 | 1 | | | | | |
| LNGDP | 0.023 | 0.005 | 0.025 | -0.074 | -0.025 | -0.027 | -0.089* | 0.079* | -0.006 | 1 | | | | |
| INF | -0.021 | -0.012 | 0.047 | 0.128*** | -0.063 | -0.100** | 0.109** | 0.060 | 0.012 | 0.011 | 1 | | | |
| INT | -0.062 | -0.021 | 0.056 | 0.092* | -0.066 | -0.162*** | 0.103** | 0.152*** | -0.004 | -0.108** | 0.712*** | 1 | | |
| LNUNEMP | -0.009 | -0.044 | 0.068 | 0.035 | -0.012 | 0.002 | 0.022 | 0.001 | -0.011 | -0.625*** | 0.016 | 0.211*** | 1 | |
| DEXCH | 0.081 | -0.016 | 0.033 | -0.016 | -0.036 | 0.105** | -0.040 | -0.161*** | 0.079* | -0.079* | -0.065 | -0.404*** | 0.042 | 1 |

The ***,** and * denotes the significance level at 1%, 5%, and 10% respectively

Table 11 demonstrates the correlation among all dependent and explanatory variables of the full period used in the model estimations. LEV1, except with the five variables namely asset tangibility, bank size, growth opportunity, real GDP growth rates, and exchange rates, it is negatively associated with all the remaining variables with a range between -0.01 and -0.38. The positive correlation of LEV1 with asset tangibility, bank size, and growth opportunity are statistically significant. The second leverage LEV2 is negatively associated with most of the variables. The only three variables that have a positive relationship with LEV 2 are asset tangibility, bank size and real GDP growth rates with the correlation coefficients of 0.5, 0.27 and 0.005 respectively, and the relationship with asset tangibility is at 1% statistically significant. Although LEV 2 is negatively correlated with most of the explanatory variables, the correlation is statistically significant only with profitability, net interest margin, and liquidity.

LEV 3 on the other hand, has a positive correlation with the majority of the variables. But the leverage is positively and significantly correlated only with bank size and growth opportunity with a degree of significance 1% and 5% respectively. These results implying that when the bank size and growth opportunity increases the short term debts also significantly increase. On the contrary, asset tangibility, net interest margin, and liquidity are negatively and significantly correlated to LEV 3 with a degree of correlation -0.11, -0.22 and -0.33 respectively.

From the three leverages, a positive and significant correlation between LEV 1 and bank size is relatively higher with a degree of association the 0.63 at 1% level of significance. On the other hand, a small positive and insignificant correlation is observed between LEV 2 and the real GDP growth rates with a degree of association 0.005. With regard to the correlation among independent variables, profitability is negatively associated with asset tangibility (-0.08) growth (-0.05), liquidity (-0.11), the real GDP growth rates (-0.07) and exchange rates (-0.02). From these negative relationships, the relationship between asset tangibility and liquidity with profitability is statistically significant. On the other hand, net interest margin, inflation rates, and interest rates are positively and significantly correlated to profitability.

The only variable that positively and significantly correlated to asset tangibility is bank size with a degree of correlation 0.040 and at 1% level of significance. This result indicates that when the size of the banks increases the fixed assets held by the banks also increase. On the contrary, when the fixed assets of the banks increase, the profitability, the net interest margin, the growth opportunity and the liquidity of the banks decrease. Similarly, the bank size except with profitability, and exchange rates the association with most of the explanatory variables is negative with a range of -0.02 and -0.298.

As it can be seen from Table 10 above, the higher and the statistically significant correlation among independent variables is observed between the interest rates and inflation rates with a degree of

association 0.71. Thus, to decide whether there is multicollinearity or not a variance inflation factor (VIF) is computed. The commonly used rule of thumb is that if the VIFs value of a variable is 10 or less considered as no multicollinearity. The result of VIF that is presented in the appendix 1 shows, the VIF value of all variables less than the rule of thumb (10). From this result, because of the degree of association between the variables is not strong, it is worthwhile to deduct no multicollimearity between the variables. The correlation between variables in the first sub-period is presented in the following Table 12.

**Table 12: The Correlation Coefficients of the First Sub-period (2003-2008)**

| | LEV1 | LEV2 | LEV3 | PROFT | TANG | SIZE | NIM | GROW | LIQU | LNGDP | INF | INT | LNUNEMP | EXCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEV 1 | 1 | | | | | | | | | | | | | |
| LEV 2 | 0.105 | 1 | | | | | | | | | | | | |
| LEV 3 | 0.504*** | -0.154** | 1 | | | | | | | | | | | |
| PROFT | -0.001 | -0.130* | 0.066 | 1 | | | | | | | | | | |
| TANG | 0.166** | 0.385*** | -0.171** | 0.027 | 1 | | | | | | | | | |
| SIZE | 0.556*** | 0.293*** | 0.321*** | 0.123* | 0.393*** | 1 | | | | | | | | |
| NIM | -0.332*** | -0.039 | -0.226*** | 0.173** | -0.024 | -0.213*** | 1 | | | | | | | |
| GROW | 0.121* | -0.030 | 0.128* | -0.049 | -0.145* | -0.041 | -0.147** | 1 | | | | | | |
| LIQU | -0.401*** | -0.074 | -0.427*** | -0.260*** | -0.073 | -0.318*** | 0.090 | -0.095 | 1 | | | | | |
| LNGDP | 0.007 | 0.006 | 0.074 | -0.073 | -0.058 | -0.089 | -0.120 | 0.121* | 0.071 | 1 | | | | |
| INF | -0.015 | 0.082 | -0.006 | 0.140* | 0.010 | -0.087 | 0.107 | -0.018 | 0.016 | -0.211 | 1 | | | |
| INT | -0.025 | 0.097 | 0.012 | 0.077 | 0.001 | -0.132* | 0.065 | 0.034 | 0.037 | 0.288*** | 0.788*** | 1 | | |
| LNUNEMP | -0.009 | 0.087 | -0.057 | 0.035 | 0.048 | -0.015 | 0.139* | -0.046 | -0.012 | -0.521*** | 0.546*** | 0.317*** | 1 | |
| EXCH | 0.000 | 0.084 | 0.040 | 0.038 | -0.028 | -0.129* | 0.017 | 0.038 | 0.073 | 0.424*** | 0.680*** | 0.730*** | 0.354*** | 1 |

The *,**, and *** denotes the significance level at 1%, 5%, and 10% respectively

The correlation between the variables in the first sub-period is presented in Table 12 above. Asset tangibility, bank size, growth opportunity, and the real GDP growth rates are positively correlated with LEV1 whose degree of association is 0.16, 0.55, 0.12 and 0.01 respectively. Except with the real GDP growth rates, the correlation between LEV1 and the three variables (asset tangibility, bank size, and growth opportunity) is statistically significant at a level of 5%, 1% and 10% respectively. The correlation between LEV 1 and exchange rates indicates the absence of association between the two variables. LEV2 is positively correlated with most of the explanatory variables. The four variables that have a negative correlation with LEV2 are profitability, net interest margin, growth opportunity and liquidity with a range between -0.03 and -0.13 as maximum and minimum values. Although LEV2 is positively correlated with most of the variables, the statistically significant correlation is observed only with asset tangibility and bank size. LEV3 has a negative association with asset tangibility (-0.17) net interest margin (-0.23) liquidity (-0.43), inflation rates (-0.01) and unemployment rates (-0.06).

As it can be seen from the Table 12, profitability is negatively correlated with growth opportunity, liquidity and the real GDP growth rates whose correlation of coefficients are -0.05, -0.03 and -0.07 respectively, but the only significant negative correlation is between profitability and liquidity at 1% level of significance. Except with profitability and asset tangibility, bank size is negatively associated with all other variables. Especially the association of bank size with net interest margin and liquidity is statistically strong. On the other hand, interest rate is positively correlated with almost all independent variables and the only variable that has a negative and statistically significant relation with interest rates is bank size with a degree of association is -0.13. Similarly, exchange rate has a positive correlation with the majority of the variables with a maximum and minimum coefficient value of 0.73 with interest rates and 0.02 with net interest margin. The correlation between the variables in the second sub-period is presented in the following Table 13.

**Table 13: The Correlation Coefficients of the Second Sub-Period (2009-2017)**

| | LEV1 | LEV2 | LEV3 | PROFT | TANG | SIZE | NIM | GROW | LIQU | LNGDP | INF | INT | LNUNEMP | EXCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEV 1 | 1 | | | | | | | | | | | | | |
| LEV 2 | 0.262*** | 1 | | | | | | | | | | | | |
| LEV 3 | 0.569*** | -0.322*** | 1 | | | | | | | | | | | |
| PROFT | -0.177*** | -0.142** | -0.030 | 1 | | | | | | | | | | |
| DTANG | 0.318*** | 0.567*** | -0.087 | -0.273*** | 1 | | | | | | | | | |
| SIZE | 0.679*** | 0.257*** | 0.483*** | -0.075 | 0.406*** | 1 | | | | | | | | |
| NIM | -0.387*** | -0.131** | -0.234*** | 0.390*** | -0.248*** | -0.368*** | 1 | | | | | | | |
| GROW | 0.160** | 0.045 | 0.085 | -0.089 | 0.014 | 0.034 | -0.245*** | 1 | | | | | | |
| LIQU | -0.392*** | -0.090 | -0.303*** | -0.013 | -0.180*** | -0.200*** | 0.072 | -0.077 | 1 | | | | | |
| LNGDP | 0.041 | 0.011 | -0.002 | -0.135* | 0.000 | 0.026 | -0.098* | 0.020 | -0.022 | 1 | | | | |
| INF | 0.049 | -0.148** | 0.139** | 0.002 | -0.153** | 0.046 | 0.031 | -0.023 | 0.074 | 0.170*** | 1 | | | |
| INT | -0.044 | -0.099* | 0.089 | 0.113* | -0.058 | -0.019 | 0.070 | 0.075 | 0.024 | -0.853*** | -0.019 | 1 | | |
| LNUNEMP | -0.023 | -0.086 | 0.113* | 0.087 | -0.043 | -0.030 | 0.010 | 0.094 | -0.018 | -0.650*** | -0.151** | 0.770*** | 1 | |
| DEXCH | 0.075 | -0.067 | 0.085 | 0.028 | -0.120* | 0.028 | 0.013 | -0.151** | 0.079 | -0.031 | 0.621*** | -0.092 | -0.089 | 1 |

The ***, ** and * denotes the significance level at 1%, 5%, and 10% respectively

Table 13 above, presents the correlation among the variables in the second sub-period. LEV1 is positively correlated with asset tangibility (0.32), bank size (0.68), growth opportunity (0.16), the real GDP growth rates (0.04), inflation rates (0.05) and exchange rates (0.07). The correlation of LEV1 with asset tangibility and bank size is statistically significant at 1% degree level. On the other hand, the correlation of LEV1 with profitability, net interest margin, and liquidity are negative and statistically significant with a degree level of 1%. The second measure of leverage, long term debt ratio or LEV2 is negatively associated with most of the explanatory variables.

Asset tangibility, bank size, growth opportunity, and the real GDP growth rates are the four variables that have a positive correlation with LEV2 with a correlation coefficient of 0.57, 0.26, 0.04 and 0.01 respectively. From these positive correlations, the correlation of LEV2 with asset tangibility and bank size is statistically significant, while the correlation with growth opportunity and the real GDP growth rates is not. Whereas, profitability, net interest margin, inflation rates, and interest rates are negatively and significantly correlated with LEV2.

LEV 3 has a negative association with profitability, asset tangibility, net interest margin, liquidity and the real GDP growth rates with a maximum and minimum value of -0.002 and -0.30. The negative correlation with net interest margin and liquidity is statistically significant. Profitability is negatively correlated with asset tangibility, bank size, growth opportunity, liquidity and the real GDP growth rates with a correlation coefficient of 0.27, -0.07, -0.09 and -0.01 and 0.13 respectively. A statistically significant correlation is observed on the correlation of profitability with asset tangibility and the real GDP growth rates.

With the exception of bank size and growth opportunity, the correlation of asset tangibility with other explanatory variables is negative with a range from -0.04 to -0.27. The correlation of asset tangibility and bank size is positive and statistically significant at 1% level. But the variable (asset tangibility) has no association with the real GDP growth rates. Similarly, the real GDP growth rate has a negative correlation with most of the variables. The correlation of the real GDP growth rates with interest rates and unemployment rates is statistically strong and significant. On the other hand, bank size, growth opportunity, and inflation rates are the three variables that have a positive correlation with the real GDP growth rates whose degree of correlation is 0.03, 0.02 and 0.17 respectively.

In the second sub-period, the strong positive and statistically significant correlation is observed between interest rates and unemployment rates with a correlation coefficient of 0.77. To make sure whether the variables in the second sub-period have multicollinearity problem, the VIF is computed and the result indicates no multicollinearity, the result is found in appendix 3 of the paper.

### 3.3. Determinants of Banks Capital Structure Based on Classified Periods

To analyze the factors that affect the capital structure of banks, the regression analysis is made based on classified periods. The first regression analysis and the discussions are made for the full period and then followed by the regression analysis and discussions of the first and the second sub-periods respectively.

#### 3.3.1. Determinants of Bank Capital Structure in the Full Period ( 2003-2017)

To examine the factors that affect the capital structure in the full period, a regression analysis is made based on each dependent variables. In the following Table 14, the result of regressions is presented. In the Table, the first dependent variable LEV1 that represents the total debt ratio is found in column 2. The other two leverages LEV 2 and LEV3 that indicate the long term debt and short term debt ratios presented in column 3 and 4 respectively.

**Table 14: The Regression Results of the Full Period (2003 – 2017)**

| Variable | LEV 1 | LEV 2 | LEV 3 |
|---|---|---|---|
| C | -0.019<br>(0.123) | 0.493<br>(0.291) | -0.775***<br>(0.151) |
| PROFT | -0.556***<br>(0.049) | -0.513***<br>(0.111) | -0.100<br>(0.075) |
| DTANG | -0.056<br>(0.051) | 0.300***<br>(0.053) | -0.259**<br>(0.105) |
| SIZE | 0.238***<br>(0.034) | 0.083*<br>(0.043) | 0.168***<br>(0.016) |
| NIM | -0.014<br>(0.123) | 0.510***<br>(0.103) | -0.095<br>(0.147) |
| GROW | 0.020***<br>(0.006) | 0.007<br>(0.010) | 0.016**<br>(0.006) |
| LIQU | -0.002***<br>(0.000) | 0.000<br>(0.000) | -0.001***<br>(0.000) |
| LNGDP | 0.334**<br>(0.112) | -0.096<br>(0.242) | 0.792***<br>(0.141) |
| INF | 0.134<br>(0.303) | -1.756*<br>(0.742) | 1.333**<br>(0.514) |
| INT | 0.524**<br>(0.173) | 0.047<br>(0.308) | 0.888***<br>(0.130) |
| LNUNEMP | -0.027<br>(0.030) | -0.135**<br>(0.045) | 0.217**<br>(0.066) |
| DEXCH | 0.052***<br>(0.012) | 0.026<br>(0.033) | 0.020<br>(0.038) |
| Adjusted $R^2$ | 0.815 | 0.634 | 0.671 |
| Wooldridge | 50.96*** | 45.34*** | 87.26*** |
| Hetrosce Wald | 15614.92*** | 3269.80*** | 2714.83*** |
| Total panel | 587 | 587 | 587 |
| No.of groups | 42 | 42 | 42 |

Robust standard errors are reported in parentheses and ***,** and * denote the significance level at 1%, 5%, and 10% respectively.

The result of Table 14 above shows, in all three regressions of full period profitability, is negatively associated with the three leverages. The association with LEV1 and LEV2 is statistically

significant with a degree level of 1%. However, the relationship with LEV3 is not statistically significant. A unit increase in profitability results in a drop of total debt, long term debt and short term debt ratios by 0.55, 0.51 and 0.10 respectively. The negative relationship between leverage and profitability suggests that highly profitable banks in Turkey have a lower level of debt than less profitable banks. This result is consistent with the prediction of pecking order theory that assumes firms with a high profit have more retained earning which makes them less dependent on debt. Other studies also confirm this finding (Titman and Wessels, 1988:17; Booth et al., 2001: 105; Oztekin and Flannery, 2012:22; Joeveer, 2013:306).

Asset tangibility is negatively associated with LEV1 and LEV3, while with LEV2 the relation is positive. The 1% level of significance and the positive relationship of asset tangibility with LEV2 implies that banks with a high amount of fixed or tangible assets seem to have more long term debts than short term debts. In other mean, banks that make a high investment on tangible assets have a higher long term debt ratio. On the other hand, a 5% level of significance and the negatives relationship between LEV3 and asset tangibility indicates that short term debts are used for short term or current requirements. Based on these findings it is possible to deduct that, banks in Turkey follow the maturity matching approach in their asset management. The negative association of LEV1 and asset tangibility is similar with the prediction of pecking order theory that assumes, since tangible assets are not complex to determine the value of the company than intangible assets, firms with more tangible assets are less prone to the asymmetric information problem. As a result, they issue equity than debt without being a negative signal in the market. This result also related to the conclusion of other empirical works in Turkey like Baltaci and Ayaydin (2014:54). However, it contradicts with the finding of trade-off theory that assumes firms with a high amount of tangible asset can have access for credit at a lower cost, and this makes them less dependent on issuing of equities.

The effect of bank size is positive and statistically significant on all three leverages. A unit increase in bank size increases LEV1, LEV2, and LEV3 by 0.23, 0.08 and 0.16 respectively. These results indicate that other things remain constant, large banks in terms of total asset use more debt with a mix of short term and long term debts in their capital structure than small banks. In addition, the level significance in all leverages indicates that in the Turkish banking sector bank size is the most important determinant of leverage. This result is consistent with the assumption of trade-off theory that suggests that large firms generally assumed to be more diversified and have more stable cash flow than small firms. Because of this reason, the chance of getting financial distress and agency cost problem is low. This result is similar to other empirical evidence (Rajan and Zingales, 1995:1454; Hovakimian et al., 2004:534; Abor, 2008:24). From the result of Table 14, the impact of net interest margin on LEV2 is positive and statistically significant at 1%. But the impact on LEV1 and LEV3 is negative and statistically not significant. This implies that whenever the long term debts of banks increase the net interest margin also increase. The impact of growth

opportunity is positive on the three leverages. However, the effect is not statistically significant on LEV 2.

The positive and the statistically significant impact of growth opportunity on the two leverages state that banks with a high growth opportunity tend to hold more leverage. The main reason is, the opportunity of getting more investments makes internal funds unlikely to be sufficient which lead firms to demand more fund. This finding is similar to the expectation of the pecking order theory. Liquidity has a negative and at 1% statistically significant effect on LEV1 and LEV3, while this variable has no effect on LEV2. A unit increase of liquidity makes LEV1 and LEV 3 to decline by 0.002 and 0.001 respectively. This might be because of when the indebtedness of banks increases, the amount of current assets on hand may decrease and it makes liquidity to turn down. This finding is similar to the expectation of pecking order theory that assumes firms with high liquidity prefer less debt. Because managers manipulate the liquid assets against the interest of debt owners and this creates agency problem between shareholders and debt holders.

Regarding the regression results of macroeconomic factors, the two variables (the real GDP growth rates and inflation rates) have a similar sign of the coefficients. These two variables have a positive impact on LEV1 and LEV3 while on LEV2 the effect is negative. Even though the estimated coefficients of these variables have a similar sign, the coefficient of the real GDP growth rates is statistically significant in LEV1 and LEV3 equations with a significance level of 5% and 1% respectively. This finding indicates that a bank in high economic growth seems to demand more debt than equity. The reason for this is, during high economic growth the demand for external financing increase to make new investments. This result appears to be in line with the expectations of the pecking order theory. Most empirical works find a positive association between GDP growth rate and leverage (Gropp and Heider, 2010:45; Ahsan et al., 2016: 185). On the other hand, the finding is inconsistent with the finding of (Demirgüc-Kunt and Maksimovic, 1996:357) and trade-off theory that suggests, firms in a highly growing environment may face financial distress and the problem of debt overhang.

On the other hand, the effect of the inflation rates is statistically significant on LEV 2 and LEV 3. A unit increase in inflation rates significantly increases the LEV3 by 1.33, while LEV2 is decreased by 1.73. As it can be observed from the result of Table 13, the coefficient of the inflation rates is high in relative to the coefficients of other variables. Based on this finding it is worth to mention that, the inflation rate is an important determinant of leverage in the banking sector. Some of the studies that find a positive relationship between leverage and inflation rates are (Sett and Sarkhel, 2010:40; Hanousek and Shamshur, 2011:1364; Mokhova and Zinecker, 2014:535). During the high inflation rates the indebtedness of firms' increases. Although the cost of debt increases with the increase of inflation, the rate of return after tax is still higher than the cost of debt. In case of banks, higher inflation rates increase the demand of depositors and investors for

banking service so as to get the higher interest that helps them to offset the impact of inflation (Gordon, 1980:16; Rosli, 2017:11). This result is in line with the expectation of the trade-off theory. The negative and significant association of inflation with long term debt might be because of, during high inflation one of the measures taken by the banks is increasing interest rates which increases the cost of debt of banks. Thus banks prefer to reduce the leverage amount in the capital structure.

The interest rate is positively associated with all three leverages but the relation with LEV2 is not statistically significant. A unit increase in interest rates increases the LEV1 and LEV3 by 0.52 and 0.88 respectively. Based on this finding the possible conclusion is, in the full period the leverage of banks in Turkey is sensitive to the change of interest rates. Similarly, the impact of the exchange rates is positive on all three leverages. However, the impact is statistically significant only on LEV1 at 1% level. This result indicates that the total debt of banks is positively and significantly affected by the exchange rates. A unit increase in the exchange rates leads the total debt to increase by 0.05. But the effect on the long term and short term debts is not statistically significant.

The unemployment rates is negatively related to LEV1 and LEV2. But the relation with LEV1 is not statistically significant. On the other hand, the relation with the LEV3 is positive and statistically significant. This means the impact of the unemployment rates on long term debt is positive and statistically significant, while on the short term debt the impact is positive and statistically significant.

### 3.3.2. Determinants of Banks Capital Structure in the First Sub-period ( 2003-2008)

The regression results of the first sub-period are presented in the following Table 15. In the table, the first dependent variable LEV1 is found in column 2. The other two leverages LEV2 and LEV3 are presented in column 3 and 4 respectively.

**Table 15: The Regression Results of the First Sub-period (2003 - 2008)**

| Variable | LEV1 | LEV2 | LEV3 |
|---|---|---|---|
| C | 0.010 | -0.662*** | 0.753** |
| | (0.126) | (0.103) | (0.212) |
| PROFT | -0.129 | -0.346*** | -0.047 |
| | (0.107) | (0.072) | (0.132) |
| TANG | -0.191*** | 0.095 | -0.308*** |
| | (0.070) | (0.120) | (0.059) |
| SIZE | 0.270*** | 0.133*** | 0.116** |
| | (0.030) | (0.035) | (0.042) |
| NIM | -0.324 | 0.480*** | -0.159 |
| | (0.194) | (0.248) | (0.234) |
| GROW | 0.012 | -0.004 | 0.010 |
| | (0.009) | (0.010) | (0.016) |
| LIQU | -0.001 | 0.000 | -0.002*** |
| | (0.000) | (0.001) | (0.001) |
| LNGDP | -0.028*** | -0.008* | -0.018** |
| | (0.005) | (0.004) | (0.007) |
| INF | -0.493*** | -0.293*** | -0.375** |
| | (0.126) | (0.099) | (0.146) |
| INT | 0.503*** | 0.579*** | 0.299** |
| | (0.115) | (0.090) | (0.122) |
| LNUNEMP | -0.346*** | 0.027 | -0.500*** |
| | (0.038) | (0.077) | (0.066) |
| EXCH | 0.624*** | 0.305*** | 0.549*** |
| | (0.051) | (0.085) | (0.094) |
| Adjusted $R^2$ | 0.847 | 0.637 | 0.631 |
| Wooldridge | 26.567*** | 12.620*** | 22.220*** |
| Hetrosce Wald | 67600.32*** | 5993.81*** | 29265.75*** |
| Total panel | 252 | 252 | 252 |
| No.of groups | 42 | 42 | 42 |

Robust standard errors are reported in parentheses and ***,** and * denote the significance level at 1%, 5%, and 10% respectively.

Based on the results of Table 15 above, in the panel data of first sub-period profitability is negatively associated with all three leverages but statistically significant only in LEV2 equation at 1 % level of significance. The negative association of profitability and leverage indicates that

before the financial crises, highly profitable banks seem to have low leverage. This finding is similar to the result of the full period and with the conclusion of the pecking order. The effect of asset tangibility is negative and statistically significant on LEV1 and LEV3. But the effect on LEV 2 is positive and statistically not significant. In this study since asset tangibility is measured by fixed asset to total assets, the finding of Table 15 indicates that before the financial crises when banks hold a high amount of fixed asset the amount of total debt and short term debt decrease than long term debt. This means long term debts are used to finance fixed assets. Bank size is positively and significantly affects all the three leverages. The effect on LEV1 and LEV2 is statistically significant with a degree level of 1% and 5% respectively. This result indicates that before financial crises, large banks highly depend on external source of financing than retained earnings. This result is similar to the expectation of the trade-off theory.

Even though the impact is not statistically significant, the net interest margin has a negative effect on LEV1 and LEV3 with a coefficient of 0.32 and 0.15 respectively, whereas, the impact on LEV2 is positive (0.48) and statistically significant with a degree level of 10%. The result of the net interest margin in the first sub-period is similar to the result of the full period that was presented in Table 14. The impact of growth opportunity, on the other hand, is positive on LEV1 and LEV3, while on LEV2 the impact is negative. But on the three leverages, the effect of growth opportunity is not statistically significant. Generally, in the first sub-period even though the total leverage of banks increases with the increase of growth opportunity, the variable seems to have a little effect on the leverages.

The effect of liquidity on LEV1 and LEV3 is negative, while on LEV2 is positive. The effect of this variable is statistically significant only on the LEV3 at the degree level of 5%. This implies that, in fist sub-period, banks that hold more debt especially short term debts have less liquidity. This result is parallel with the prediction of the pecking order theory. The positive association of debt and asset liquidity supported by other empirical works like Williamson (1988:567) who suggested that holding more liquid assets makes firms to have more debt because the cost of financing liquid assets is not high. This finding is consistent with the prediction of the pecking order theory.

Based on the demonstration of Table 15 in the first sub-period, the real GDP growth rates and inflation rates have similar impacts on the three leverages. The two variables have a negative association with all three leverages. The coefficient of the inflation rates is statistically significant in the three models, while the coefficient of the real GDP growth rates is statistically significant in LEV1 and LEV3 models. The finding indicates that before the financial crisis the amount of debt used to finance total assets of banks decreases as the real GDP growth rates and inflation rates increases. On the other hand, the impacts of interest rates and the exchange rates are positive and statistically significant on the three leverages. A unit increase interest rates increase the LEV1,

LEV2, and LEV3 by 0.50, 0.57 and 0.29 respectively. Similarly, the positive impact of the exchange rates on LEV1, LEV2, and LEV3 is statistically significant at 1% degree level.

Furthermore, the result of Table 14 shows that, in the first sub-period, the unemployment rates is negatively and at 1% degree level significantly affects the LEV1 and LEV3, whereas, the effect on LEV2 is positive and statistically not significant. This implies that in the first sub-period when the unemployment rates increases by a unit the total debt and short term debt of banks decreased by 0.34 and 0.50 respectively.

### 3.3.3. Determinants of Banks Capital Structure in the Second Sub-period ( 2009-2017)

The regression results of the second sub-period are presented in the following Table 15. In the table, the first dependent variable LEV1 is found in column 2. The other two leverages LEV 2 and LEV3 are presented in column 3 and 4 respectively. The results indicate that in the second sub-period, factors that affect the three leverages of banks show some changes from the result of first sub-period.

**Table 16: The Regression Results the Second Sub-period (2009 - 2017)**

| Variable | LEV1 | LEV2 | LEV3 |
|---|---|---|---|
| C | 0.055 | 0.420 | -0.558** |
| | (0.055) | (0.222) | (0.151) |
| PROFT | -0.004 | 0.170 | -0.049 |
| | (0.425) | (0.282) | (0.252) |
| DTANG | -0.175*** | 0.226** | -0.389*** |
| | (0.035) | (0.075) | (0.035) |
| SIZE | 0.177*** | 0.077 | 0.104*** |
| | (0.028) | (0.052) | (0.021) |
| NIM | 0.142 | 0.272*** | -0.153 |
| | (0.115) | (0.079) | (0.109) |
| GROW | 0.072*** | 0.049* | 0.020 |
| | (0.009) | (0.022) | (0.026) |
| LIQU | -0.001*** | 0.000 | 0.000** |
| | (0.000) | (0.000) | (0.000) |
| LNGDP | -0.405*** | -1.860*** | 1.426*** |
| | (0.118) | (0.312) | (0.242) |
| INF | -1.273*** | -3.846*** | 2.064*** |
| | (0.317) | (0.382) | (0.545) |
| INT | -0.326* | -0.758** | 0.434 |
| | (0.165) | (0.289) | (0.541) |
| LNUNEMP | 0.082*** | 0.027 | 0.167** |
| | (0.015) | (0.048) | (0.054) |
| DEXCH | 0.058*** | -0.014 | 0.019 |
| | (0.013) | (0.031) | (0.034) |
| Adjusted $R^2$ | 0.879 | 0.713 | 0.764 |
| Wooldridge | 29.301*** | 42.941*** | 62.973*** |
| Hetrosce Wald | 30442.40*** | 7381.32*** | 8451.23*** |
| Total panel | 335 | 335 | 335 |
| No.of groups | 42 | 42 | 42 |

Robust standard errors are reported in parentheses and ***,** and * denote the significance level at 1%, 5%, and 10% respectively.

Based on the results of Table 16 above, in the second sub-period, the impact of profitability on the LEV1 and LEV3 is negative, while on the LEV2 is positive. On the three leverages, the impact is not statistically significant. The positive impact of profitability on LEV 2 is implying that profitable banks seem to have more long term debts than short term debt. This result is opposite to

the findings of the full period and the first sub-period. This might be because of, highly profitable banks that had less amount of long term debt, after the financial crises they change their strategy to increase long term debts. This finding is in line with the prediction of trade-off theory that assumes more profitable firms have more debt so as to have more benefit from the tax shield.

In the second sub-period, asset tangibility is negatively and at a 1% level of significance affects the LEV1 and LEV3. On the other hand, it positively and at 5% significance level affects the LEV2. The fact that after the financial crises banks with more tangible assets seem to have a low level of total debt and short term debts. Moreover, the maturity matching principle that had been applied in the first sub-period is continued in the second sub-period too. Generally, the finding is consistent with the prediction of the trade-off theory.

The results of Table 16 also revealed that bank size and growth opportunity have a positive effect on the three leverages. The effect of bank size is statistically significant at 1% level on LEV1 and LEV 3. Not only in the second sub-period, the all regression results of the full period and the first sub-period also show that, a strong positive relationship between bank size and the leverages. The positive and the statistically significant effect of bank size indicate that other things remain constant, in the second sub-period large banks seem to have more debt in their capital structure than small banks. This finding is compatible with the trade-off theory. The other positive effect on the three leverages is observed in the variable of growth opportunity. Even though growth opportunity positively affects the three leverages, the effect is statistically significant only on the total debt and long debts. Net interest margin has a positive effect on LEV1 and LEV2, while the effect on LEV3 is negative. But the effect of the variable is statistically significant only on LEV2 with a 1% level of significance. This implied that the long term debt of banks increases when the net interest margin increase. Based on the result of Table 16, in the second sub-period liquidity has no effect on LEV2 and LEV3, while it has a negative and at 1% statistically significant effect on LEV1.

In the second sub-period, the impact of the real GDP growth rates and inflation rates seem really strong on the three leverages. The relationship of the real GDP growth rates with the three leverages is statistically significant with a degree level of 1%. A unit increase in the real GDP growth rates, decrease the total debt and long term ratios by 0.40 and 1.86 respectively. On the other hand, the short term debt ratio increased by 1.42. Similarly, a unit increase of inflation rates leads to a significant decline of LEV1 and LEV2 by 1.27 and 3.84, while the LEV3 is significantly increased by 2.06.

A statistically significant and negative effect of interest rates is observed in LEV 1 and LEV2 equations. On the contrary, the coefficient of the variable is positive and not statistically significant in LEV3. This implies after the crises period high-interest rates made the total and the long term

debt of banks significantly to decrease. Generally, these findings suggest that in period two the increase of GDP growth, the rise of inflation and interest rates inversely related to total debt and long term debt. Exchange rates and unemployment rates have a positive effect on the LEV1 and LEV3 of the second sub-period. Unemployment rates positively affect the three leverages but it loses its significance on LEV2. Whereas, the impact of exchange rates on LEV2 is negative but not statistically significant. This implies that in the second sub-period the total debt of banks increases with the increase of the exchange rates and unemployment rates.

### 3.3.4. Summarizing the Regression Results of All Periods

At this point, it might be logical to summaries the results of regressions in the three periods and make it clear whether the explanatory variables have a different impact on leverages before and after global financial crises. Even though profitability is not statistically significant in all equations of the three periods, the statistically significant results obtained have a negative effect. Especially in the full period and in the first sub-period, the variable has a negative association with all leverages. The positive association of profitability with LEV2 that was observed in the second sub-period is not statistically significant. Given that, generally profitable banks in Turkey seem to have less debt in their capital structure. Generally, this result is in line with the prediction of pecking order theory which assumes profitable firms uses less debt because of having more internal financing sources.

The impact of asset tangibility on LEV2 and LEV3 of the three periods is similar. Except in the second sub-period, asset tangibility has a positive and statistically significant impact on LEV2. While in the second sub-period the impact is positive but not statistically significant. On the other hand, the impact is negative and statistically significant on the LEV3 of all periods. Based on the results of the regressions the three periods, banks with a high amount of tangible asset tend to have a low level of total debt and short term debts and high level of long term debts. Regarding the difference between the results asset tangibility in the two sub-periods, there is no material difference between the results of before and after financial crises. This implying that since asset tangibility is measured by the fixed asset to total assets, banks in Turkey follow maturity matching principle, which means the long term requirements funded with long term debt and short term requirement financed by current debts. Most of the findings in this study regarding the relationship between leverage and asset tangibility are explained by the pecking order theory.

The results of all regressions of the three periods show that bank size has a positive and statistically significant impact on all three leverages. When the impact of the variable before and after the crises observed, except losing of its statistical significance in the LEV 2 model of the second sub-period, there is no a significant difference between the results of the two periods. Based on this point it is worthwhile to deduct that, large banks in Turkey use significantly more debt (both

long term and short term debt) in their capital structure than equity. It might be because of large firms assumed to be more diversified and have stable cash flow which helps them to get external finance easily. The result also indicates that bank size is an important determinant of capital structure. This finding is compatible with the suggestion of the trade-off theory

In the regression results of all periods, the effect of the net interest margin on the leverages is similar. The only difference occurred in model 1 of the second sub-period that shows a positive effect on LEV1, while the effect on the LEV1 of the two periods is negative. The variable negatively affects the LEV3 of all periods. From all regression results of three periods, the effect of the net interest margin is statistically significant only on the LEV2. Based on the results of the regressions it is clear that before and after financial crises long term debt of banks is positively and significantly affected by net interest margin. But the short term debt is negatively affected and not statistically significant. These findings indicate that before and after financial crises banks with high net interest margin tend to have more long term debt and less short term debt.

Generally, when the impact of growth opportunity on the leverages is analyzed, except on LEV2 of the first sub-period, it positively affects the leverages of all periods. However, in the first sub-period, the variable does not have a significant effect on the three leverages. This finding implies that in Turkey, banks with a high growth opportunity hold more debt than equity. Especially after the financial crises, this strategy becomes a significant factor in capital structure decision. The result is consistent with the conclusion of the pecking order theory.

Regarding the effect of liquidity on the leverages, the estimated results from the regression analysis of the three periods indicate that liquidity has no effect on the LEV2 of the three periods. When the impact of the variable on the LEV1 and LEV3 observed, It has a negative explanatory power on the LEV1 of the three periods. After the crises period, liquidity has no effect on LEV3 too, which had a negative effect in the first sub-period. These findings implying that before the financial crises highly liquid banks seem to hold less short term debts than less liquid banks. While after the crises liquidity has no longer significant impact on the determination of short term debts. This finding is largely explained by the pecking order theory.

The results concerning the impact of the real GDP growth rates on the leverage are, in the full period it negatively and significantly affects the LEV 1 and LEV 3. When the difference between the results of sub-periods observed, generally in the first sub-period the real GDP growth rates is negatively and significantly affects the LEV1 and LEV 3, while in the second sub-period the effect on LEV 3 is positive and statistically significant. Additionally, in the second sub-period, the negative effect of the real GDP growth rates on LEV2 is statistically significant at 1% level which was not in in the first sub-period. This finding is consistent with the suggestion of the trade-off theory.

In the regression results of all periods, the inflation rate has an explanatory power to explain leverage. In the full period, LEV1 is negatively affected by the inflation rates and the LEV3 is positively affected. Regarding the result of the two sub-periods, in the first sub-period inflation rates has a significant negative influence on all leverages while in the second sub-period the influence of inflation rates on the LEV3 becomes positive and significant. Generally based on the majority sign of coefficients from the results of all periods, the result is against the prediction of trade-off theory that assumes positive association.

Regarding interest rates, it has a significant and positive influence on all leverages of the full period and in the first sub-period. While after the crises period, except on the LEV3, the impact of interest rates on LEV1 and LEV2 is negative and statistically significant. Moreover, the positive effect of the variable on the LEV3 loses its significance. The unemployment rate has an opposite effect on LEV1 and LEV3 of the two sub-periods. In the first sub-period, the two leverages (LEV1 and LEV3) negatively and significantly affected by the unemployment rates, while in the second sub-period the impact of the unemployment rates on the two leverages is positive and statistically significant only on LEV1. In the two sub-periods, the effect on the LEV2 is not significant.

In all regression results of the three periods, the statistically significant effect of the exchange rates on the leverages is positive. In the three periods, LEV 1 is positively and significantly affected by the exchange rates. Additionally in the first sub-period the LEV 2 and LEV 3 also positively and significantly affected by this variable. But in the second sub-period, although it is not statistically significant, LEV 2 is negatively affected.

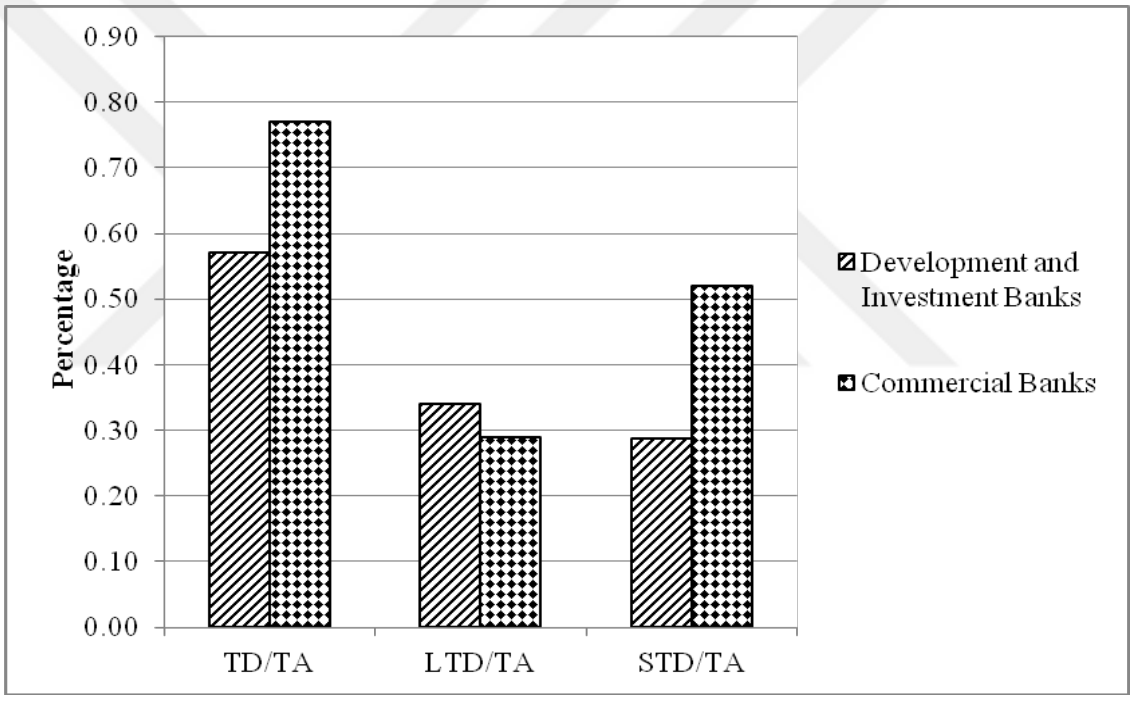
### 3.4. Determinants of Banks Capita Structure Based on Classified Banks

In the previous parts of the thesis, the result of the regressions presented and discussed based on all banks, which means there was no classification of banks based on their characteristics. In some studies like Myers (2003) indicated that, different types of firms might not be affected by a similar factor in the same way. If so, to make sure that, whether the selected variables used in this study have a different impact on the capital structure, banks are classified as commercial banks, Development and investment banks, domestic banks and foreign banks. The classification is made based on the categorization made by BAT.

### 3.4.1. Determinants of the Commercial Banks and Development and Investment Banks Capital Structure

The banking industry handles finance by facilitating funds between lenders and borrowers. Although the function of all banks related to funds, banks are classified according to the functions they provide. Because of these classifications, the ratio of the capital structure may differ from bank to bank. The following Figure 3 demonstrates the average leverage ratios of commercial banks and development and investment banks from the year 2003 -2017

**Figure 3: Leverage Ratios of Commercial Banks and Development and Investment Banks**




**Source:** Own calculation based on the data of BAT (2003-2017)

Figure 3 above presents that, the total debt and the short term debt ratios of commercial banks are higher than the total debt and short term debt ratios of development and investments banks. But the long term debt ratio of commercial banks is less than the short term debt ratio of development and investment banks. Since the primary function of commercial banks is to accept deposits and most of their deposits are for short term, this might be the reason to be more leveraged than development and investment banks.

To examine the determinants of the capital structure of commercial banks and development and investment banks, a regression is separately calculated for the two types of banks. This analysis

is based on the full period by using similar dependent and independent variables that have been used in the previous sections of this thesis. The results are presented in the following Table 17.

**Table 17: The Regression Results of Commercial Banks and Development and Investment Banks**

| | Commercial Bank | | | Development and Investment Banks | | |
|---|---|---|---|---|---|---|
| **Variable** | **LEV 1** | **LEV 2** | **LEV 3** | **LEV 1** | **LEV 2** | **LEV 3** |
| C | 0.391** | 0.900** | -0.388 | 0.048 | 0.182 | -1.086*** |
| | (0.118) | (0.293) | (0.320) | (0.181) | (0.633) | (0.148) |
| PROF | -0.455** | -0.390** | -0.103 | -0.840*** | -0.761*** | -0.113 |
| | (0.151) | (0.129) | (0.122) | (0.198) | (0.167) | (0.278) |
| DTANG | -0.027 | 0.290*** | -0.283*** | -0.180*** | 0.257* | -0.283* |
| | (0.026) | (0.068) | (0.060) | (0.044) | (0.125) | (0.147) |
| SIZE | 0.106*** | 0.013 | 0.092* | 0.354*** | 0.146** | 0.249*** |
| | (0.016) | (0.035) | (0.041) | (0.053) | (0.047) | (0.034) |
| NIM | -0.239 | 0.129 | -0.346** | 0.457 | 0.946*** | 0.268 |
| | (0.152) | (0.107) | (0.123) | (0.291) | (0.246) | (0.322) |
| GROW | 0.068*** | 0.025 | 0.045*** | -0.006 | -0.003 | 0.003 |
| | (0.015) | (0.021) | (0.013) | (0.009) | (0.003) | (0.018) |
| LIQU | -0.001*** | 0.001*** | -0.001*** | -0.002** | -0.001*** | -0.001* |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) |
| LNGDP | 0.211* | -0.274 | 0.382 | -0.061 | -0.159 | 1.362*** |
| | (0.102) | (0.303) | (0.228) | (0.127) | (0.505) | (0.248) |
| INF | 0.432* | -1.762** | 1.844** | -1.241*** | -2.260* | -0.357 |
| | (0.218) | (0.644) | (0.539) | (0.290) | (1.117) | (0.663) |
| INT | 0.194** | -0.219 | 0.382 | 0.379 | 0.153 | 1.564*** |
| | (0.066) | (0.245) | (0.224) | (0.252) | (0.511) | (0.217) |
| LNUNEMP | -0.016 | -0.207** | 0.173* | -0.104** | -0.019 | 0.281*** |
| | (0.034) | (0.062) | (0.075) | (0.039) | (0.213) | (0.063) |
| DEXCH | 0.054*** | -0.005 | 0.021 | 0.014 | 0.051 | -0.032 |
| | (0.013) | (0.022) | (0.025) | (0.029) | (0.093) | (0.055) |
| Adjusted $R^2$ | 0.849 | 0.659 | 0.644 | 0.773 | 0.675 | 0.553 |
| Wooldridge | 25.664*** | 36.537*** | 48.274*** | 36.721*** | 18.524*** | 41.413*** |
| Hetrosce Wald | 12883.49*** | 12883.49*** | 1119.32*** | 405.72*** | 240.18*** | 777.04*** |
| Total panel | 419 | 419 | 419 | 167 | 167 | 167 |
| No.of groups | 30 | 30 | 30 | 12 | 12 | 12 |

The dependent variables in the three models of commercial banks (LEV1, LEV2 and LEV3) are presented in column 2, 3 and 4 respectively. The dependent variables of development and investment banks are (LEV1, LEV2 and LEV3) found in column 5, 6 and 7 respectively. The robust standard errors are reported in parentheses. ***,** and* denote the significance level at 1%, 5% and 10% respectively.

Based on the regression result of Table 17 it is discovered that most of the estimated coefficients of commercial banks variables have a similar sign with the results of the full period

that is presented in Table 14. This might be because the majority of the data (71%) used in this work is collected from commercial banks

The result of Table 17 shows that there are similarities and differences in how the bank specific and macroeconomic factors affect the three leverages of commercial banks and development and investment banks. For example, in the two types of banks, profitability, asset tangibility, bank size, and unemployment rates have a similar sign of the coefficients. In the two types of banks, profitability negatively affects the three leverages, and the effect on LEV1 and LEV2 of the two banks is statistically significant. The finding of a negative effect of profitability and on the leverage is against the prediction of trade-off theory. Generally, the intention of profitable banks in Turkey is not getting benefit from debt in the form of tax deduction rather they prefer to apply the arguments of pecking order theory. Contrarily, bank size has a positive effect and on the three leverages of the two banks. The effect of the variable is statistically significant on the three leverages of development and investment banks, while it loses its significance on the LEV 2 of commercial banks.

The impact of asset tangibility on the LEV1 and LEV2 of the two banks is negative, while on the LEV3 it is positive. Except on the LEV1 of commercial banks, the impact is statistically significant. These findings provide evidence for maturity matching. Even though in the two banks the coefficient of unemployment rates have similar sign, the negative effect of unemployment rate on the LEV1 is statistically significant for development and investment banks which is not for commercial banks and the negative relation of the variable with LEV2 is significant for commercial banks which is not for development and investment banks. But the LEV3 of the two banks positively and significantly affected by the unemployment rates.

Net interest margin has a negative and significant effect on the LEV3 of commercial banks at 5% level of significance, but the negative effect on the LEV1 and the positive effect on the LEV2 is not statistically significant. In contrast, the three leverages of development and investment banks are positively affected by net interest margin but the effect is statistically significant only on long term debt ratio with a degree level of 1% which is not for commercial banks.

Growth opportunity has a positive impact on the three leverages of commercial banks. The impact on LEV1 and LEV3 is statistically significant with a degree level of 1%. When the regression result of Table 16 above observed, growth opportunity seems has no significant impact on the three leverages of development and investment banks. Similarly, the positive effect of exchange rates on the three leverages of development and investment banks is not statistically significant. However, this variable (exchange rates) has a positive and significant effect on the LEV1 of commercial banks. Liquidity seems an important factor to determine the three leverages of both banks. It negatively affects the LEV 1 and LEV 2 of the two types of banks. But the LEV2

of commercial banks positively and significantly affected by liquidity, while the LEV2 of development and investment banks negatively and significantly affected.

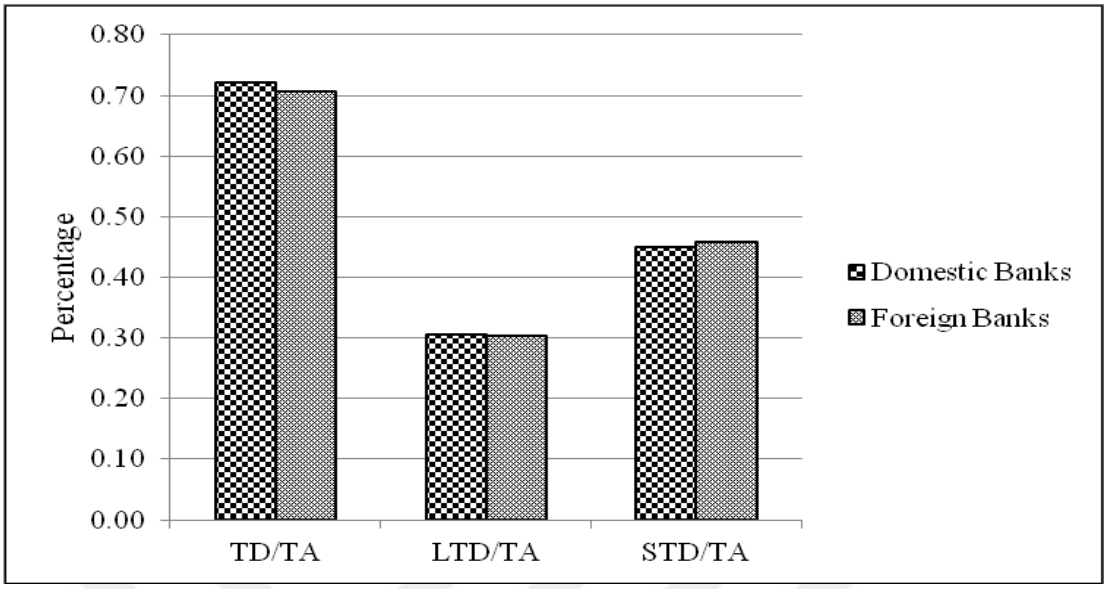
The real GDP growth rates and interest rates have similar effects on leverages commercial banks. The two variables positively affect the LEV1 and LEV3, while the effect on the LEV2 is negative. This implies that whenever the economic activity of the country and the real interest rates increases the total debt of commercial banks also increase. On another hand, in the regression results of development and investment banks, the real GDP growth rates negatively affect the LEV1 and LEV2 but the effect on the LEV3 is positive and statistically significant at 1% level. The effect of the real GDP growth rates on the LEV3 of development and investment banks is not only statistically significant but the value of the coefficient (1.36) is also high. Similarly, the positive impact of interest rates on the LEV3 of development and investment banks seems quite strong than other leverages of the two banks. Additionally, although it is not statistically significant interest rates has a negative impact on the LEV2 of development and investment banks which is not for commercial banks.

From the regression results of commercial banks, the impact inflation rates are statistically significant on the three leverages. This variable has a positive effect on LEV1 and LEV3, while on LEV2 the effect is negative. On the other hand, the effect of inflation rates on the three leverages of development and investment banks is negative and statistically significant only on LEV1 and LEV2. In relative to the coefficient of other variables, the coefficient of the inflation rates is high on the long term debts of the two banks. Especially the influence of this variable seems strong on the long term debt of development and investment banks.

### 3.4.2. Determinants of the Domestic and Foreign Banks Capital Structure

Figure 4 below demonstrates the average ratios of total debts, long term debts and short term debts of domestic and foreign banks over the full period. These average leverage ratios are computed based on the debt ratios of all banks. This means banks are not separated as commercial banks and development and investment banks.

**Figure 4: Leverage Ratios of Domestic and Foreign Banks**




**Source:** Own calculation based on the data of BAT (2003-2017)

Figure 4 above shows that there is no big difference between the average leverage ratios of domestic and foreign banks. For instance, the average total debt ratio of domestic banks is 0.72 while the total debt ratio of foreign banks is 0.71. When the average short term debt ratio is observed it is 0.46 for foreign banks and 0.45 for domestic banks. The regression results about determinants of the capital structure of domestic and foreign banks presented in the following Table 18.

**Table 18: The Regression Results of Domestic and Foreign banks**

| | Domestic Banks | | | Foreign Banks | | |
|---|---|---|---|---|---|---|
| **Variable** | **LEV1** | **LEV2** | **LEV3** | **LEV1** | **LEV2** | **LEV3** |
| C | -0.288<br>(0.191) | -0.373<br>(0.188) | -0.803*<br>(0.316) | -0.101<br>(0.162) | 0.667***<br>(0.168) | -0.605***<br>(0.093) |
| PROFT | -0.475*<br>(0.172) | -0.700***<br>(0.044) | -0.082<br>(0.195) | -0.467*<br>(0.224) | -0.252<br>(0.237) | -0.145**<br>(0.053) |
| TANG | -0.007<br>(0.078) | 0.378***<br>(0.076) | -0.330**<br>(0.091) | -0.235**<br>(0.086) | 0.270***<br>(0.071) | -0.440***<br>(0.099) |
| SIZE | 0.282***<br>(0.013) | 0.180***<br>(0.014) | 0.176***<br>(0.028) | 0.275***<br>(0.064) | 0.058<br>(0.037) | 0.197***<br>(0.040) |
| NIM | -0.107<br>(0.181) | 0.899***<br>(0.222) | 0.100<br>(0.356) | 0.173<br>(0.102) | 0.342***<br>(0.046) | -0.101<br>(0.105) |
| GROW | 0.102***<br>(0.016) | 0.049**<br>(0.014) | 0.045***<br>(0.011) | 0.003<br>(0.004) | 0.005<br>(0.007) | 0.004<br>(0.005 ) |
| LIQU[13] | 0.000<br>(0.000) | 0.000<br>(0.000) | -0.001**<br>(0.001) | -0.001**<br>(0.000) | 0.000<br>(0.000) | -0.000***<br>(0.000) |
| LNGDP | 0.093<br>(0.098) | 0.153<br>(0.238) | 0.746**<br>(0.227) | 0.610**<br>(0.156) | -0.212<br>(0.114) | 0.749***<br>(0.075) |
| INF | 0.213<br>(0.313) | -1.244<br>(0.630) | 0.870<br>(0.460) | -0.060<br>(0.231) | -1.829**<br>(0.508) | 1.331***<br>(0.318) |
| INT | 0.019<br>(0.091) | 0.555**<br>(0.161) | 0.399<br>(0.318) | 1.111***<br>(0.302) | -0.231<br>(0.209) | 1.248***<br>(0.149) |
| LNUNEMP | 0.009<br>(0.047) | -0.056<br>(0.050) | 0.305***<br>(0.062) | -0.035<br>(0.053 ) | -0.158***<br>(0.015) | 0.119*<br>(0.059) |
| DEXCH | 0.051**<br>(0.016) | 0.016<br>(0.025) | 0.031<br>(0.017) | 0.001<br>(0.025 ) | -0.045**<br>(0.015) | 0.005<br>(0.023 ) |
| Adjusted $R^2$ | 0.875 | 0.648 | 0.723 | 0.735 | 0.641 | 0.639 |
| Wooldridge | 36.953*** | 30.923*** | 44.699*** | 26.694*** | 35.064*** | 71.184*** |
| Hetrosce Wald | 893.66*** | 1277.87*** | 893.66*** | 4217.93*** | 1343.95*** | 896.52*** |
| Total panel | 294 | 294 | 294 | 293 | 293 | 293 |
| No.of groups | 21 | 21 | 21 | 21 | 21 | 21 |

The dependent variables in the three models of domestic banks (LEV1, LEV2, and LEV3) are presented in column 2, 3 and 4 respectively. The dependent variables of foreign banks are (LEV1, LEV2, and LEV3) found in column 5, 6 and 7 respectively. The robust standard errors are reported in parentheses. ***,** and* denote the significance level at 1%, 5% and 10% respectively.

The regression results of Table 18 above implying that, profitability is negatively affected all leverages of the two banks. Except on the LEV3 of domestic banks and the LEV2 of foreign banks, the effect is statistically significant on the other leverages. This results largely clarified by

[13] In the regression analysis of foreign banks, the first difference of asset tangibility (DTANG) and liquidity (DLIQU) are used.

the pecking order theory. Bank size and growth opportunity have a positive effect on the three leverages of the two banks. Excluding the LEV2 of foreign banks, the effect of bank size is statistically significant at 1% level on all leverages. This result is similar to the expectation of trade-off theory. On the other hand, even though growth opportunity positively affects all leverages of the two banks. The effect is not statistically significant on all three leverages of foreign banks, while the effect is statistically significant on all leverages domestic banks. The result of growth opportunity is similar to the suggestion of the pecking order theory.

Asset tangibility has a negative effect on LEV1 and LEV3 of the two banks, but it is not statistically significant on LEV1 of domestic banks. On the other hand, the effect on LEV2 of the two banks is positive and statistically significant at 1% level. The result of a negative association between leverage and asset tangibility is similar to the prediction of the pecking order theory. Net interest margin seems to have a positive and at 1% statistically significant effect on the LEV2 of the two banks. However, the effect on LEV1 and LEV3 of the two banks is not similar. It affects the LEV3 of foreign banks negatively, while the LEV3 of domestic banks positively affected and statistically not significant. Likely the effect of this variable on LEV1 of both banks is not statistically significant. Liquidity has a negative and significant impact on LEV3 of domestic banks and LEV1 of foreign banks. But the other leverages of the two banks are not affected by liquidity.

Based on the result of Table 18, generally, the effect of macroeconomic factors on the capital structure of foreign banks seem quite significant than domestic banks. With the exception of LEV2 of foreign banks, the real GDP growth rates have a positive effect on all leverages of two banks. But the impact is statistically significant on LEV3 of domestic banks and LEV1 and LEV3 of foreign banks. The impact of the inflation rates is positive on the LEV1 and LEV3 of domestic banks and LEV3 of foreign banks.

The inflation rates have a negative impact on the LEV2 of domestic banks and on the LEV1 and LEV2 of foreign banks, while it positively affects the LEV3 of the two banks. However, the effect of inflation seems strong and statistically significant on the LEV2 and LEV3 of foreign banks. This result indicates that the long term and the short term debts of foreign banks respond more change for the change in the inflation rates. A statistically significant and a positive effect of interest rates is observed on LEV2 of domestic banks and the LEV1 and LEV3 of foreign banks. Although the LEV1 and LEV3 of domestic banks positively affected by interest rates, the impact is not statistically significant. The exchange rates seem to be an important factor in the determination of the total debt of domestic banks and the long term debts of foreign banks. The effect this variable is positive and statistically significant on the LEV1 of domestic banks and negative and statistically significant on the long term debts of foreign banks. The negative and effect of unemployment rates seem strong on the determination of the long term debts of foreign banks than

domestic banks. The effect is statistically significant at 1% level but not for domestic banks, whereas, the effect on the short term debts of the two banks is positive and statistically significant.

### 3.5. The Expected Results and Findings

Based on the findings of the analysis made on the effect of the selected factors on the leverage of banks, the result of some variables is similar with the developed hypothesis or expected results. In this study, the null hypotheses that predict the negative effect of profitability, liquidity and the real GDP growth rate on leverage are accepted, while the hypotheses that predict the negative effect of net interest margin and interest rate are rejected. On the other hand the hypotheses that the estimate the positive effect of bank size, growth opportunity, unemployment rates and exchange rates on leverage are accepted, whereas the hypotheses that assume the positive effect of asset tangibility and inflation on leverage are rejected. The following Table 19 presents the summary of the expected results and findings.

**Table: 19 The Expected Results and Findings**

| Variable | Expected Result (Hypothesis) | Finding |
|---|---|---|
| PROFT | - | - |
| DTANG | + | - |
| SIZE | + | + |
| NIT | - | + |
| GROW | + | + |
| LIQU | - | - |
| LNGDP | - | - |
| INF | + | - |
| INT | - | + |
| LNUNEMP | + | + |
| DEXCH | + | + |

### 3.6. Determining of the Capital Structure Theory

Most of the findings of the thesis on the relationships between leverages and the selected explanatory variables support the predictions of the pecking order for the Turkish banking sector. The theory emphasizes that there is no optimal capital structure in the presence of information asymmetry and signaling problems related to external financing. Because of this reason, firms' decision related to financial structure follows a hierarchy with a preference from retained earnings to debt. In this thesis during the determination of a theory that proved a better description on the relationships between leverage and some variables, the result of total leverage and the majority results that are collected from each regression analysis are used. For example, except in model 2 of the second sub-period, profitability has a negative effect on all leverages presented in all estimated models. But in model 2 of the second sub-period, the effect is positive and statistically not significant. Even though the positive impact of profitability on the long term debt is not similar with the prediction of the pecking order theory, it is good to interpret based on the majority results and the result of total leverage and its significance. Based on these findings, the effect of profitability on leverage is consistent with the expectation of the pecking order theory.

Even though the findings of this study support the pecking order theory, the theory does not exactly explain the relationships between of all variables used in the study and the capital structure. Almost in the outcomes of all regression analysis of this study, bank size is positively associated with leverage, and this prediction is consistent with the trade off theory. The positive sign of bank size, the negative relation of GDP growth with leverage are considered as the difficulty of accounting for pecking order theory. Furthermore, according to Köksal and Orman (2015:30), the major limitation of pecking order theory over the trade-off theory is, it does not produce a prediction about the association of corporate debt tax shields, inflation and non-debt tax shields with leverage. The findings this study also indicates that neither pecking order nor trade-off theory can much for the relationship between leverage and some of the macroeconomic factors.

To emphasize whether the conclusion of this study is in line with the result of previous studies on the capital structure of banks in Turkey, a study conducted by Gocmen and Sahin (2014:64) that tried to investigates firm-specific determinates of deposit banks in Turkey concluded that, the pecking order theory has a better prediction on the capital structure of banks in Turkey. Similarly, the study of Caglayan and Sak (2010: 64) also concluded that, the evidence of their analysis on the banks in Turkey indicates the expectation of pecking order theory. On the other hand, Terzioğlu (2017:524 ) indicates that, neither pecking order theory nor trade-off theory is adequate to describe the capital structure of banks in Turkey.

## CONCLUSIONS AND RECOMMENDATIONS

This thesis studies the banking sector of Turkey over the period 2003 to 2017 with the objective of determining the bank specific and macroeconomic factors that affect the capital structure. First, the thesis examines the factors that affect the leverage of banks by using the full period, and then the full period is divided into two sub-periods to investigate whether the factors have a different impact before and after the 2008 global financial crises. Furthermore, it demonstrates whether there is differentiation on the determinants of the capital structure based on different conditions, additional analysis is made by classifying banks as commercial banks and development and investment banks, domestic banks, and foreign banks.

Based on the data of the full period, three separate regressions by making the book value of leverages ratios as dependent variables are computed over six bank specific and five macroeconomic factors. The findings reveal that banks that have more profits have less leverage and this indicates that the intention of banks is not getting benefit from debt in the form of tax deduction, while larger banks in terms of total asset and banks that have more growth opportunity tend to hold high leverage. Additionally, banks that hold more tangible assets seem to have more long term debts than short term debts, and this finding provides evidence for the application of maturity matching by the banks. The regression results of the full period indicate that banks with high liquidity ratio issue less total debts and short term debts, but the long term debts of these banks are not affected.

Turning to the result of macroeconomic factors, generally, when the real GDP growth rates and the inflation rates is expected to be high, banks issue more total debt and short term debts. Similarly, the increase in interest rates and exchange rates also makes banks to hold more leverage in the form of total debt, long term debt and short term debt. On the other hand, a higher rate of unemployment leads banks to issue less long term debt and more short term debt.

When breaking the full period into two sub-periods, the results show that except on the long term debt ratio of the second sub-period, profitability has a negative effect on the leverages of the two sub-periods. While in the second sub-period the long term debt is positively affected by profitability. In both sub-periods banks that hold more tangible assets issue less total debts and short term debts.

On the other hand, the size and the growth opportunity of banks have a great positive influence on the decision of banks' capital structure. However, based on the result of the first sub-period regression, the growth opportunity has no statistically significant impact on the three leverage measures.

In the two sub-periods, the statistically significant effect of the net interest margin has a positive and statistically significant effect on the long term debts. This means banks with high net interest margin tend to have more long term debt. The regression results of these sub-periods also indicate that before the crises period banks with high liquidity ratio seem to hold less total debt and short term debt while, after the crises, the short term debt increased with the increase of liquidity.

The positive effects of real GDP growth rates and inflation rates on the short term debt ratio of the first sub-period become positive and statistically significant in the second sub-period. The effect of interest rates on the total debt and long term debt of the second sub-period is negative and statistically significant but in the first sub-period, the effect is positive. The impact of the unemployment rates on the total debts and short term debts of the second sub-period is negative. However, in the first sub-period, the effect is positive. Although it is not statistically significant the effect of exchange rates on long term debt is negative in the second sub-period which is positive in the first sub-period.

Generally, most of the findings obtained from the regression results of commercial banks are similar to the results of the full period. This might be because the majority of the data (71%) used in this study contains commercial banks. When the impact of the factors on the capital structure of development and investment banks observed, like commercial banks the leverage of development and investment banks affected negatively by profitability and positively by bank size. Net interest margin, interest rates, and exchange rates positively affect the leverages of development and investment banks. Although growth opportunity has a negative effect on the total debt and long term debt ratios of development and investment banks which is positive on the all leverages of commercial banks, the effect is not statistically significant on the three debt ratios of development and investment banks. Additionally, the impact of the exchange rates also is not statistically significant on all leverages of development and investment banks.

Regarding the regression results of domestic and foreign banks, profitability has a negative effect on all leverages of the two banks. Except on the LEV3 of domestic banks and on LEV2 of foreign banks, the effect is statistically significant on the other leverages. Net interest margin is positively and significantly affect the long term debts of the two banks, but it negatively affects the short term debts of foreign banks and the total debt of domestic banks. Although growth opportunity has a positive impact on the leverages of the two banks the effect is not statistically significant on the three leverages of foreign banks. Liquidity seems has no effect on the total debt

and long term debt ratios of domestic banks and on the long term debts and short term debts of foreign banks. On the other hand, the effect on the short term debt ratios of the two banks is negative and statistically significant. In general, the impact of macroeconomic factors seems statistically significant on the leverages of foreign banks than domestic banks.

The findings of this study indicate that the relationship between the leverages and most of the variables used in this study is relatively consistent with the predictions of pecking order theory. This means pecking order theory is a better theorem to describe the capital structure of Turkish banks. However, because of the theory does not generate prediction for the association between leverage and some of the variables used in this study and the positive sign of bank size in all regression outcomes of the analysis that support the expectation of trade-off theory, the pecking order does not exactly match with all of the observed associations between leverages and the selected variables.

The results of this study have important implications, especially for bank managers. As it was observed in the previous parts of the thesis, all the factors that are assumed to have an effect on the leverages of banks have different influence on different types of banks and strategies. Thus, by taking this into consideration, bank's managers should take in to account both macro and microeconomic factors when they make decisions related to financing. Even though all firm-specific factors have a different impact on the three leverages of banks, bank size seems a statistically significant factor on the capital structure of all banks. This indicates that bank managers should take the size of the bank as an important factor in capital structure decisions. Similarly, in the regression results, the magnitude of the inflation rates is high relative to other variables. So the bank managers especially when there is the expectation of change in the inflation rates, they should be careful when they make decisions related to financing.

The results of all regressions computed in this study indicate that banks that have more tangible assets hold more long term debts than short term debts. This finding provides evidence for the application of maturity matching. So bank managers should continue this strategy in the future periods also. Because the application of maturity matching is the best strategy so as to save interest rates difference between short term and long term interest rates. The findings of this study make a great contribution to the existing literature on capital structure, especially in the Turkish banking sector.

Under the general objective of analyzing the macro and microeconomic factors that affect the capital structure of banks in Turkey, this study also tries to analyze whether these factors have a similar impact or not on the capital structure of different banks. Therefore, banks are classified as commercial banks and development and investment banks, domestic banks, and foreign banks. All the discussions of the study, however, focused on book based leverage as a proxy of capital

structure which is considered as backward-looking of firm's operation. Thus it falls to show the association of the factors with market-based leverage which is assumed as forward-looking. The other limitation of the study is, it does not provide whether the ownership structure of banks has an effect on capital structure and factors related risk and taxes such as non- debt tax shield, corporate debt tax shields and asset quality are not observed. Since theories argue that tax benefits in the form of deductions from investments, depreciation, and debts make firms to hold more debt, it would be important to include such types of factors in future studies.

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# APPENDICES

**Appendix 1: The Variance Inflation Factor for the Full Period (2003 -2017)**

| Variable | VIF | 1/VIF |
|---|---|---|
| INT | 3.2 | 0.31205 |
| INF | 2.51 | 0.398427 |
| LNUNEMP | 1.78 | 0.560783 |
| LNGDP | 1.69 | 0.592222 |
| EXCH | 1.47 | 0.67852 |
| SIZE | 1.39 | 0.720272 |
| TANG | 1.24 | 0.80591 |
| NIM | 1.22 | 0.818678 |
| PROFT | 1.11 | 0.899649 |
| GROW | 1.1 | 0.911832 |
| LIQU | 1.09 | 0.919534 |
| Mean VIF | 1.62 | |

**Appendix 2: The Variance Inflation Factor for the First sub-period (2003-2008)**

| Variable | VIF | 1/VIF |
|---|---|---|
| INF | 7.54 | 0.13266 |
| LNGDP | 7.23 | 0.138334 |
| EXCH | 6.87 | 0.145639 |
| INT | 5.29 | 0.188968 |
| LNUNEMP | 3.38 | 0.295816 |
| SIZE | 1.42 | 0.704108 |
| TANG | 1.22 | 0.818823 |
| LIQU | 1.21 | 0.824234 |
| PROFT | 1.17 | 0.856115 |
| NIM | 1.15 | 0.866935 |
| GROW | 1.12 | 0.89235 |
| Mean VIF | 3.42 | |

**Appendix 3: The Variance Inflation Factor for the Second Sub-period (2009-2017)**

| Variable | VIF | 1/VIF |
|---|---|---|
| INT | 8.24 | 0.121416 |
| LOGGDP | 5.93 | 0.168604 |
| LOGUNEMP | 2.75 | 0.363601 |
| INF | 2.65 | 0.377817 |
| EXCH | 2.45 | 0.407695 |
| NIM | 1.47 | 0.680588 |
| SIZE | 1.41 | 0.709444 |
| TANG | 1.38 | 0.725767 |
| PROFT | 1.28 | 0.778389 |
| GROW | 1.13 | 0.886878 |
| LIQU | 1.07 | 0.931088 |
| Mean VIF | 2.71 | |

## CURRICULUM VITAE

Semira Hassen ALI was born in Harar, Ethiopia on July 16, 1987. She completed her primary and secondary school at Ras-Mokonen and Harar Junior Secondary School. In 2006, she joined Addis Ababa University College of Commerce and graduated with Bachelor of Art in Accounting. Then she joined Dire Dawa University and served as a graduate assistant for one year until she joined Adama Science and Technology University, School of Graduate Studies on September 2009. In 2011 she graduated with a Masters degree in Accounting and Finance. After the graduation, she came back to Dire Dawa University and served for about one year as assistance lecturer until she joined Karadeniz Technical University, Trabzon, Turkey on October 2013 to study PhD. She is married and she speaks Amharic, English and Turkish languages.