THE EFFECTS OF BANK SPECIFIC, INDUSTRY SPECIFIC AND MACROEOCONOMIC FACTORS ON BANK PROFITABILITY IN OECD COUNTRIES BETWEEN 2000 - 2009

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ABSTRACT

THE EFFECTS OF BANK SPECIFIC, INDUSTRY SPECIFIC AND MACROEOCONOMIC FACTORS ON BANK PROFITABILITY IN OECD COUNTRIES BETWEEN 2000-2009

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This thesis analyzes the bank-specific, industry-specific and macroeconomic determinants of bank profitability (ROA) in 31 OECD Countries between 2000 and 2009 using a panel data. Each country's banking sector is treated as a single representative bank. Fixed effects model is used in the study. Deposits, capitalization, non-interest income, GDP growth are found to have a positive impact on bank profitability while non-performing loans, operating expenses and financial sector development have negative effect. Evidence is found on country-specific effects in bank profitability determinants. Also, analyses show that, operating expenses and financial sector development have positive impact on large banks' profitability. Finally, financial sector development has no significant effect on bank profitability in emerging countries.

Keywords: Bank profitability, OECD, financial sector development, emerging countries.

ÖZ

2000-2009 YILLARI ARASINDA, OECD ÜLKELERİNDE BANKA KÂRLILIĞINI BELİRLEYEN BANKALARA ÖZGÜ, ENDÜSTRİYE ÖZGÜ VE MAKROEOKONOMİK FAKTÖRLERİN ETKİLERİ

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Bu tez, Banka kârlılığını (mali varlıkların getirisi) belirleyen bankalara özgü, endüstriye özgü ve makroekonomik faktörleri 31 OECD ülkesinde 2000-2009 yılları arası için panel veri analizi kullanarak incelemektedir. Her bir ülkenin bankacılık sektörü ayrı bir banka gibi kabul edilmiştir. Çalışmada, sabit etkiler modeli kullanılmıştır. Mevduatlar, sermaye miktarı, faiz dışı gelir ve GSYH'deki büyüme banka kârlılığı üzerinde pozitif etkiye sahipken; takipteki krediler, işletme giderleri ve finansal sektör gelişmişlik düzeyi negatif etkiye sahiptir. Banka kârlılığını belirleyen faktörlerde ülkelere özgü etkiler tespit edilmiştir. Ayrıca, yapılan analizler, işletme giderleri ve finansal sektörün gelişmişlik düzeyinin büyük bankaların kârlılığı üzerinde pozitif etkiye sahip olduğunu göstermiştir. Son olarak da, finansal sektörün gelişmişlik düzeyinin, gelişmekte olan ülkelerde banka kârlılığına bir etkisi görülmemektedir.

Anahtar Kelimeler: Banka kârlılığı, OECD, finansal sektör gelişmişlik düzeyi, gelişmekte olan ülkeler.

To My Family

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machine
CDTA	Customer Deposits to Total Assets
CRTA	Capital and Reserves to Total Assets
GDP	Gross Domestic Product
GDPGRW	GDP Growth
IMF	International Monetary Fund
NIITA	Non-interest Income to Total Assets
NIM	Net Interest Margin
NPL	Non-performing Loans
OECD	Organization for Economic Co-operation and Development
OETA	Operating Expenses to Total Assets
POLTL	Provisions on Loans to Total Loans
ROA	Return on Assets
ROE	Return on Equity
TAGDP	Total Bank Assets to GDP

CHAPTER 1

INTRODUCTION

Banks are the major source of financing all economic activities and they are the most important actors of the economy during economic shocks and crisis. They are the key to a healthy financial system. Recent developments showed that financial institutions are so important for an economy that, a financial crisis may even cause developed economies to collapse. Also, as is seen during the financial crisis in 2008, economies are so interdependent that, soundness of another country's system may significantly affect other systems. In today's world, due to improved communications, large capital flows, enhanced international trade, increased foreign direct investment, all systems became interdependent and very responsive to each other's activities. Thus, a country does not only monitor the factors affecting its own financial system, but also monitor activities of other countries and factors affecting them in order to take necessary measures and make adjustments accordingly.

Profitability is an important factor for a sound and healthy financial system. Banks need to make profits in order to continue in the business, and the system will be less vulnerable with banks that have higher profit margins (Athanasoglou, Brissimis and Delis, 2006). After the 2008 financial crisis, bank profitability and its determinants became even a more important subject. When we think of the importance of profitability for the stability of the banking sector, and the effect of the banking industry both on the stock markets and the economy, the profitability determinants appear to be very important. Some researchers like Dietrich and Wanzenried (2011), Albertazzi and Gambacorta (2009) investigated macro prudential analysis - which is a term used to describe a method of economic analysis that evaluates the health, soundness and vulnerabilities of a financial system, and presented that banking sector profitability and its institutional and structural determinants are the most important elements.

This study covers 31 OECD (Organization for Economic Co-operation and Development) countries' banking systems and extends the literature on bank profitability by providing empirical evidence using panel data. OECD covers the most of the largest economies which are important for world economy. Thus, it is a good sample for a cross- country analysis. A more competitive environment for banks has emerged after the financial deregulation in the 1970s. This caused the banks within each country follow each other's behavior and often act 'as one', and so the method of treating each national banking sector as a single agent is reasonable and interesting (Hawtrey and Liang, 2008).

In this thesis, each country's banking sector is treated as a single representative firm following Hawtrey and Liang (2008). The differences between countries' banking sectors are as relevant as differences between individual banks within that country. The benefit of this method is that it emphasizes cross-border differences in banking sectors of different countries. The behaviors may be more similar for banks within a country but they are expected to differ among countries. Thus, this method will also allow us to check if there is a country effect in bank profitability. If any country effect is identified, then bank managers and policymakers should take into account that country specific effects while making decisions.

Also, this thesis checks if there are any differences between different country and bank groups. Besides the main analysis in which all banks data from 31 countries are included, 4 separate analyses are carried out. First analysis includes large bank data from 17 countries and aims to identify if there are any size effects in bank profitability. In other 3 analyses, 22 European countries, 27 advanced countries and 5 emerging countries are included, respectively. The purpose is to identify if there are any differences between different country groups. I examine whether the determinants of bank profitability same for advanced and emerging countries. The motivation of this thesis is the inconclusive nature of the existing literature. The intention of this paper is to clarify the contradictory results in past studies by providing a comprehensive cross-country study. A prior cross-country study was

conducted by Kunt and Huizinga (1998) using data for eighty advanced and emerging economies for the 1988 - 1995 period, but their main aim was to analyze the effects of external factors like macroeconomic indicators and tax rates on the bank profitability. Another research by Hawtrey and Liang (2008) also focused on OECD Countries, but their particular concern was net interest margin, rather than profitability. Complementing the existing literature, this paper investigates factors effecting particularly overall bank profitability which is measured by return on assets (ROA) and focuses on internal determinants. The recent cross country studies mainly focus on net interest margin which is accepted as a measure of bank efficiency (Espinosa, Moreno and Gracia, 2011; Dietrich, Wanzenried and Cole, 2010; Hawtrey and Liang, 2008). According to some researchers like Brock and Franken (2002), because interest rate spreads are mainly determined at industry level, internal bank characteristics are more related to bank profitability. As a result, this thesis concentrates more on individual bank characteristics and uses bank profitability as a dependent variable.

Also, the most recent data published by OECD is employed in this thesis, since it is necessary to update our knowledge on bank profitability determinants in order to monitor changing trends. This thesis also covers 31 OECD countries, which allows it to be more comprehensive than the existing literature which mainly focuses on European countries.

In this thesis, I aim to show the recent situation in banking sector. Data covers 2000-2009 period, which can show us the situation before the 2008 crisis. I will be able to see, how bank choices affected their performance. A further study can be done for the post crisis period when more data are available, which can allow me to compare what has changed after the crisis.

The outline of the thesis is as follows; Chapter 2 scans existing literature on the determinants of bank profitability, gives the general view of the literature on the

expected effects of these determinants, and specifies determinants included in this study. In chapter 3, I discuss the hypotheses. Chapter 4 describes the econometric model and data for the analysis, Chapter 5 presents the results of the empirical analysis and Chapter 6 concludes.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the existing literature on bank profitability and its determinants are described. It has two main sections. In the first section, the most commonly used measures of profitability, their advantages and disadvantages are briefly stated. In the second section, the categorization of the bank profitability determinants and the items employed under each category are mentioned.

2.1 The Measures of Bank Profitability

In the literature, there are three most commonly used measures of bank profitability which are, return on assets (ROA), return on equity (ROE) and leastwise, net interest margin (NIM).

2.1.1 Return on Assets (ROA)

Return on assets (ROA) is the most comprehensive and commonly used measure of bank profitability, which is calculated by profits (net income) divided by total assets of the bank (Berger and Humphrey, 1993). Past research on bank profitability showed that, ROA is a good measure of profitability and it reflects the bank management's ability to generate profits from its assets (Dietrich and Wanzenried 2011; Sufian, Habibullah 2009). Another reason why it is a good measure is that it is not affected from high equity multipliers so it delivers more objective and accurate results (Rivard and Thomas, 1997). A great number of researchers in the literature use ROA as the measure of bank profitability in their studies (Athanasoglou et al., 2006; Aburime, 2008; Albertazzi and Gambacorta, 2009; Beckmann, 2007; Berger, 1995; Holden and El-Bannany, 2006; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003; Stiroh, 2004).

2.1.2 Return on Equity (ROE)

Return on equity is another measure of bank profitability which is preferred by some researchers but less frequently compared to ROA. It is calculated as the ratio of net profits over total equity of the bank. In the literature, there are a number of studies which argue that ROE is not a very optimal measure of bank profitability. For instance, if bank is holding a lower level of capital compared to the general level in the sector, this generates a higher ROE and cause misleading results in the analysis. Another reason why ROE is not an optimal measure of profitability is because; degree of capitalization is often set by the regulatory authority. Especially in some developing countries, banks operate with very low levels of capital, and government supports this. This situation boosts return on equity artificially. Finally, ROE is discredited for disregarding the risks resulting from low levels of capital (Athanasoglou et al., 2006; Kunt and Huizinga, 1998).

2.1.3 Net interest margin (NIM)

Net interest margin is also used by few researchers (Hamadi and Awdeh, 2012; Tan and Floros, 2012) as a measure of bank profitability. Another group of researchers also used net interest margin in their analyses, but they keep it apart from bank profitability. According to them, NIM is more of an efficiency measure; they use ROA to measure overall profitability (Kosmidou, Sailesh and Pasiouras, 2005; Kunt and Huizinga, 1998 and Ramlall, 2009).

Thus, the general view in the literature is that ROA is the best measure for profitability of banks. The changes in ROA is due to the banks own decisions (which creates bank specific factors) and macroeconomic factors (Sufian, Habibullah, 2009).

2.2 Determinants of Bank Profitability

The existing literature classifies the determinants of bank profitability into three as bank-specific, industry (market) specific and macroeconomic factors (Athanasoglou et al., 2006; Aburime, 2008; Dietrich and Wanzenried, 2011; Kunt and Huizinga, 1998; Sufian and Habibullah, 2009).

2.2.1 Bank Specific Determinants

First group of bank profitability determinants are called bank-specific or internal determinants. They result from banks' internal policies and management decisions. They are the determinants which can be controlled by the bank managers and adjusted to changing conditions.

2.2.1.1 Capitalization

The capital structure of the bank is an important determinant of bank profitability. Managers usually need to choose between equity financing and debt financing and this needs detailed analysis of each method. There are different views in the literature on this issue.

According to some researchers, the amount of capital a bank holds has a positive effect on bank profitability (Athanasoglou et al., 2006; Berger, 1995; Bourke, 1988; Busch and Kick, 2009; Davydenko, 2011; Dietrich and Wanzenried, 2011; Flamini, Mc Donald and Schumacher, 2009; Goddard, Molyneux and Wilson, 2004b; Holden and El-Bannany, 2006; Ivey, Gropper and Rutherford, 2005; Kosmidou et al., 2005; Kosmidou, 2008; Kunt and Huizinga, 1998; Molyneux and Thornton, 1992; Naceur, 2003; Naceur and Goaied, 2001; Naceur and Omran, 2008; Pasiouras and Kosmidou, 2007; Ramlall, 2009; Staikouras and Wood, 2003; Sufian and Habibullah, 2009; Vong and Chan, 2009).

Advocates of this view attribute this to regulations that require banks to hold higher levels of capital and reserves, but at the same time allow them to make more risky and thus profitable investments. Also, another view is that, well-capitalized banks are more profitable because of their low cost of funding thanks to their lower probability of bankruptcy. An increase in the level of capital is followed by an increase in earnings and this increase comes mainly from reduced interest rates on borrowed funds.

The higher profitability of well capitalized banks may also be tied to their lower moral hazard, agency costs. As the percentage of debt in the capital structure exceeds an optimal point, this may create significant agency costs. There may be several reasons. First, bankruptcy costs will increase and managers may reduce their effort to control risk which result in higher expected costs of financial distress, bankruptcy, or liquidation. Second, increased leverage provides managers with free cash flow, which they may use inefficiently, to enlarge their firms beyond the optimal size in order to increase their own power. (Zhang and Li, 2008)

Stockholders have voting rights which enable them to take some control on bank's management. This would decrease agency costs which would be higher when debt financing is preferred and creditors have no rights in management process. Also, capital works as collateral for stockholders and debt holders which would ensure that they will compensate their losses in case of the liquidation of the bank.

The opposing view which claims that banks hold a higher amount of capital compared to its counterparts are less profitable, usually ground their hypothesis on traditional risk-return approach. According to Guru, Staunton and Balashanmugam, (2002), management's policy about risk taking can be explained by analyzing the amount of capital and reserves held by the bank and the bank's liquidity policies. If a bank is holding a large amount of capital and reserves, it creates a buffer against any loss or liquidation, so risk is lower for these banks. Thus, it is expected to have a

negative relationship with profits according to traditional risk- return theory. According to Goddard, Molyneux and Wilson, (2004a), banks with high capital ratios may indicate that they are operating over-cautiously and missing profitable opportunities and they identified a strong negative relationship between capital and profitability. There are some other studies which also identify a negative relationship between capitalization and bank profitability (Aburime, 2008; Gul, Irshad and Zaman, 2002; Hamadi and Awdeh, 2012 and Tan and Floros, 2012).

Interestingly, the studies that find a negative relationship between the capital and the profitability are mostly the ones that analyze emerging countries.

2.2.1.2 Non-interest Income

Non-interest income is a term used to describe non-traditional income of banks from activities such as trading, investment banking and brokerage, municipal securities underwriting, real estate brokerage services, real estate development, real estate equity participation, and insurance brokerage (Gambacorta and Marques-Ibanez, 2011; Smith, Staikouras and Wood, 2004).

Main sources of income differ among banks. Banks always offer traditional banking services, which generate fee income like checking, and trust and cash management. Besides household lending and business lending, diversification into fee-earning activities increased gradually since deregulation started in 1970's. In the past, a lower level of fee income was generated by depository institutions, but nowadays, it plays very important role in general financial policies of banks (Smith, et al., 2004).

According to Albertazzi and Gambacorta (2009), financial stabilization and deregulation have had important effects on the banks' activities, like the shift from activities that generate net interest income to activities, which generate non-interest income, which are not dependent on traditional financial intermediation. There has

been a decline in interest margins which has changed the traditional role of banks and has forced them to look for new sources of income. Thus, banks started to concentrate on fee generating activities. In addition, there have been structural changes that have increased the importance of fee income like industry deregulation, new information technologies and financial innovation.

The banks' tendency to increase their fee-earning activities makes non-interest income an important determinant of profitability. Traditionally, fee income is thought to be more stable than traditional interest income. However, this situation may have changed with the banks increasing tendency towards non-interest bearing activities (Smith et al., 2004).

The modern portfolio theory suggests that diversification reduces the return variance of a portfolio of financial assets. Non-interest income is preferred by banks because it is thought to have diversification benefits. According to some researchers non-interest income measures the impact of diversification strategy of banks, thus they expect it to have a positive effect on the profitability of the banks. Diversification reduces bank's exposure to risk, help banks to generate more stable income, cost of borrowing decreases, and value of the stocks increases then in turn, profitability is positively affected (Busch and Kick, 2009; Sufian and Habibullah, 2003).

On the other hand, Gambacorta and Marques-Ibanez (2011) claim that, banks have a tendency to increase their non-interest income which is more profitable but also more volatile. It is profitable, because the increase in non-interest income is an additional source of income for banks. They find that it is also more volatile, when they analyze the credit supply of banks during normal times and crisis. According to their analysis, the banks with a larger share of fee income limit their credit supply to a greater extent during economic crisis. This is because, during financial crisis, the decrease in non-interest income is larger than the decrease in interest income.

Also, Staikouras and Wood (2004) claim that non-interest income does not bring diversification benefits and does not have a positive effect on income. Rather, it is more fluctuating than traditional interest income. According to Stiroh (2004), non-interest income is believed to be less dependent on external business conditions than interest income, so it is expected to decrease the cyclical variation in bank income and profits. However, in his study, in which he used both aggregate and bank level data, he found a little evidence that the shift to non-interest income delivers diversification benefits. He claims that the tendency of banks to depend more heavily on fee income increases risk, and risk – adjusted return in recent years. Kunt and Huizinga (1998) and Vong and Chan (2009) also found a negative relationship between fee based services and the profitability of the banks.

2.2.1.3 Loan Portfolio Quality

Loan portfolio quality is a very important area for the banks since the main income source of the banks is loans. Deciding the size and quality of the loan portfolio is an important decision for bank managers. Because on one hand, extending loans without checking the credibility of the borrower cautiously increases credit risk so the possibility of going bankrupt, but on the other hand, its expected return is much more than other investments like government securities (Sufian and Habibullah, 2009).

In the literature, there are several indicators that are used to determine the quality of the loan portfolio. The most frequently used measures are the ratio of provisions on loans to total loans, and non-performing loans to total loans, which is defined as "principal or interest on them is due and left unpaid for 90 days or more" (Greuning and Bratanovic, 2003, p. 178).

Traditional risk-return hypothesis argue that higher risk will bring higher return. Thus, the general expectation should be; higher credit risk will lead to higher profits. However, the findings in the literature suggest otherwise, higher risk does not always

yield higher return for banks. If a bank is increasing the amount of bad loans on its balance sheet, it is at the same time increasing cost of funding which could have a negative impact on profitability (Athanasoglou et al., 2006; Bernstein, 1996; Busch and Kick, 2009; Davydenko, 2011; Hamadi and Awdeh, 2012; Ivet et al., 2005; Kosmidou, 2008; Naceur, 2003; Ramlall, 2009; Vong and Chan, 2009; Wu, Chang and Selvili, 2003).

2.2.1.4 . Deposits

The amount of deposit liabilities on bank's portfolio is another important decision for bank managers. By adjusting deposit rates, developing a better ATM network and enhancing online banking, banks could attract more deposits.

Being the major source of funds for banks, it is generally believed that customer deposits affect profits positively as long as there is enough demand for loans in the market. However, if there is insufficient loan demand, more deposits in fact may cause a decline in earnings, since this type of funding is costly in terms of the required branching network (Kunt and Huizinga, 1998; Vong and Chan 2009).

Some researchers argue that, banks with higher level of deposits on their balance sheet perform much better than others. Because, as the amount of deposits increase, more funds which can be used in profitable investments, will be available to a bank. Also, banks can increase the value of their deposit accounts by investing in ATM's and online banking which provides them deposits which is cheaper than most of other funding types. Thus, their overall cost of funding would decrease and their profit margins would increase. Deposits may also affect bank income positively because banks, which are preferred more by the customers to deposit their savings, pay lower rates to depositors (Allen and Rai, 1996; Davydenko, 2011; Holden and El-Bannany, 2006; Naceur and Goaied, 2001).

2.2.1.5 Operating Expenses

Operating expenses are total costs for running the bank, like staff costs, property costs and other operating expenses. It is an important determinant of bank profitability and most of the literature argue that is has a negative impact on bank profits. According to the literature, higher operating expenses show management's inability to manage costs efficiently (Athanasoglou et. al., 2006; Bourke, 1988; Davydenko, 2011; Dietrich and Wanzenried, 2011; Guru, et al., 2002; Kosmidou et al., 2005; Kosmidou, 2008; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003; Sufian and Habibullah, 2009).

There are some opposing views in the literature claiming that, the effect of operating expenses on bank profits depends on the management's ability to pass the costs to its customers. If the managers can pass these costs to the customers then the increase in operating expenses may not negatively affect the profits (positively affect the profits) (Naceur, 2003; Vong and Chan, 2009). For instance, if a bank has a wide network of ATMs, and this creates maintenance and other costs, the bank can reflect these costs to customers in the form of account maintenance fee. If the bank is indispensable for the customer because of the quality or uniqueness of the service it delivered, customers will not object to pay this amount. Moreover, deposit rates of one bank could be lower than its counterparts, but because of the large network and other services offered by the bank it may be still preferred by depositors among other banks.

In addition to bank specific factors, there are other factors that are accepted in the literature as determinants of bank profitability. Two groups of variables, - industry specific and macroeconomic, are also expected to influence bank profitability.

2.2.2 Industry-Specific Determinant (Financial Sector Development)

The second group is industry specific bank profitability determinant, financial sector development. It has an impact on all banks operating in a country. This is important for controlling for the indigenous characteristics of the industry. Banks are directly affected by the environment they are operating in. The level of development in a banking sector is important for banks and must be carefully analyzed.

According to some studies like in countries where ratio of bank assets to GDP is high banks have smaller margins and are less profitable (Kosmidou, 2008; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007). In their study, Kunt and Huizinga (2000) examine the effect of financial development on bank profitability in more detail and find that, financial development of a country significantly and negatively affects bank profitability. They attribute the lower profitability of banks in developed financial systems to increased efficiency, resulting from greater competition. Better development of banking sector leads to higher efficiency, competitive pricing behavior and so, lowers profits. Also according to Kosmidou et al. (2005) if the stock market is more developed relative to the banking industry in a country, banks have a better chance to gain higher profits. This is because, if stock market is more dominant in financing activities of a country, this means there is a less competitive banking system, which enables existing banks to gain higher levels of profits.

The findings in the literature differ between different economies. The studies that identified a negative relationship between financial sector development (measured by bank assets to GDP) cover mostly advanced countries. Kosmidou (2008) covered Greek banks, Kunt and Huizinga (1998) covered banks from 80 countries which include many advanced economies (all OECD countries) and Pasiouras and Kosmidou (2007) covered banks from 15 EU countries. According to Kunt and Huizinga (2000) which used a dataset covering all OECD countries and 22 emerging countries, emerging countries generally have underdeveloped banking sectors and

stock markets. Naceur (2003) studied 10 main deposit banks in Tunisia and found that financial sector development (size of the banking sector) is insignificant in determining the profitability of Tunisian banks.

2.2.3 Macroeconomic Determinant (Gross Domestic Product (GDP) Growth)

Past research showed that macroeconomic factors also effect the functioning of a country's banking system and the return of banks. (Athanasoglou et al., 2006; Dietrich and Wanzenried, 2011; Ivey et.al., 2005; Staikouras and Wood, 2003). Some researches show that when banks are well managed and respond to the fluctuations in the economy properly, severe crises are not very likely to happen (Arpa, Giulini, Ittner and Pauer, 2001; Pasiouras and Kosmidou, 2007). Thus the relationship between the macro economy and the banking sector is very important.

GDP growth which reflects amount of the goods and services produced by an economy over time is an important indicator that measures the economic situation within a country. As a result, it is used as a demand-side indicator in studies on bank performance (Goddard et al. 2004a). Most of the literature found a positive relationship between GDP growth and bank profitability. Because as GDP growth decelerates, the quality of credit decreases, loan defaults increase and thus, profitability decreases. Also the researchers claim that debt servicing capacity of borrowers decrease when aggregate growth rates are falling down and so, expect a positive relationship between GPD and bank profits (Beckmann, 2007; Davydenko, 2011; Flamini, et al., 2009; Goddard et al., 2004a; Ivet et. al., 2005; Kosmidou, 2008; Kosmidou et al., 2005; Pasiouras and Kosmidou, 2007; Sufian and Habibullah, 2009).

There are a few studies that claim a negative effect of GDP growth on bank profits. According to them, GDP growth effects bank profits negatively through increased competition and lowered entry barriers as a result of the improved business

environment (Hamadi and Awdeh, 2012; Staikouras and Wood, 2003; Tan and Floros, 2012).

This chapter puts together the prominent determinants of bank profitability and the existing literature on them. Also, the mostly used measures of bank profitability and their pros and cons are discussed. The next chapter will focus on the hypotheses formed in this study based on the existing literature.

CHAPTER 3

HYPOTHESES

The model analyzes the effects of bank–specific, industry-specific and macroeconomic factors on bank profitability in 31 OECD countries. Panel data analysis between years 2000-2009 is applied. The motivation of this thesis is the inconclusive nature of the literature. The reason of the contradictory arguments in the literature may be due to dynamic nature of the financial system and the different characteristics of countries and regions. Also, if country effects will be identified, different results in the literature would make more sense.

In the analysis seven variables are used which are explained in detail in the next section. The variables are selected in accordance with the theoretical and empirical literature. However, data availability is an important factor in determining the explanatory variables.

This thesis models the return on assets as a function of the size of deposit liabilities, capital and reserves to total assets, operating expenses to total reserves, non-performing loans to total gross loans, non-interest income to total assets, total bank assets to GDP and GDP growth.

The model is of the following linear form:

$$(PROF)(i,j)= \propto_0 + \beta_1 CDTA(i,j) + \beta_2 CRTA(i,j) + \beta_3 NIITA(i,j) + \beta_4 NPL(i,j) + \beta_5 OETA(I,j) + \beta_6 TAGDP(i,j) + \beta_7 GDPGRW(i,j)$$

PROF(i,j) is the profitability of all banks in country i at time j, with i=1, . . .31, t=2000, . . . 2009,

$\propto_0$ is a constant term

CDTA(i,j) is the ratio of customer deposits to total assets of all banks in country i at time j,

CRTA is the ratio of capital and reserves to total assets of all banks in country i at time j,

NIITA(i,j) is the ratio of non-interest income to total assets of all banks in country i at time j,

NPL(i,j) is the ratio of non-performing loans to total gross loans in country i at time j

OETA is the ratio of operating expenses to total assets of all banks in country i at time j,

TAGDP(i,j) is the ratio of total bank assets to total GDP in country in country i at time j

GDPGRW(i,j) is the growth in GDP in country i at time j.

The summary statistics and the correlation coefficients of the variables are presented in the appendix in tables A.1 and A.2 respectively.

3.1 Variables

I specified 5 bank-specific variables, 1 industry-specific variable and 1 macroeconomic variable according to the past literature on the subject and depending on the data availability. The bank-specific variables are; customer deposits to total assets (CDTA), capital and reserves to total assets (CRTA), non-interest income to total assets (NIITA), non-performing loans to total gross loans (NPL), operating expenses to total assets (OETA). The industry specific variable is total bank assets to GDP (TAGDP) and the macroeconomic variable is the GDP Growth (GDPGRW).

3.1.1 The dependent variable

Dependent variable used in this study is income before tax divided by the total assets (ROA), in line with the literature. Income before taxes is employed to eliminate the effects of different tax rates on different countries as suggested by prior reasearch (Aburime, 2008; Albertazzi and Gambacorta, 2009; Berger, 1995; Beckmann, 2007; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003; Holden and El-Bannany, 2006; Stiroh, 2004).

3.1.2 Bank specific determinants

Capitalization

In line with the literature the capital and reserves to total assets ratio (CRTA) is used as a proxy for the capitalization (Athanasoglou et al., 2006; Berger, 1995; Bourke,1988; Davydenko, 2011; Dietrich and Wanzenried, 2011; Flamini et al., 2009; Goddard et al. 2004a; Goddard et al. 2004b; Holden and El-Bannany, 2006; Ivey et al., 2005; Kosmidou, 2008; Kosmidou et al., 2005; Kunt and Huizinga, 1998; Molyneux and Thornton, 1992; Naceur, 2003; Naceur and Goaied, 2001; Naceur and Omran, 2008; Pasiouras and Kosmidou, 2007; Ramlall, 2009; Staikouras and Wood, 2003; Sufian and Habibullah, 2009; Vong and Chan, 2009).

The advocates of traditional risk return approach who claim that better capitalized banks are less profitable are all covering a single developing country in their studies (Aburime, 2008; Gul et al., 2002; Guru et al., 2002; Hamadi and Awdeh, 2012 and Tan and Floros, 2012). However, most of the prior research in the area that employed a cross country analysis and included advanced economies in their analysis finds a positive effect of capitalization on bank profitability (Athanasoglou et al., 2006; Berger, 1995; Bourke, 1988; Busch and Kick, 2009; Dietrich and Wanzenried, 2011; Goddard, Molyneux and Wilson, 2004b; Holden and El-Bannany, 2006; Ivey,

Gropper and Rutherford, 2005; Kosmidou et al., 2005; Kosmidou, 2008; Kunt and Huizinga, 1998; Molyneux and Thornton, 1992; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003). Thus, depending on the sample studied, a positive relationship between capitalization and bank profitability is expected.

Non-interest income

Non-interest income to total assets ratio (NIITA) is used as a measure of banks non-traditional income sources. There are opposing views in the literature about its effect on profitability. According to some researchers, non-interest income has diversification benefits and affects bank profitability positively (Busch and Kick, 2009; Sufian and Habibullah, 2003). Also according to Gambacorta and Marques-Ibanez, (2011) non-interest income has a positive effect on profitability, but this is not due to diversification benefits brought by non-interest income. Instead, it is increasing profits because it is an additional source of income for banks.

On the other hand, according to some studies, non-interest income has a decreasing effect on bank profits (Kunt and Huizinga, 1998; Staikouras and Wood, 2004; Stiroh, 2004; Vong and Chan, 2009). In short; existing findings provide conflicting explanations on the relationship between non-interest income and bank profitability. Thus, the study will contribute to existing literature by providing evidence of either positive or negative relation between non-interest income and bank profitability.

Loan Portfolio Quality

In line with the existing literature and due to the lack of data on loan loss provisions, non-performing loans to total gross loans (NPL) is used as an indicator of loan portfolio quality (Bernstein, 1996; Wu et al.2003). However, the results are comparable with other studies (Athanasoglou et al., 2008; Davydenko, 2011; Ivey et.al. 2005; Hamadi and Awdeh, 2012; Ramlall, 2009; Staikouras and Wood, 2003;

Vong and Chan, 2009) that employed loan loss provisions, since both measures indicate quality of the loan portfolio and serve the same purpose.

Most of the studies that analyze non-performing loans claim that it has a negative effect on bank profitability (Athanasoglou et al., 2006; Bernstein, 1996; Davydenko, 2011; Hamadi and Awdeh, 2012; Ivet et al., 2005; Kosmidou, 2008; Naceur, 2003; Ramlall 2009; Vong and Chan, 2009; Wu et al., 2003). Thus, a negative relationship between non-performing loans and bank profitability is also expected in this study.

Deposits

Following Kunt and Huizinga, (1998), total customer deposits divided by total assets ratio (CDTA) is used as an indicator of the size of deposit liabilities. There are opposing views in the literature about the effect of the size of deposit liabilities on bank profitability. Some researchers like Kunt and Huizinga (1998) claim a negative relationship and attribute this to higher operating expenses created by higher branching that is required by higher levels of deposits.

Other studies that include deposits in their analyses find a positive relationship between the amount of deposits and bank profitability (Allen and Rai, 1996; Davydenko, 2011; Holden and El-Bannany, 2006; Naceur and Goaied, 2001) and their claims make more sense when today's state of the art is considered. In this era of high technology, ATMs and online banking is widely used by bank customers. This should reduce higher branching and higher staff expenses. Thus, banks can attract more deposits without incurring high costs and use these funds in profitable investments. Based on the literature and current situation in the industry, a positive effect on bank profitability is expected.

Operating Expenses

Operating expenses over total assets ratio (OETA) is used as a measure of expense management. One opinion asserted in the literature is that, the effect may depend on the banks' ability to pass the expenses to its customers (Naceur, 2003; Vong, Chan, 2009). If a bank has enough power to reflect its costs to customers, bank managers can make investments more confidently and do not miss profitable opportunities because of the costs that will be incurred.

On the other hand, most of the literature argues that higher operating expenses shows management's inability to manage costs efficiently and cause a decrease in bank profits (Athanasoglou et. al., 2006; Bourke, 1988; Davydenko, 2011; Dietrich and Wanzenried, 2011; Guru et al., 2002; Kosmidou, 2008; Kosmidou et al., 2005; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003; Sufian and Habibullah, 2009). Thus, a negative relationship is expected in line with the literature.

3.1.3 Industry-Specific Determinant (Financial Sector Development)

Following the literature on bank profitability, bank assets to total GDP ratio is used as a proxy for banking sector development (Kosmidou, 2008; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007). Considering the higher competition associated with the better developed financial sector, a negative relationship is expected.

3.1.4 Macroeconomic Determinant (GDP Growth)

The percent change in GDP is used as a macroeconomic variable in order to control for fluctuations in the economy and cyclical output effects (Beckmann, 2007; Davydenko, 2011; Flamini, et al., 2009; Goddard et al., 2004a; Hamadi and Awdeh,

2012; Ivet et. al., 2005; Kosmidou, 2008; Kosmidou et al., 2005; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003; Sufian and Habibullah, 2009; Tan and Floros, 2012).

A few researchers find a negative effect of GDP on bank profits and attribute this to increased competition (Hamadi and Awdeh, 2012; Staikouras and Wood, 2003; Tan and Floros, 2012).

Most of the literature find a positive relationship between GDP growth and bank profitability, since economic growth increases credit quality and decreases loan defaults (Beckmann, 2007; Davydenko, 2011; Flamini, et al.,2009 ; Goddard et al., 2004a; Ivet et. al., 2005 ; Kosmidou, 2008; Kosmidou et al., 2005; Pasiouras and Kosmidou, 2007; Sufian and Habibullah, 2009). In accordance with the analysis and countries covered, a positive relationship is expected in this thesis as well.

Table 3-1 lists the variables used in this study and their expected effect on bank profitability.

Table 3-1: Determinants of Bank Profitability

Variable	Definition	Notation	Expected Effect
Dependent Variable			
Profitability	Income Before Tax/ Total Assets	ROA	
Independent Variables			
Bank Specific Variables			
Customer Deposits	Customer Deposits/Total Assets	CDTA	+
Capitalization	Capital and Reserves/Total Assets	CRTA	+
Non-interest income	Non-interest Income/Total Assets	NIITA	+/-
Loan Portfolio Quality	Non-performing Loans/Total Gross Loans	NPL	-
Operating Expenses	Operating Expenses/Total Assets	OETA	-
Industry – Specific Variable			
Financial Sector Development	Total Bank Assets/GDP	TAGDP	-
Macroeconomic Variable			
GDP Growth	Percent Change in real GDP	GDPGRW	+

CHAPTER 4

DATA and METHODOLOGY

This chapter focuses mainly on the data used in this study and the method applied in the estimations. First section describes the data, countries included and years employed. Second section briefly explains econometric methodology applied.

4.1. Data

This study uses an unbalanced panel of 31 OECD Countries for the period 2000-2009. Banking data was retrieved from OECD database and it is composed of 31 reporting countries' balance sheets and income statements of all banks between 2000 and 2009. Due to data availability, 3 OECD countries; Australia, Iceland and New Zealand are not included in the analysis. Also due to data unavailability, data for 2000-2008 is used for 6 countries (Austria, Hungary, Portugal, United Kingdom, Luxembourg, and Japan) and 2002-2009 for Slovenia. Data for all banks are included for all countries except Greece, Hungary, Portugal, United Kingdom and Turkey. For Greece Hungary, Portugal and Turkey, data for all commercial banks are available. For United Kingdom, only data for Large Commercial banks are available. All data were extracted from OECD Database except GPD growth which is retrieved from IMF (International Monetary Fund) Database and non-performing loans to gross loans from World Bank Database.

As is known, OECD is dominated by advanced countries. There are 26 advanced countries, 22 of which are European, and 5 emerging countries in our dataset.[1]

[1] The classification of advanced and emerging countries is done according to the IMF World Economic Outlook 2011.

I also form sub-groups in order to analyze the effects of determinants on the bank profitability in banks with different sizes and different country groups. To identify if there are any size effects in bank profitability, I examine the determinants of the bank profitability of the large banks in OECD. Also, I examine the results for only European banking sector. Finally, to see if the level of development makes any difference in bank profitability determinants, I make two separate analyses including advanced and emerging countries.

The database consists of the information from all institutions that deal with ordinary banking business. However, due to both availability of the data and structural and regulatory characteristics of the national banking systems, accounting rules and practices, and reporting methods, institutional coverage of the banks is not same in each country. Large commercial banks in the data set include the financial statements of four or five largest institutions in the country (OECD, 2011). Commercial banks are defined in the literature as the institutions which buy and sell loans. They are also called deposit banks. In general terms, commercial banks are financial institutions which use the short term deposits in short term loans. Even though it is difficult to definitely classify a bank as "commercial", one essential feature of a commercial bank is; the purpose of it must be to provide profits to its shareholders (Özaydın, 1998). Large banks in the dataset are selected according to their relative asset size.

The list of countries and details related to the time span and kinds of banks used in this study are shown in Table 4-1.

Table 4-1: List of Countries

	Name of Countries	Years	Kind of Banks Employed in the Analysis
1.	Austria	2000-2008	All Banks
2.	Belgium	2000-2009	All Banks
3.	Canada	2000-2009	All Banks
4.	Chile	2000-2009	All Banks
5.	Czech Republic	2000-2009	All Banks
6.	Denmark	2000-2009	All Banks
7.	Finland	2000-2009	All Banks
8.	France	2000-2009	All Banks
9.	Estonia	2000-2009	All Banks
10.	Germany	2000-2009	All Banks
11.	Greece	2000-2009	Commercial Banks
12.	Hungary	2000-2008	Commercial Banks
13.	Ireland	2000-2009	All Banks
14.	Italy	2000-2009	All Banks
15.	Israel	2000-2009	All Banks
16.	Japan	2000-2008	All Banks
17.	Korea	2000-2009	All Banks
18.	Luxembourg	2000-2008	All Banks
19.	Mexico	2000-2009	All Banks
20.	Netherlands	2000-2009	All Banks
21.	Norway	2000-2009	All Banks
22.	Poland	2000-2009	All Banks

Table 4-1 (continued)

23.	Portugal	2000-2008	Commercial Banks
24.	Slovak Republic	2000-2009	All Banks
25.	Slovenia	2002-2009	All Banks
26.	Spain	2000-2009	All Banks
27.	Sweden	2000-2009	All Banks
28.	Switzerland	2000-2009	All Banks
29.	Turkey	2000-2009	Commercial Banks
30.	United Kingdom	2000-2008	Large Commercial Banks
31.	United States	2000-2009	All Banks

4.2. Methodology

A panel data analysis is used for this study in order to identify the individual country effects of bank specific, industry specific and macroeconomic factors on bank profitability. Panel data analysis is superior to pure cross-section and time series methods in many ways. According to Baltagi (2001) panel data analysis have some advantages like controlling for individual heterogeneity. Secondly; it gives more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency. Also panel data are better able to study the dynamics of adjustment that cross section analyses hide.

There are unobservable or ignored effects which are still affecting the dependent variable. In order to observe these affects, two models under two different assumptions are formed which are; fixed effects and random effects models. An important decision before choosing the method to apply is whether the sample is random. A random sample means that it fluctuates over units in some population; and the unit that is observed is randomly picked. When a statistical model is modeled as random, it means the observer wants to draw conclusions about the population

from which the observed units were drawn, rather than about these particular units themselves (Snijders, 2005).

In this case, since I am interested in the sample (OECD Countries), which is intentionally selected rather than random, a fixed effects model would be appropriate, still, the Hausman test is carried out to check whether random effects estimation could be almost as good. Under the null hypothesis, both models are consistent and efficient and under the alternative, fixed effects model should be preferred.

Redundant fixed effect test is also carried out to see the significance of the individual country effects. "The cross section fixed effects are redundant under the null hypothesis, i.e, they are all equal to each other. The test involves two tests that evaluate the significance of the cross section effects using sums of square (F test) and the likelihood function (Chi-square test)" (Sousa-Brown, 2008 p.87). When the null hypothesis is not rejected, there is no unobserved heterogeneity, and the model reduces to the pooled regression model. It means all countries are sufficiently homogeneous and no panel models needed. If test results are significant and individual country effects are present, panel data analysis can be confidently applied.

CHAPTER 5

EMPIRICAL RESULTS

In this section, the results of the fixed effects panel data analysis will be presented to analyze the bank-specific, industry-specific and macroeconomic determinants of bank profitability in OECD countries. The regression analysis is carried out with the help of Eviews based on panel data over 31 countries' aggregate banking sector data over the years 2000-2009.

The model has been estimated according to the fixed effects specification and results are given in the table 5-1. The bank-specific, industry-specific and macroeconomic factors explain 72 percent variation in profitability of OECD banks. F statistic which indicates overall significance of model is 22.18143 and p value of the test statistics is zero up to four digits which implies overall significance of the variables.

As explained in the previous section, Hausman test is employed to decide whether the fixed effects or random effects should be preferred. The null hypothesis is, the random effects are uncorrelated with the explanatory variables. Chi-square is equal to 65.236264 and the p- value of the test over cross section random effects model is 0.000 so, the null hypothesis is rejected with 99 percent confidence level. Since the assumption of no covariance between country effects and independent variables is invalid, fixed effects model is preferred to the random effects model.

Redundant fixed effect test is also carried out to see the significance of the fixed effects. The cross section fixed effects are redundant under the null hypothesis. Chi-square and F-statistic values (167.892650 and 6.583065) and their p-values respectively (0.0000 and 0.0000) strongly reject the null hypothesis and indicate that fixed effects are statistically significant. Thus, I accept that country effects are statistically significant. Otherwise, of all countries would have been sufficiently

homogeneous and no panel models would be needed. In this case, panel data analysis is confidently continued.

The results indicate that all explanatory variables are significant in determining the profitability of banks. All variables are significant at 1% level except TAGDP, which is significant at 10% level.

According to the estimation results, capitalization (CRTA) positively and significantly affects bank profitability. This finding is also in conformity with previous studies regarding the effect of capitalization on bank profitability (Athanasoglou et al., 2006; Berger, 1995; Bourke,1988; Davydenko, 2011; Dietrich and Wanzenried, 2011; Flamini et al., 2009; Goddard et al. 2004b; Holden and El-Bannany, 2006; Ivey et al., 2005; Kosmidou et al., 2005; Kosmidou, 2008; Kunt and Huizinga, 1998; Molyneux and Thornton,1992; Naceur, 2003; Naceur and Goaied, 2001; Naceur and Omran, 2008; Pasiouras and Kosmidou, 2007; Ramlall, 2009; Staikouras and Wood, 2003; Sufian and Habibullah, 2009; Vong and Chan, 2009). This result can be because of the lower funding costs of well-capitalized banks due to their lower possibility of bankruptcy. Also the reason of the positive effect can stem from riskier and more profitable investments they can make, since their better capital structure works as a safety net. Finally, lower moral hazard agency costs of well-capitalized banks can be another reason of the higher profitability.

Table 5-1: Regression Results

	Cross Section Fixed Effects	Cross Section Random Effects
	ROA	ROA
C	-0.007564*	-0.007696***
CDTA	0.025016***	0.016251***
CRTA	0.140654***	0.161141***
NIITA	0.693356***	0.604314***
OETA	-0.570517***	-0.483895***
NPL	-0.000599***	-0.000431***
TAGDP	-0.000674*	-0.000104***
GDPGRW	0.009635***	0.013749***
R-squared	0.764369	0.626698
Adjusted R-squared	0.729909	0.617465
Durbin-Watson stat	1.242588	0.872139
F-statistic	22.18143***	67.87137***
Redundant fixed effect test results: Cross section F	6.583065***	
Redundant fixed effect test results: Cross section Chi- square	167.892650***	
Hausman test: Cross-section random Chi-square		65.236264***
Number of observations	291	291

Note: Values in parentheses are t-statistics. ***, **, and * indicates significance at 1%, 5% and 10% levels.

Another important determinant of bank profitability, non-interest income (NIITA) also has significant and positive effect. The argument in the literature provides conflicting predictions on the relationship between non-interest income and bank profitability, so these results are expected to be informative on this regard. The empirical results are in line with previous findings of Busch and Kick (2009), Gambacorta and Marques-Ibanez (2011) and Sufian and Habibullah (2003). The reason of this positive relationship could be due to the diversification benefits provided by non-interest income or, non-interest income being an additional source of income for banks.

Loan portfolio quality measured by non-performing loans to total assets (NPL) is found as a significant determinant of bank profitability of OECD countries. The negative coefficient of the variable is in conformity with expectations. The findings indicate that, unpaid loans and increased cost of funding cause a decrease in bank profits. This result also supports the previous findings (Athanasoglou et al., 2006; Bernstein, 1996; Davydenko, 2011; Hamadi and Awdeh 2012; Ivet et al., 2005; Kosmidou, 2008; Naceur, 2003; Ramlall, 2009; Vong and Chan, 2009; Wu et al., 2003).

Operating expenses to total assets, (OETA) is another important determinant of bank profitability which has a significant negative effect on bank profits. The negative sign of the coefficient is in conformity with the literature as well as the expectations of this study (Athanasoglou et. al., 2006; Bourke, 1988; Davydenko, 2011; Dietrich and Wanzenried, 2011; Guru et al., 2002; Kosmidou, 2008; Kosmidou et al., 2005; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2003; Sufian and Habibullah, 2009). This result indicates that, higher operating expenses indicates inefficiency of cost management, and has a negative effect on bank profits.

According to the empirical analysis, deposits to total assets ratio (CDTA) also significantly and positively affects bank profitability. This result is in line with the expectations and supports the findings of previous studies (Allen and Rai, 1996; Davydenko, 2011; Holden and El-Bannany, 2006; Naceur and Goaied, 2001). The results indicate that, as deposits increase, bank managers are able to use the additional funds in profitable projects and increase the profitability.

The industry-specific determinant, ratio of bank assets to GDP, (TAGDP) is found to have significant negative effect on bank profits. This result is consistent with the expectations and supports the results of past research (Kosmidou, 2008; Kunt and Huizinga, 1998; Pasiouras and Kosmidou, 2007). The findings show that; as the level of development in the banking sector increases, this creates a more competitive environment for the banks, and profit margins decrease.

The growth in real GPD, GDPGRW, which used to control for macroeconomic effects also strongly and positively affects bank profits. The findings are in line with the literature and the expectations (Beckmann, 2007; Davydenko, 2011; Flamini, et al., 2009; Goddard et al., 2004a; Ivet et. al. 2005; Kosmidou, 2008; Kosmidou et al., 2005; Pasiouras and Kosmidou, 2007; Sufian and Habibullah, 2009). Thus, I can conclude that economic growth increases credit quality and decreases loan defaults which in turn provide banks with higher levels of profits.

5.1 Additional Analyses

As a further research, 4 additional analyses are employed. First, the bank-specific, industry specific and macroeconomic determinants of large bank's profitability is analyzed using the data consisting of 12 countries' banking sector that are available. Second, another analysis is applied only to 22 European countries. A third analysis is

done by only including 27 advanced countries and lastly, the same analysis is employed for only 5 emerging countries.[2]

5.1.1 Large Commercial Banks

In order to see if bank profitability determinants have a different effect on large bank's profitability, the same model is applied to large commercial banks of 12 countries. The data of large commercial banks is available for Belgium, Chile, Germany, Greece, Korea, Mexico, Netherlands, Slovak Republic, Sweden,, Turkey, United Kingdom and United States. The only difference from the first model is, instead of non-performing loans over total gross loans (NPL), provisions on loans to total loans ratio (POLTL) is used as a measure of credit portfolio quality since NPL data is not available only for large banks.

Table 5-2 presents the estimation results. All determinants have same effects with the main model except the amount of deposits (CDTA), operating expenses (OETA) and banking sector development (TAGDP). Customer deposits do not have a significant effect on large bank's profitability.

The same method with the first model is followed. First, Hausman test is carried out to decide whether fixed or random effects to use. Chi-square is equal to 38.042526 and the p- value of the test over cross section random effects model is 0.000 so, the null hypothesis is rejected with 99 percent confidence level. Thus, fixed effects model is preferred.

Redundant fixed effect test is also carried out to check the significance of the country fixed effects. Chi- square and F-statistic values of the test results (50.645636 and 4.849870) and their p-values respectively (0.0000 and 0.0000) indicate that fixed

[2] The classification of advanced and emerging countries is done according to the IMF World Economic Outlook 2011.

effects are statistically significant. Redundant fixed effects test results are given in Table 5-2.

The model explains 84 percent variation in profitability of large banks. F statistic which indicates overall significance of model is 32.34043 and p value of the test statistics is zero up to six digits which implies overall significance of the model.

Operating expenses have a positive effect unlike the first model, which may indicate that larger banks are more capable of passing costs to customers (Naceur; 2003; Vong and Chan, 2009). This may have several reasons. First, larger banks have a wider network of branches and ATMs, and more favorable offers, which empowers them to charge higher rates to their customers. Second, this may be due to the fact that larger banks are better managed since they can hire more qualified and trained managers. Lastly, larger banks are usually long and well established institutions which mean that they covered start-up expenses long time ago. Their operating expenses mainly are due to activities that will yield profits. Meaning that large banks will hire new staff, open new branches and establish ATMs when they decide that there is high demand for their services, so it will be easier for them to cover their expenses and have profits.

The banking sector development (TAGDP) has a positive effect on large bank profitability as well. The reason may be because, large banks dominate the banking sector within a country, and they are the ones who can take advantage of the well-developed banking industry. Also, they are not as severely affected from the competition as smaller banks, since they have more market power. As competition escalates, the margins of smaller banks will fall much more than larger banks', since they do not have much to offer. As banking sector improves within a country, all financing activities are designed accordingly, using banks as intermediaries. Not surprisingly, larger banks get the largest part from these activities.

Table 5-2: Estimation Results for Large Banks

	Cross Section Fixed Effects	Cross Section Random Effects
	ROA	ROA
C	0.002197*** (-2.999378)	-0.012358*** (-5.445277)
CDTA	0.002197 (0.231489)	0.005091 (1.215477)
CRTA	0.230024*** (8.091442)	0.246800*** (14.34808)
NIITA	0.533764*** (9.117221)	0.351010*** (10.05651)
OETA	0.336050** (2.515877)	-0.027120 (-0.437595)
POLTL	-0.129431*** (-3.300068)	-0.150844*** (-4.807156)
TAGDP	0.001176* (1.732051)	0.000742** (2.252286)
GDPGRW	0.009839** (2.318464)	0.009492** (2.508246)
R-squared	0.873898	0.771189
Adjusted R-squared	0.846876	0.754329
Durbin-Watson stat	1.248450	0.910671
F-statistic	32.34043***	45.74146***
Redundant fixed effect test results: Cross section F	4.849870***	
Redundant fixed effect test results: Cross section Chi- square	50.645636***	
Hausman test: Cross-section random Chi-square		38.042526***
Number of observations	103	103

Note: Values in parentheses are t-statistics. ***, **, and * indicates significance at 1%, 5% and 10% levels

5.1.2 European Countries

Second analysis is employed for 22 European countries; Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

The results are same for all determinants except capitalization (CRTA) which is insignificant in determining the profitability of European banks.

The chi – square and p- value of the Hausman test over cross section random effects model are 35.125349 and 0.000 respectively so, fixed effects model is preferred here as well. Chi- square and F-statistic values for redundant fixed effect test are (111.616273 and 6.077148) and their p-values respectively (0.0000 and 0.0000) strongly reject the null hypothesis and indicate that country effects are statistically significant.

The variation in profitability of European banks can be explained up to 61% by the model. Overall significance of the variables is ensured by the F statistic of 12.32269 and p value of the test statistics which is zero up to six digits.

Table 5-3: Estimation Results for European Countries

	Cross Section Fixed Effects	Cross Section Random Effects
	ROA	ROA
C	0.001876 (0.344679)	-0.006126** (-2.581999)
CDTA	0.028009*** (2.987777)	0.027445*** (5.506433)
CRTA	0.036753 (1.139753)	0.068001*** (3.104818)
NIITA	0.770749*** (7.941198)	0.642705*** (7.422306)
OETA	-0.621656*** (-6.923877)	-0.506239*** (-6.178136)
NPL	-0.000666*** (-4.044729)	-0.000502*** (-3.578659)
TAGDP	-0.001654*** (-3.457455)	-0.000262** (-2.226141)
GDPGRW	0.009097*** (3.021046)	0.012691*** (4.404656)
R-squared	0.666046	0.422665
Adjusted R-squared	0.611996	0.401833
Durbin-Watson stat	1.155108	0.949169
F-statistic	12.32269***	20.28952***
Redundant fixed effect test results: Cross section F	6.077148***	
Redundant fixed effect test results: Cross section Chi- square	111.616273***	
Hausman test: Cross-section random Chi-square		35.125349***
Number of observations	202	202

Note: Values in parentheses are t-statistics. ***, **, and * indicates significance at 1%, 5% and 10% levels

5.1.3 Advanced Countries

26 advanced countries; Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, Norway, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom and United States are employed in the third analysis and the results are presented in table 5-4. All determinants have the same effect as in the first model which is not surprising since OECD is dominated by advanced countries. 31 countries are included in the actual analysis, 26 of that are advanced economies.

Hausman test results indicate that fixed effects model is favorable here as well. The Chi-square is 61.799752 and the p- value of the test over cross section random effects model is 0.000. Chi- square and F-statistic values of the redundant fixed effect test (132.666237 and 6.100502) and their p-values respectively (0.0000 and 0.0000) indicate that country fixed effects are statistically significant. Redundant fixed effects test results are given in Table 5-3.

62 percent variation in profitability of banks can be explained by the dependent variables as implied by the adjusted R^2. F statistics of the model is 13.60426 and p value of the test statistics is zero up to six digits so, I can say that all the independent variables in the model are not insignificant simultaneously.

Table 5-4: Estimation Results for Advanced Countries

	Cross Section Fixed Effects	Cross Section Random Effects
	ROA	ROA
C	0.002840 (0.559046)	-0.002194 (-1.185721)
CDTA	0.021725** (2.583466)	0.014733*** (4.920538)
CRTA	0.052459* (1.838782)	0.082852*** (4.948222)
NIITA	0.834601*** (9.928969)	0.658611*** (8.675369)
OETA	-0.645854*** (-8.069600)	-0.487579*** (-6.569752)
NPL	-0.000963*** (-5.793616)	-0.000688*** (-4.969167)
TAGDP	-0.001730*** (-3.951599)	-0.000253*** (-2.752071)
GDPGRW	0.007274*** (2.677195)	0.012464*** (4.902952)
R-squared	0.674588	0.448799
Adjusted R-squared	0.625002	0.432381
Durbin-Watson stat	1.087189	0.879551
F-statistic	13.60426***	27.33458***
Redundant fixed effect test results: Cross section F	6.100502***	
Redundant fixed effect test results: Cross section Chi- square	132.666237***	
Hausman test: Cross-section random Chi-square		61.799752***
Number of observations	243	243

Note: Values in parentheses are t-statistics. ***, **, and * indicates significance at 1%, 5% and 10% levels

5.1.4 Emerging countries

Last analysis is done including 5 emerging countries in the data set which are Chile, Hungary, Mexico, Poland and Turkey.

The cross section random effects cannot be employed for this dataset because the number of cross sections is not sufficient. In order to check the significance of the fixed effects, redundant fixed effect test is carried out. Chi- square and F-statistic values (12.656352 and 2.715334) and their p-values respectively (0.0131 and 0.0449) indicate that country effects are statistically significant at 95 percent confidence level. Redundant fixed effects test results are given in Table 5-5.

The 89 percent of variation in profitability of emerging countries' banks is explained by the model. .As a whole, the variables are significant as shown by the F statistic (38.38496) and p value of the test statistics (zero up to six digits).

Except for banking sector development (TAGDP) which is insignificant, all other variables have the same significance level and the signs with the first model estimated. This result supports the previous finding of Naceur (2003) and indicated that banking sector development is insignificant in determining bank profitability in emerging countries.

As a result, we can conclude that the model we have estimated is robust to the changes in the dataset. The model controls for the differences in the countries.

Table 5-5: Estimation Results for the Emerging Countries

	Cross Section Fixed Effects
	ROA
C	-0.025072** (-2.128631)
CDTA	0.028932** (2.049454)
CRTA	0.331392*** (5.328960)
NIITA	0.443442*** (5.393511)
OETA	-0.562558*** (-3.171894)
NPL	-0.000391* (-1.760218)
TAGDP	0.001653 (1.650217)
GDPGRW	0.016403*** (2.824359)
R-squared	0.921438
Adjusted R-squared	0.897432
Durbin-Watson stat	1.228832
F-statistic	38.38496***
Redundant fixed effect test results: Cross section F	2.715334***
Redundant fixed effect test results: Cross section Chi- square	12.656352***
Hausman test: Cross-section random Chi-square	
Number of observations	48

Note: Values in parentheses are t-statistics. ***, **, and * indicates significance at 1%, 5% and 10% levels

CHAPTER 6

CONCLUSION

The purpose of this thesis is to explore the effect of bank-specific, industry specific and macroeconomic determinants of bank profitability in OECD countries from 2000 to 2009. A panel data analysis is employed in order to capture the relationship between bank profitability and the amount of deposits, capitalization, non-interest income, and non-performing loans, operating expenses, financial sector development and GDP Growth. A fixed effects model is applied in order to identify country-specific effects.

The findings of this study reflect that; deposits to total assets (CDTA), capital and reserves to total assets (CRTA), non-interest income to total assets (NIITA), non-performing loans to total gross loans (NPL), operating expenses to total assets (OETA), total bank assets to GDP (TAGDP) and GDP Growth (GDPGRW) all significantly affect the profitability of banks in OECD Countries. While CDTA, CRTA, NIITA and GDPGRW have positive effects on bank profitability, NPL, OETA and TAGDP have negative impact. The findings are mostly in conformity with the expectations which depend on the findings of the prior research.

One important contribution of this thesis is; some of its findings are explanatory for the existing literature which has conflicting arguments. For instance there are opposite findings on the effect of non-interest income on bank profits. These different results may be due to different country groups or different time spans employed in these studies. According to the results of this thesis that covers a broad set of countries and a recent dataset, non-interest bearing activities affect bank profits positively supporting Busch and Kick, (2009) and Sufian and Habibullah (2003). This may be due to diversification benefits brought by non-traditional activities or may be because they are additional sources of income for banks. All in all, they are still a profit generating source for banks. For deposits, unlike Kunt and Huizinga

(1998), a positive relationship is identified supporting the findings of Allen and Rai, (1996), Davydenko, (2011), Holden and El-Bannany, (2006) and Naceur and Goaied, (2001) and this can be attributed to changing conditions in the banking system. Kunt and Huizinga (1998), found a negative impact of deposits on bank profitability. According to their study, deposits require high branching which increases operating expenses and lowers profits. The opposite result of this thesis may be due to improved information and communication technologies like online banking and ATMs. By using these instruments, banks make deposits more profitable without incurring high staff and branching expenses. By employing a more recent dataset, this thesis identified the altered conditions in the industry.

Also, to my knowledge; it is the most recent study that covers all OECD counties and focuses on profitability. It is very important to update our knowledge on the financial sector's trends since it is continuously changing and this study fills the gap at this point, with using a very recent data which shows the situation in the banking sector of the 31 important countries in the world.

In the literature, there are a few studies that employ a country level data which helps to emphasize cross-border differences in banking sectors of different countries. The current research helps to determine whether there is country effect in bank profitability determinants and by employing a fixed effects model and Hausman test, I find evidence of country specific effect on bank performance. Hence, bank managers and policymakers should take into account that country specific effects while making decisions. Bank managers should examine the countries' state before determining the strategies of the bank. They must be aware of that; they should develop special policies which fit to their own system's needs. Emerging county's policymakers and regulators usually take advanced economies' systems and policies because they think that the ways that led them to success will also be useful for their countries. However, as shown in the thesis, bank profitability and its determinants are affected from the country specific factors to a great extent. In addition, the findings indicate that the effects of industry specific variables are insignificant in

emerging economies. Thus, they should customize the systems and policies in accordance with their own countries' needs and characteristics.

One of the most interesting findings of the thesis is the results of the analysis of emerging countries. As mentioned, financial sector development is insignificant in determining bank profitability in emerging economies. This result also supports the findings of previous researchers like Naceur (2003) who also identified an insignificant relationship between banking sector development and profitability, but do no put emphasis on. This finding opens a new subject up for discussion. If banking sector development is not a significant determinant of bank profitability in emerging countries, there is a high possibility of the existence of another factor. This result requires further investigation.

Another important point of this thesis is the result of the empirical analysis in which, data of large banks is employed. The results are same to a great extent, but there are two important differences. First of all, operating expenses have a positive effect on profitability of large banks, which indicates that large banks are more successful at passing costs to customers and turning them into profits. Also, managers of larger banks may be more qualified and capable of better expense management. Moreover, large banks are usually long and well established institutions which mean that they already covered start-up expenses and their operating expenses mainly come from activities that they are sure will yield profit. Secondly, financial sector development (TAGDP) has a positive impact on large bank's profitability. This may be because, large banks who have a better capacity to compete with smaller banks dominate the banking sector within a country, and they are the ones who can take advantage of the well-developed banking industry.

The main limitation of the study is data availability. The data are available until 2009 and no new data is announced by OECD yet. Therefore the available data for 2000-2009 is used in the analysis. If the data until 2012 were available, the effects of the

financial crisis could have been analyzed. Further research is necessary to explore whether there's any difference between the crisis and non-crisis periods.

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APPENDICES

APPENDIX A

DESCRIPTIVE INFORMATION ON THE VARIABLES

Table A. 1 Summary Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	0.008691	0.008362	0.030852	-0.047500	0.008042
CDTA	0.500321	0.473357	0.856510	0.210393	0.144644
CRTA	0.067661	0.061676	0.138204	0.026684	0.024330
NPL	3.218213	2.200000	29.30000	0.100000	3.800360
NIITA	0.011759	0.010796	0.178952	-0.055411	0.012216
TAGDP	2.902302	1.709230	27.70200	0.336631	4.287548
GDPGRW	0.080995	0.089046	0.358790	-0,26608	0.109668

Table A.2 Correlation Matrix (For all banks in 31 OECD Countries)

	CDTA	CRTA	NIITA	NPL	TAGDP	GDPGRW
CDTA	1.000000					
CRTA	0.238489	1.000000				
NIITA	0.056125	0.228123	1.000000			
NPL	0.250613	0.189512	0.274745	1.000000		
TAGDP	-0.333215	-0.301283	-0.154804	-0.169357	1.000000	
GDPGRW	0.029242	0.086554	0.011569	-0.180221	0.033181	1.000000

APPENDIX B

TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü [ ]

Sosyal Bilimler Enstitüsü [x]

Uygulamalı Matematik Enstitüsü [ ]

Enformatik Enstitüsü [ ]

Deniz Bilimleri Enstitüsü [ ]

YAZARIN

Soyadı: MALTAŞ
Adı: Zeynep
Bölümü: İşletme

TEZİN ADI: (İngilizce): The Effects of Bank Specific, Industry Specific and Macroeconomic Factors on Bank Profitability in OECD Countrıes between 2000 -2009.

TEZİN TÜRÜ: Yüksek Lisans [x] Doktora [ ]

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın. [x]
2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullanıcılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) [ ]
3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) [ ]

Yazarın imzası ..... Tarih .....