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DISSERTATION

Determinants of Banks' Profitability in Greece and Balkans before and during Financial Crisis

MSc in Banking and Finance

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Abstract

This dissertation thesis examines the profitability determinants of commercial banks in Greece and Balkans, by creating an unbalanced panel dataset of 115 commercial banks over a period of six years (2005-2010). The latter is separated into two sub-periods; the pre-crisis period (2005 – 2007) and the crisis and post-crisis period (2008 – 2010). The core aim of this study is to analyze the effects of the world financial crisis on banks' profitability determinants. We employ in our analysis bank-specific variables, such as growth of gross loans, and macroeconomic determinants, like the gross national savings that both have not been examined by previous studies. Our results indicate that the impact of the examined variables on banks' profitability is not always the expected one and differentiate between the two periods because of the changing financial conditions. We find a positive relationship between the determinants of bank-size and the equity over total assets ratio with banks' profitability. Yet, the variable of bank-size is statistically significant only for the crisis period, while the equity to total assets is significant in both periods. Regarding the macroeconomic variables, only this of gross national savings is significant during financial crisis. However, it appears to have a positive relationship with ROAA, for the pre-crisis period, while it has a negative one for the crisis/post-crisis period.

Keywords: Financial Crisis, Greece, Balkans, Banking Profitability

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1 Introduction

The banking sector is of main importance for the whole economy. Thus financial institutions must be profitable in order to ensure the stability of the financial system during economic crisis like the one that started at the end of 2007 and was deteriorated after the collapse of Lehman Brothers in USA. Many studies have attempted to identify the factors affecting banks' profitability, since their knowledge is considered very significant for different groups of people such as the managers, the investors or even the governments. Banks' management is interested in knowing the determinants that designate their performance, in order to adjust their policy over them and increase their prosperity. On the other hand, investors by knowing such kind of information are able to control, if the financial institutions operate by taking into consideration these factors and invest to them.

Few of the researches trying to find out those internal and external factors, are that of Short (1979) and Bourke (1989). Over the last decades, more and more studies expand their investigation in new countries and regions including in their analysis different bank-specific, industry-specific (e.g concentration, size, ownership) and macroeconomic variables (e.g inflation, interest rates, cyclical output) that may be related with banks' performance. However, there is little literature examining the impact that has the recent financial recession on the determinants of bank's performance. Dietrich and Wanzenried (2010) were among the first to analyze this impact for Switzerland's banks.

The purpose of this dissertation thesis is to offer more evidence on the effects of the financial crisis to the determinants of banks' profitability and contribute to the limited literature. We examine the banking markets of Greece and Balkan countries (namely Albania, Bulgaria, Romania, Serbia and FYROM) because they are connected by the presence of Greek financial institutions (namely National Bank of Greece S.A, E.F.G Eurobank-Ergasias S.A, Emporiki Bank S.A, Piraeus Bank S.A, Alpha Bank S.A, Agricultural Bank of Greece S.A and Marfin Egnatia Bank S.A) in Balkans. Kosmidou (2008) examined the determinants of Greek banks' profitability during the period of EU financial integration (1990-2002), using an unbalanced panel data of 23 commercial banks, whereas Athanasoglou et

al. (2008) examined a larger period between 1985 and 2001.Regarding the Balkan market, Athanasoglou et al. (2006) using an unbalanced panel dataset of South Eastern European (SEE) credit institutions, examined the internal and external indicators that have an impact on banks' performance, over the period 1998-2002.

What is more, this research intends to find out the impact of bank-specific and macroeconomic variables on banks' profits of the aforementioned markets, concerning the period before and during the current financial crisis. The interval 2005-2007 is the pre-crisis period and 2008-2010 is the crisis and post-crisis period. In order to achieve the above purpose, we apply a panel data regression analysis by including as internal factors the total bank's assets (logarithm), cost to income ratio, equity to total assets, loan loss provisions to net interest reserves, loans to total assets and the yearly growth of gross loans. At a second step, we include macroeconomic variables (namely GDP growth, GDP per capita, inflation and the gross national savings) to examine their impact on bank's profitability. To our knowledge, there is no previous study examining the factor of gross national savings.

The rest of this paper has the following structure. Section 2 refers to the presence of Greek financial institutions in Balkans. Section 3 includes the literature about the determinants that affect banks' profitability. Section 4 refers to the determinants of banks' performance used in our analysis. Section 5 presents the data and methodology Section 6 the empirical results of our analysis and finally, Section 7 the conclusions and further research.

2 The presence of Greek banks in Balkan region

The liberalization of the Greek banking system started at the late 80's and was followed by a number of extra procedures like the deregulation of national market, the internationalization of competition and the entry of Greece into the Euro zone. New institutions and tools were adopted by Greek banks with the deregulation of national market. The internationalization of competition increased

the competition among the Greek banks, because more and more foreign banks operate in Greek banking market. Consequently, Greek banks confront this new situation of the intense competition either through mergers and acquisitions to strengthen their position in the domestic market or they establish new branches in Balkans and countries of South-eastern Europe.

The Greek banking system entered into a new era of stability and development after the adoption of Euro by Greece on January 2001.That was until the beginning of the financial crisis at the end of 2007. The Greek economy, after the outbreak of the recession, was gradually downgraded because of its bad fiscal condition[1]. Consequently these downgrades of Greece lead to the downgrading of the credibility of Greek banks, the disqualification of borrowing from the international fund markets and the outflow of deposits. However, despite the difficult financial situation that Greek banks have fallen, they are able to confront all these difficulties due to their high capital adequacy, adequate liquidity and qualitative assets.

The Greek banks have a very strong presence in Balkans, since seven banks (namely National Bank of Greece S.A, E.F.G Eurobank-Ergasias S.A, Emporiki Bank S.A, Piraeus Bank S.A, Alpha Bank S.A, Agricultural Bank of Greece S.A and Marfin Egnatia Bank S.A) have found branches in the five countries of the South-Eastern Europe (Albania, Bulgaria, Romania, Serbia and FYROM) after the fall of communist regimes in 1989. The reasons for Greek banks to establish in this area were the decision of the governments of Balkan countries to restructure their banking system and privatize their banks. What is more, according to a study of Emporiki Bank[2] conducted in 2007, these countries offer a very favourable business environment, an increasing macroeconomic activity and also in the near future they will become members of European Union that gives them the chance to improve their profitability.

[1] The Greek banking System in 2010 (Greek Banks Association).
[2] http://www.tovima.gr/finance/article/?aid=181167

For the period 2002-2008 the Greek banks which were operating in the region of Balkans, present very high ROA. The reasons of their high profitability were the increasing credit; especially towards households and the low levels of non profiting loans. However, the bankruptcy of Lehman Brothers changed the macroeconomic conditions in these countries. The latter led to the increase of default loans as banks could not cover them, since they anticipated lower loan loss provisions. For the safety of the parent banks, Greek banks stopped the liquidity from the parent banks in Greece to their subsidiaries[3]. Despite the difficult situation, Greek banks continue their operations in Balkans and try to be competitive and get greater market share in order to strengthen their position and profitability after the end of financial crisis. Finally, according to the 2010 annual report of Greek Banks Association, Greek banks increased their presence at the area of South-Eastern Europe during the last three years. The latter happens because many of these countries are going to be soon, members of the European Union.

3 Literature Review

Lots of studies have attempted to identify the major determinants of banks' profitability, which is affected by internal and external determinants. The measures that are used usually, in the literature, for bank profitability are the return on assets (ROA) and/or the return on equity (ROE) and especially the average value of them. With the term internal determinants we define bank-specific determinants of profitability, such as capital adequacy, liquidity, operational efficiency (expenses management), bank size and other. The external determinants are industry-specific and macroeconomic variables affecting financial institutions' profitability. Such external influences include GDP growth, interest rates, inflation, ownership and other.

[3] http://www.bankersreview.gr/default.asp?pid=9&la=1&arId=570&pg=2&ss=

Short (1979) and Bourke (1989) were the first to try to identify the major determinants of bank profitability. There are two categories of empirical studies. On the one hand, there are those which focus their analysis on cross-country banking systems like studies of Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1998), Abreu and Mendes (2001), Staikouras and Wood (2004), Goddard et al. (2004), Athanasoglou et al. (2006) and Pasiouras and Kosmidou (2007) and investigate a panel data set. On the other hand, there are those studies that analyze individual banking systems of single countries such as, Kosmidou (2008), Naceur and Goaied (2008), Athanasoglou et al. (2008), García-Herrero et al. (2009) and Dietrich and Wanzenried (2010). Because of the fact of differences in examined countries, datasets and time periods, the empirical results vary significantly.

The studies of Bourke (1989) and Molyneux and Thornton (1992) were the first attempts to examine bank profitability in several countries or territories. Bourke (1989) creates a panel-data of banks from twelve countries and territories around the world, whereas Molyneux and Thorton (1992) examine a sample of European banks across eighteen countries. Both studies find similar results for the relationship between examined determinants and bank profitability, apart from the determinant of government ownership and liquidity risk. More specifically from the external determinants, the bank concentration ratio presents a positive and statistically significant relationship with banks' profitability, which is consistent with the traditional structure–conduct–performance paradigm. The results for the factor of ownership are controversial. Bourke (1989) finds statistically significant but negative relationship between government ownership and return on assets, whereas, Molyneux and Thornton (1992) find opposite results. The explanation which is given by Molyneux and Thornton is that their sample consists of larger proportion of state-owned banks and thus it generates higher return on capital than private banks. Considering the internal determinants, both studies indicate a positive and statistically significant relation between bank expenses and profitability, indication of better quality management. Finally Molyneux and Thornton (1992) find a negative and significant relationship between liquidity risk and profitability which is expected since the bank reserves money and this is a cost, while Bourke (1989) reports an opposite result.

Demirguc and Huizinga (1998) analyze the determinants of bank interest margin and profitability over the period 1988-1995. They differentiate their study by using cross-country data for 80 countries set with bank-level data and also by including determinants, such as the ownership variable, taxation, some of the financial structure variables that had not been used in previous studies. They find a positive relationship between capitalization and profitability. This is sensible according to authors, since well-capitalized banks have greater amounts of equity and thus, they have lower needs of external funding and so they face lower possibilities of going bankrupt. The higher the equity capital of a bank, the less need to borrow to support its assets. Furthermore their findings indicate a significant relationship between the factor of international ownership and banks' profitability. Especially foreign banks tend to be more profitable than domestic in developing countries and the reverse happens in developed countries. The results suggest that bank concentration ratio has a significant and positive impact on bank profits. Finally we should mention that the effect of corporate income tax on banks' profitability was examined for the first time by Demirguc-Kunt and Huizinga (1998) and was found positively related with interest margins and profitability.

The impact of financial development and financial structure on bank performance is examined by Demirguc and Huizinga (2000), something new for the existing literature. The results of their study indicate that banks' profits and margins in developed financial systems are almost the same for both bank-based systems and market-based systems. On the other hand, banks in underdeveloped financial systems present higher profits and margins. The aforementioned advantage of the banks that operate in underdeveloped financial systems, against banks in developed financial systems disappears when they move towards a more developed financial system. This happens because bank development causes tougher competition, higher efficiency and lower profits.

Claessens's et al. (2001) purpose of their study is to find out how foreign entry affects domestic banking markets. The results of their study suggest that foreign banks are more profitable than domestic banks in developing countries and the

opposite holds for developed countries. Additionally there is empirical evidence that the entrance of foreign banks causes the reduction in profitability and margins for domestic banks, and more specifically the number of entrants and not their market share is responsible for this situation.

The last decade more and more studies try to look into the determinants of banks' profits in several countries. Abreu and Mendes (2001) examine the EU counties of Portugal, Spain, France and Germany. They find that the higher the equity to assets ratio, the higher is bank's interest margins and profitability. The loan to assets ratio has the same positive impact on interest margins and profitability. Additionally they find that operating costs have a positive relationship with net interest margins but not with profitability and the reverse relationship stands for bank's market share. At the side of macroeconomic variables the unemployment rate was found to be negatively related with banks' profitability and statistically significant in the case of ROA . Finally, the nominal effective exchange rate does not have any impact on both net interest margins and profitability, while inflation is relevant in all cases.

Staikouras and Wood (2004) examine the contribution of internal and external determinants to the performance of the EU banking industry (including thirteen banking markets and for the period 1994-1998). As far as the internal determinants concerns, they find that the higher the equity to assets ratio the more profitable the including developed and developing countries. Moreover, they used some new determinants, such as tax variables and legal indicators, which have not been used in previous studies, in order to examine banks' profitability. The results indicate a reverse relationship between loan to assets ratio, proportion of loan loss provisions and banks' return on assets. In addition neither the structure-conduct-performance nor the efficient hypothesis is supported by their study. Considering external factors, the results suggest a positive impact of the level of interest rates, whereas a negative impact of the variability of interest rates and the growth of GDP.

Goddard et al. (2004) used cross-sectional and dynamic panel estimation to check out the determinants that affect banks' profitability in Denmark, France,

Germany, Italy, Spain and the UK for the period 1992-98. They find no relationship existing in a consistent or systematic way between the determinant of size and banks' performance. However, the results indicate that the relative size of off-balance-sheet is positively related with banks' profits for UK but negative or neutral in other examined countries. Moreover, they find a positive association between the capital-assets ratio and profitability, whereas their findings do not support any systematic relationship between ownership and profitability.

Kosmidou et al. (2004) by using a sample of 26 domestic and 32 foreign UK banks, performs a multivariate analysis to examine how the performance of foreign banks differs from domestic banks. The results indicate that domestic banks perform better than foreign banks in the UK and the latter derives from the fact that domestic banks present higher returns on equity, net interest revenue to total earning assets, and loans to customer & short-term funding. In another study, Kosmidou et al. (2005) examines, by creating an unbalanced panel data set of 224 observations and including years from 1995 to 2002, the impact of bank-specific determinants, macroeconomic conditions and financial market structure, on UK's owned commercial banks profitability. They find that equity to total assets, representing power strength, is the most important determinant of UK banks profitability, while the cost-to-income ratio and bank size are negatively related to banks' profitability. On the contrary, the results for the impact of liquidity ratio and loan loss reserves on net interest margins and ROAA, are mixed. Finally, the use of externals factors in their model increase its explanatory power only in the case they are used individually.

Using bank level data for the 15 EU countries in the period 1995-2001, Pasiouras and Kosmidou (2007) analyze how the profitability of commercial domestic and foreign banks is affected by bank's specific characteristics and the overall banking environment. The innovation of their study is that they use more financial market structure variables such as stock market capitalization to GDP, stock market capitalization to assets of deposits money banks and assets of deposits money banks to GDP. The results indicate that there is a positive relationship between equity to assets and ROAA, whereas the cost to income ratio and the size was negatively related with profitability. In addition, the most significant determinant

of profitability for domestic banks was equity to assets, whereas the cost to income was for foreign banks. They find that the determinant of size is negatively related with profitability for both domestic and foreign banks. The impact of concentration, GDP growth and inflation has different signs for domestic and foreign banks and is not significant only for the determinant of concentration.

Naceur and Goaied (2008) investigate the determinants of the Tunisian banks' performance during the period 1980-2000 by using balanced panel data. They used as dependent variable of banks' profitability the net interest margin and return on assets. The results indicated that there is a positive correlation between banks, which hold large amounts of capital and overheads, and both measures of profitability (net interest margin and returns on equity). This may be an indication that well capitalized banks reduce their cost of capital by lower bankruptcy costs for themselves and their customers. Additionally they found that bank loans have a positive and significant impact, while the size ratio is significant but affects negatively the net interest margins. Considering macroeconomic indicators they found inflation to have a positive impact on banks' interest margin whereas economic growth has no incidence. Finally the authors report that concentration ratio affects negatively and significantly net interest margins, while there is a complementary relation between bank and stock market growth since stock market development has a positive effect on bank profitability.

One of the main studies in emerging markets is Herrero's et al. (2009) study that is carried out in China. By using annual panel data of 87 banks over the period 1997-2004, they investigated the main determinants of low profitability in Chinese banks. In order to measure bank profitability they use not only ROA but also pre-provision profits which are complementary measures. They find that banks with more deposits, being better capitalized and more efficient are more profitable, whilst profitability seems to be quite persistent because of the high degree of government intervention that puts barriers to competition.

In a more recent study, Goddard et al. (2010) examine the determinants and convergence of bank profitability in eight European Union member countries over the period 1992-2007. The authors separate the examined period into two sub-

periods, before (1992-1998) and after (1999-2007) the introduction of the euro and the implementation of the Financial Services Action Plan. They find that excess profits persist significantly from one year to the next for the period 1992-1998, meaning that banks which earn excess returns for the current year it is possible to earn these excess profits increased the following year. However, this persistence decreases at the second sub-period because of the intensity of bank competition after the integration of EU financial markets. Furthermore the results suggest that the capital ratio and cost to income ratio are negatively related to profitability, while non-interest income to total operating income is positively related and statistical significant in all cases. The aforementioned finding means that profitability is higher for banks that are cost efficient and highly diversified, whereas it is lower in the case of highly capitalized banks. There is an inverse relationship between concentration and profitability, whereas the results for the coefficient of market share are mixed.

3.1 Studies on the Greek and Balkan banking System

The up-to-date literature that examines the determinants of profits of the Greek banking sector is limited.

Spathis et al. (2002) examines the differences of profitability and efficiency between small and large banks during 1990-1999, by using a multicriteria methodology. The results suggest that large banks are more efficient than small ones, because their size allows them creating economies of scale and having a wider network and thus to have lower operating costs.

Using a methodology based on the framework of the Structure-Contact – Performance, Mamatzakis and Remoundos (2003) examine the determinants of the profitability of the Greek commercial banks over the period 1989-2000. They find that the ratio of operational efficiency affects negatively and significantly the Greek commercial banks, while the opposite holds for the ratio of loans to assets. Moreover, they find the internal factor of equity to assets ratio to be statistically significant and positive. On the contrary, the independent variables of loan loss

reserves, the status of ownership and the inflation have no statistically significant impact on profitability, whereas there is no strong relationship between the degree of concentration and profitability. The results suggest that economies of scale, caused by the size of bank, while the size of the market defined by the supply of money, significantly influences profitability.

Using an unbalanced pooled time series dataset of 23 banks, Kosmidou (2008) tries to find out the determinants of performance of Greek banks during the financial integration period (1990-2002). They find the equity to assets ratio and the cost to income ratio to be both statistically significant but with opposite impact on banks' performance, positive and negative respectively, whereas their credit risk ratio is statistically insignificant. The results indicate a negative and significant relation between bank's loans to customers plus short-term funding (liquidity ratio) and ROAA, in the case they use only bank's characteristics in equation, while it becomes positive but insignificant when macroeconomic and financial structure variables enter the equation. On the contrary, size was statistically significant with the presence of macroeconomic and financial structure variables in the model, but it has a positive relationship with banks' profits in all cases. As far as the macroeconomic variables concerns, the growth of gross domestic product (GDP) is significantly and positively related with ROAA, whereas inflation has a significant negative impact.

Athanasoglou et al. (2008) study the profitability of Greek commercial banks over the period 1985-2001 by using unbalanced panel data. The bank-specific variables they use include the capital variable, credit risk, productivity growth, operating expenses and size. The empirical results indicate that all bank-specific determinants with the exception of size, affect bank's profits significantly and in the expected way. Moreover they find persistence in profits indicating no perfectly competitive market structure. The results also could not verify the structure-conduct-performance hypothesis since the concentration on bank profitability was found insignificant. Regarding the industry variables of ownership and concentration are not seem to be significant for banks' profitability. Finally, macroeconomic control variables, such as inflation and

cyclical output, clearly affect the performance of the banking sector, whilst the business cycle is significant only in the upper phase of the cycle.

Athanasoglou et al. (2006) examines, by using an unbalanced panel dataset over the period 1998-2002, the effect of bank-specific, industry-related and macroeconomic determinants on the profitability of South Eastern European (SEE) credit institutions. The results suggest that bank's profitability is significantly affected by all bank-specific indicators in the anticipated way, except of liquidity risk variable which is positive but insignificant. The explanation given by authors is that the SEE banking system holds a more illiquid position to prevent failures, whilst it focus more on credit risk management. Therefore the improvement of bank profitability requires new standards in risk management and operating efficiency. A key result is that the effect of market concentration is positive, which supports the structure-conduct-performance hypothesis. At the side of the macroeconomic determinants the results are mixed, since inflation affects positively and significantly profitability, whilst real GDP per capita has not any significant affect.

3.2 Studies on the financial Crisis

There are just a few studies which examine the impact of the recent financial crisis on the determinants of bank profitability. Xiao (2009) examines the performance of French banks over the period 2006-2008 and the financial support measures taken by the French government, by using qualitative and quantitative analyses. She finds that despite the fact that French banks were not immune to the severe impact of the crisis, it seems to recover partially so far and that's because of the comprehensive supervision, proactive regulation and timely information. Beltratti and Stulz (2009) investigate the determinants of performance for large banks, according their stock returns, and across the world, during the period from July 2007 till December 2008. The performance of banks with more Tier 1 capital, more deposits and more loans is better during the examined period, while those with stronger capital supervision have also higher returns. On the contrary, banks with more shareholder-friendly boards and those which are operating in

countries with stronger regulators have worse performance. Millon Cornett et al. (2010), look into internal corporate governance mechanisms and the performance of publicly-traded U.S. banks before and during the financial crisis. The results indicated that bank performance decreased for all banks during the financial turmoil, whilst the largest one face the largest losses and also experience the largest changes in corporate governance.

In a very recent study Dietrich and Wanzenried (2010) analyze the profitability of 372 commercial banks in Switzerland during 1999-2009. The purpose of their study is to examine how the recent financial turmoil affected banks' performance and so they consider two sub periods, the pre-crisis period 1999-2006 and the crisis period 2007-2009. They find that operationally efficient banks are more profitable in both examined sub-periods, whereas the more well-capitalized banks are less profitable during the financial crisis. Their results provide empirical evidence that above-average growth of lending rates influences positively bank profitability, while the funding costs affect significantly and negatively the return on assets only before crisis. Furthermore they find that banks with higher interest income relative to the total income are less profitable, before and during financial crisis. Their findings for the determinant of the ownership are that state-owned banks are more profitable than state-owned banks during the financial turmoil because they are considered safer. Considering the external factors, they find that taxation has a statistically significant and negative impact on bank profitability in all specifications. Finally, their results support the structure-conduct performance hypothesis since they find a positive effect on bank profitability before crisis.

4 Determinants of bank profitability and variable selection

4.1 Performance measures

In our dissertation thesis we use as a measure of bank profitability the ratio of return on average assets (ROAA). The ROAA is defined as the net company's

annual income after tax divided by total assets and is expressed as a percentage. It shows the profits earned per euro of assets and measures how efficient bank's management operates its assets in order to generate revenues. In order to capture changes in assets that occur in assets during the fiscal year, we use the average assets value. Athanasoglou et al. (2008, pp.126) reports that "*ROA reflects the ability of a bank's management to generate profits from the bank's assets, although it may be biased due to off-balance-sheet activities*".

4.2 Bank-specific variables

There are two categories of independent variables that are used for the analysis of bank profitability. One category is the bank-specific or internal determinants which have to do with bank's management decisions. The other category is the market-specific or external determinants that are connected with financial conditions and industry structure. We use six independent variables as internal determinants of performance and four external factors.

Our analysis includes the following internal determinants: the bank's total assets (LNSIZE) (logarithmic) representing its size, the ratio of equity to total assets (EQTTA) representing capital adequacy, the ratio of loan loss provisions to net interest reserves (LLPTNIR) indicating banks' asset quality, cost to income ratio (COST) as an indicator of banks' operational efficiency, the ratio of loans to total assets (LTTA) representing liquidity and the yearly growth of gross loans (GGL). The aforementioned bank-specific and also the market-specific factors are presented in Table 1.

Regarding the independent variable of the size of the bank, we use the total assets of banks (logarithm) (LNSIZE), which is used in most studies as a proxy for bank size to examine for economies or diseconomies of scale. The results for the association of bank size with its profitability are a little ambiguous. However, most of the studies suggest that there is a positive relationship between this variable and bank's performance because larger banks have the advantage of

economies of scale and thus they present reduced costs. Moreover, Dietrich and Wanzenried (2010) report in their study that according to Smirlock (1985) larger banks are considered less risky, since they posses higher diversified loan portfolio. Flamini et al. (2009) points out, that large banks are more protected from the government than small banks because are considered "too big too fail". The latter combined with the possibility of big banks to posses a greater proportion of the domestic market than small banks, could lead them enjoy higher profits since they could charge high lending rates, because of their market power, and also offer lower deposits rates as they perceived to be safe. On the other hand, very large banks may not be as profitable since they are managed much more difficult.

As a measure of capital adequacy we use in our dissertation thesis the ratio of equity over total assets (EQTTA). With the term of capital adequacy we are referring to the capital that its bank keeps aside in order to absorb any shocks that it may experience in future. The impact of this ratio on bank's profitability is not clear. For instance, it is believed that the higher the equity to assets ratio the more profitable is a bank, since the need for external funding is lower. There are several reasons that well-capitalized banks have reduced needs for external funding. First of all, the possibility of better-capitalized financial institutions to go bankrupt is smaller because they need to borrow less in order to support a given level of assets and that reduces their cost of funding. Additionally banks with higher capital-to-asset ratios are perceived safer and less risky and consequently bank's creditworthiness increase and that reduces its funding costs. On the contrary, Dietrich and Wanzenried (2010, pp.311) report that, "I*n line with the conventional risk return hypothesis, we expect banks with lower capital ratios to have higher returns in comparison to better-capitalized financial institutions*". In the literature, the results for most studies indicate a positive relationship between capital ratios and bank profitability (e.g Molyneux and Thornton, 1992; Abreu and Mendes, 2001; Pasiouras and Kosmidou, 2007).

Table 1: Variables, definitions, notation and the expected effect on banks' profitability

Variable	Description	Notation	Expected Effect
Dependent			
Profitability	The net profits on average over total assets	ROAA	
Independent			
Bank-specific			
Size	Bank's total assets (logarithm)	LNSIZE	Positive
Capital	It is calculated by the Equity over Total Assets ratio and is an indicative measure of bank's capital adequacy.	EQTTA	Positive
Operational Efficiency	It is estimated by the cost-to-income ratio and indicates how effectively bank's operating expenses are managed.	COST	Negative
Credit Risk	This is the ratio of Loan Loss Provisions to Net Interest Reserves. It represents bank's asset quality.	LLPTNIR	Negative
Liquidity Risk	This variable measures bank's liquidity and is assessed by Loans to Total Assets.	LTTA	Positive
Growth of gross Loans	This measure indicates how quickly creates profits through the growth of loans.	GGL	Positive
Macroeconomic			
GDP growth (%)	The annual percentage growth rate of GDP (in constant US$ 2000).	GDPGR	Positive
GDP per capita	GDP per capita is the gross domestic product divided by midyear population (in constant US$ 2000).	GDPPC	Positive/Negative
Inflation	It is expressed as the annual average of consumer prices.	INFL	Positive/Negative
Gross National Savings	This is the Gross National Savings as percentage of GDP.	GNS	?

Source:

Bank-specific factors obtained from Bankscope Database. Macroeconomic factors obtained from International Monetary Fund (IMF) and World Data Bank.

The cost-to-income ratio (COST) measures how efficient the bank manages its expenses. It is defined as the operating costs divided by the total generated revenues. The ratio includes only bank's operating expenses (e,g administrative expenses, staff expenses, etc) and not other expenses (such as taxes, depreciation etc.) because only them are directly related with banks' profits and therefore we

could examine how efficiently bank's expenses are managed. The anticipating effect of cost-to-income ratio on bank's profitability is negative, since the higher this ratio the less efficient the expenses management and therefore the lower bank's profits. The impact that has the cost-to-income ratio on bank's performance could not be straightforward in the case that we use the general expenditures in the ratio. The reason is as Kosmidou (2008, pp.149) reports "*higher amounts of expenses may be associated with higher volume of banking activities and therefore higher revenues*". What is more, the profitability of an operational efficient bank may be decrease instead of being increased if the bank passes this advantage on to customers in the form of lower loan rates and/or higher deposit rates (Goddard et al., 2009).

The management of liquidity risk is considered a very important determinant of bank profitability. Banks should always sustain an adequate level of liquidity in order to be able to meet their obligations, such as sudden withdraws of deposits and other short-term funding, otherwise they may lead to bankruptcy. In other words, liquidity risk refers to the ability of a bank to correspond at any time to a possible decrease in liabilities or to fund increases on the assets. Banks in order to avoid being insolvent, they often hold liquid assets that offer lower rates of returns, since they can be easily converted to cash (Kosmidou, 2008). Therefore, financial institutions during unstable financial periods, like the world financial integration which started in 2008, may decide to decrease credit to enterprises and individuals that are more risky and increase their exposure to less profitable assets but more liquid, such as the government securities. We could expect a negative relationship between liquidity and banks' profitability, as Molyneux and Thornton (1992) found. The ratio of loan-to-assets (LTTA) is used as a measure of liquidity risk. As it was mentioned above, the amount of loans that each bank holds, defines its liquidity risk and therefore the higher the loans-to-assets ratio the more profitable is a bank. However, according to Staikouras and Wood (2004, pp. 61) "*banks that are rapidly increasing their loan books have to pay a higher cost for their funding requirements and this could reduce the positive impact on profitability*".

Another type of risk that a bank has to manage is the credit risk. With the term credit risk we are referring to the quality of the assets each bank holds to its portfolio. Theoretically it is suggested that the higher the exposure to credit risk the less bank's profitability. Thus, if a bank possesses low quality loans, it increases its credit risk and consequently reduces its profits. We use the loan-loss provisions to net interest reserves (LLPTNIR) as a proxy of the credit risk. We expect a negative relationship between ROAA and our selected credit ratio, because a low loan-loss provision is an indication that a bank holds a small number of risky loans and hence it performs better. Loan loss provisions are a forecast that makes each bank to account for future losses they may face on unpaid loans. Banks adjust the level of loan loss provisions at the beginning of each fiscal year and according to the riskiness of the loans they hold. This helps a bank to remain solvent when the defaults happen. As it is difficult for a financial institution to define the proper level of loan-loss provision, central banks intervene and set the standards that should be adopted by the country's banking system (Athanasoglou, 2008).

Finally we examine how the factor of growth of gross loans is related with bank's profitability. The main source of income for banks is the loans. Therefore the higher the growth of gross loans the more capable a bank is in transforming deposits into loans and increasing its profits. However, that's not always the case because as Staikouras and wood (2004) points out, banks which want to increase rapidly their volume of loans they may lead to higher cost funding and this could reduce their profits. Considering that banks transform into loans only the deposits they have, we could expect a positive relationship between this variable and our performance measure (ROAA). There are not many studies that use a variable like this in their studies. Dietrich & Wanzenried (2010) use an indicator of the difference between bank and market growth of total loans which is similar to growth of gross loans. They mention in their study that the high increase of the volume of bank loans may lead to deterioration of credit quality and thus to decline of bank's profitability.

4.3 Macroeconomic and industry-specific variables

The profitability of banks is affected, not only by the aforementioned bank-specific determinants but also by external factors that consist of macroeconomic and financial structure indicators. In our dissertation thesis we use only macroeconomic variables because we lack data for financial structure variables such as concentration.

The real gross domestic product growth (GDPGR) indicates the annual change of the GDP and as many studies have found till now (Kosmidou, 2006; Demirguc-Kunt and Huizinga, 1998), is expected to have a positive relationship with banks' profitability. The growth of GDP means that the economy blossoms and the demand for lending, both to enterprises in order to expand their business and to individuals, increase. Additionally the extreme demand permits banks in some cases to charge higher margins and thus the profitability of the financial sector improves (Athanasoglou et al., 2006). On the contrary when the economy is in downturn and the GDP decreases, like the current recession, the asset quality of banks' portfolio deteriorates as they face more default loans and that leads to the decline of their returns.

Another macroeconomic indicator that we include in our analysis, considering the external factors which may affect banks' performance is the per capita GDP (GDPPC) and it assesses the gross domestic product divided by midyear population. An increase of GDP per capita is an indication of economic welfare. Therefore we should expect a positive association of GDP per capita with banks' profits. According to Mendes and Abreu (2003) GDP per capita has a positive effect on bank profitability because when the economy blossoms, the performance of institutions is good. Therefore, the possibility of institutions to default is lower and thus, banks face lower loan losses. However, Flamini et al. (2009) find GDP per capita to be negatively related to bank's profitability but still insignificant.

Inflation (INFL) is a very important macroeconomic indicator that affects bank's profitability and has been examined by many authors. However the correlation between inflation and financial institutions' performance is a little ambiguous and

as Perry (1992) states, it depends on whether inflation is fully anticipated or unanticipated. In the case of fully anticipated inflation banks are able to forecast it and adjust interest rates in time in order to get higher returns than their expenses. Therefore inflation has a positive impact on bank profitability when it is anticipated. On the other hand, when inflation is unanticipated the inverse relationship stands. Banks can not appropriately adjust interest rates while bank's operating costs increase faster and that leads to lower profits. In addition, Staikouras and Wood (2004) point out that inflation causes cash flow difficulties to borrowers because their money not only is undervalued but also the installments of their loans are increasing as a result of the increased interest rates. Consequently banks potentially may face more loan defaults and thus decreased profits. Most of the previous studies such as (Molyneux and Thornton,1992; Naceur and Goaied,2008; Athanasoglou et al.,2006) have reported a positive correlation between inflation and bank profitability. However, Kosmidou (2006) examining the factors that affect Greek banks' profitability, she find a negative association with inflation.

We also examine how the factor of gross national savings as a percentage of GDP (GNS) is related with bank profitability. Actually gross national savings are the deposits in financial institutions but because of the fact that is expressed as a percentage of GDP, is considered a macroeconomic factor. We expect a positive association of gross national savings (GNS) and bank's performance because the higher the savings of a bank the more money is available for lending and thus the higher banks' profits. However, that's not the case if the bank is not able to convert savings into earnings from loans. Dietrich & Wanzenried (2010) include in their analysis the bank-specific determinant of the yearly growth of deposits and they found, for the period of financial crisis (2007-2009), a negative impact on Switzerland's bank profitability. This happened because Switzerland banks could not convert the increased deposits, because of the turmoil, into high quality assets.

5 Data and Methodology

5.1 Data

Data for the bank-specific determinants of Greek and Balkan banks are downloaded from the Bankscope Database of Bureau van Dijk's company. Furthermore data for macroeconomic variables of GDP growth rate and the GDP per capita are obtained from the database of the International Monetary Fund's (IMF) and those of gross national savings as percentage of GDP and inflation are obtained from the World Data bank. Considering the recent situation of the world financial recession and in order to examine its impact, we select the period 2005-2010 and we separate it into the pre-crisis (2005-2007) and crisis and post-crisis (2008-2010) period. Moreover we select the year 2005 as the beginning year of our sample, since it is the period that Greek banks applied for the first time the International Accounting Standards.

The criteria of choosing banks for our analysis are the following: 1) they have to be active commercial banks 2) they should have at least one accounting statement in the Bankscope Database during the period 2005-2010. Moreover we use banks' unconsolidated statements since they are not only available for the majority of banks but they also include more data and information for the examined period and our bank-specific indicators. However, in case of missing values for the unconsolidated statements, we use data from consolidated statements. According to these criteria we get 120 commercial banks, but we choose only 115 which have available data for all bank-specific and macroeconomic variables for one year at least. Therefore, we created an unbalanced panel data of 115 commercial banks and 516 observations including 78 banks in 2005, 78 in 2006, 92 in 2007, 99 in 2008, 96 in 2009 and 73 in 2010.

Table 2 presents the descriptive statistics of the internal and external variables we use in our analysis for the entire period (2005-2010). We will point out some interesting findings from the descriptive statistics.

Table 2: Descriptive Statistics*

	Mean	Median	Maximum	Minimum	Std Dev	Skewness	Kyrtosis
ROAA	0,583	0,871	21,321	-28,114	3,359	-2,000	22,844
LNSIZE	13,511	13,439	18,383	8,933	1,843	0,459	3,056
EQTTA	15,401	11,773	92,362	1,389	11,597	2,658	13,095
COST	76,532	66,185	491,315	13,753	49,097	3,919	24,104
LLPTNIR	36,378	20,459	473,684	-237,548	66,028	3,774	22,305
LTTA	58,336	60,521	90,351	10,069	14,215	-0,590	3,091
GGL	37,169	27,380	602,650	-69,580	53,486	4,252	35,934
GDPGR	3,085	5,000	9,430	-8,500	4,446	-0,985	3,128
GDPPC	4,138	2,330	15,090	1,050	4,725	1,725	4,080
INFL	6,299	6,111	17,284	-0,814	3,887	0,823	3,641
GNS	14,598	15,046	24,139	3,893	5,399	-0,439	2,415

*For information about the notation of variables see Table 1.

We observe that our measure of profitability, ROAA, has a mean value of 0,58% for the whole examined period (2005-2010) while its median value is much higher. The above result, as Dietrich and Wanzenried (2010) mention in their study, indicates large profitability differences among the banks of our sample. The mean value of equity and loans which are both expressed as a percentage of total assets is 15,40% and 58,34% respectively, whereas their standard deviations are quite high (11,59% and 14,21% respectively). Moreover, the results for the capitalization of banks in our sample suggest that there is very large gap, since the well-capitalized banks have 92,36% equity over their total assets and for the least-capitalized banks the capital adequacy is just 1,39%. Another significant fact that is worth to be mentioned is the very high standard deviations of the bank-specific determinants of the cost-to-income ratio, loan loss provisions over net interest reserves and growth of gross loans (49,10%, 66,02% and 53,49% respectively). On the other hand our macroeconomic variables of GDP growth, GDP per capita, inflation and the gross national savings present quite low standard deviations.

Table 3 presents the correlation matrix for our bank-specific and macroeconomic determinants. The highlighted cells are those with the highest positive and negative correlation. We observe that a lot of correlations among the independent variables are quite high, having a price in absolute numbers greater than 0,30, but

nothing so important that will affect the results of our analysis. The highest positive correlation is between the GDP per capita (GDPPC) and the logarithm of total assets (LNSIZE), which is 0,63. On the other hand we find a strong negative correlation between the determinant of gross national savings (GNS) and the GDP per capita, having a price of -0,59.

Table 3: Correlation matrix of independent variables

	LNSIZE	**EQTTA**	**COST**	**LLPTNIR**	**LTTA**	**GGL**	**GDPGR**	**GDPPC**	**INFL**	**GNS**
LNSIZE	1									
EQTTA	-0.55	1								
COST	-0.22	0.14	1							
LLPTNIR	0.00	-0.06	0.07	1						
LTTA	0.38	-0.29	-0.03	0.06	1					
GGL	-0.11	-0.05	0.13	0.06	0.01	1				
GDPGR	-0.02	0.10	-0.07	-0.17	-0.22	0.37	1			
GDPPC	**0.63**	-0.32	-0.08	0.03	0.35	-0.16	-0.22	1		
INFL	-0.22	0.21	0.08	0.11	-0.16	0.17	0.33	-0.38	1	
GNS	-0.33	0.05	-0.06	0.00	-0.15	-0.04	-0.08	**-0.59**	-0.15	1

5.2 Methodology

For the examination of the impact of bank-specific and macroeconomic factors on bank's profits we consider the following linear model:

$$ROAA_{i,c,t} = \alpha + \sum \beta_j X^j_{i,c,t} + \sum \beta_m X^m_{c,t} + \varepsilon$$

where $ROAA_{i,c,t}$ is the dependent variable and refers to the average return on assets of bank *i* in country *c* at time *t*, and the $X^j_{i,c,t}$ and $X^m_{c,t}$ refer to bank-specific and macroeconomic determinants, respectively and ε is the error term.

As we have mentioned above, the purpose of this dissertation thesis is to find out how the recent financial crisis affects the determinants of banks' profitability. Therefore, as Dietrich and Wanzeried (2010) did in their study, we firstly estimate the above equation by using the entire sample including the period (2005 – 2010). At a second step the separated data of the pre-crisis period (2005-2007) and the crisis and post-crisis period ranging from 2008 to 2010 were used to recalculate

our model. Moreover, for each one of the above sub-samples we assess it with only bank-specific determinants and once more including also the macroeconomic factors (either jointly or individually).

The calculations were done with the help of EViews 6. Each of the aforementioned sub-samples is firstly assessed with a fixed effects regression, having both cross-sectional and period fixed. After that we conduct the Redundant Fixed Effects Likelihood Ratio Test which suggests if it is better to use a restricted model with only period fixed effects. Furthermore in order to decide if it's better to use the random effects model instead of the fixed effects, we conduct the Hausman test. In the case that the value obtained from the Hausman test is larger than the chi-squared critical values ($X^2_{0.5,\ 6}$ = 5,348 for only bank-specific and $X^2_{0.5,\ 10}$ = 9,342) then the fixed effect is the proper model. Regarding our sample and sub-samples the fixed effects model is the indicative since the value of Hausman Test is always greater than the chi-squared critical values.

Furthermore we have to check for presence of heteroskedasticity in the residuals. This is done by using the Breusch-Pagan Test which calculates the Lagrange multiplier (LM) and we compare its value with the critical value of chi-squared. Therefore, in order to check for heteroskedasticity of the standard errors we estimate our sample and sub-samples by using the White cross-section and after we check for differences, in results, with only the fixed effects model. The results do not indicate that heteroskedasticity in residuals is present in our case.

6 Empirical Results

As we have mentioned above, in order to examine the effect of the recent financial crisis on banks' performance we include in our analysis three different periods; the pre-crisis period, covering the years from 2005 to 2007, the crisis and the post-crisis period, referring to period (2008 2010) and finally the whole period (2005-2010. Therefore, following the steps of Dietrich and Wanzenried's (2010) study, we initially assess a regression with only the bank-specific determinants and after another one including also the macroeconomic variables, for each one of the

aforementioned periods separately. The empirical results of our calculations are presented in Tables 4, 5 and 6, where the first column, refers to the regression with only the bank-specific variables, while the second column ,includes the external determinants, as well. It can be observed from the results shown in Tables 4, 5 and 6 that the significance of many variables and their impact on banks' profitability differs among the examined periods. Moreover, we notice that by including the external factors in our model, we increase its explanatory power, presented by the Adjusted R^2, very slightly. The price of the Adjusted R^2 is around 60% for the entire period and the pre-crisis period, while it is much higher for the post-crisis period, reaching 75%.

The first bank-specific variable is the bank size which is defined as the logarithm of total assets. The studies of Athanasoglou et al. (2006) and Kosmidou (2008) refer to time before crisis and examine the Southeastern Europe region and Greece respectively. They both find a positive correlation between bank's size and its profitability. Our findings regarding the entire period and the post-crisis period are consistent with the aforementioned studies, since we find the size to be positively related to profitability and statistically significant at 1% significance level (p-value = 0..0000). However, that's not the case for the pre-crisis (2005-2007) period as the effect of size is insignificant (p-value = 0.7391).

Considering the determinant of capital ratio, we use as proxy measure equity over total assets ratio and we find it to be positively related to ROAA and statistically significant in all periods, whether we examine only bank-specific variables or including external factors, as well. The latter supports the findings of previous studies (Molyneux and Thornton, 1992; Abreu and Mendes, 2001; Pasiouras and Kosmidou, 2007) suggesting that well-capitalized banks perform better than less-capitalized since they have lower needs of external funding and thus, the possibility of going bankrupt is smaller. What is worth to be mentioned is that, despite the difficult financial conditions, as a result of the recent financial crisis, the banks of Greece and those in Balkans achieve to sustain an adequate level of equity in order to avoid the possibility of going bankrupt.

Table 4: Estimation Results for pre-crisis period (2005 - 2007)

	Bank-specific factors		**Bank-specific and macroeconomic factors**	
	Coefficient	p-value	Coefficient	p-value
LNSIZE	0.041821	0.7391	0.103002	0.4396
EQTTA	0.132513	0.0000***	0.132188	0.0000***
COST	-0.067462	0.0000***	-0.065939	0.0000***
LLPTNIR	-0.021957	0.0000***	-0.022345	0.0000***
LTTA	0.006588	0.5254	0.010742	0.3476
GGL	-0.000581	0.8218	-0.000278	0.9184
GDPGR			-0.019729	0.8586
GDPPC			-0.016990	0.8707
INFL			0.063555	0.1636
GNS			0.024019	0.5491
Adjusted R2	0.616563		0.612978	
Hausman Test	32.065	$X^2_{0.5,\ 6} = 5{,}348$	33.971	$X^2_{0.5,\ 10} = 9{,}342$
F-statistic	5.094576	0.0000***	4.873329	0.0000***

Notes: Significance levels are presented with ***, **,* and correspond to 1%, 5% and 10% respectively. Number of observations: 248.

Table 5: Estimation Results for crisis and post-crisis period (2008 - 2010)

	Bank-specific factors		**Bank-specific and macroeconomic factors**	
	Coefficient	p-value	Coefficient	p-value
LNSIZE	0.650343	0.0000***	0.627645	0.0000***
EQTTA	0.066432	0.0043***	0.041808	0.0880*
COST	-0.012918	0.0000***	-0.012999	0.0000***
LLPTNIR	-0.039533	0.0000***	-0.038163	0.0000***
LTTA	-0.010635	0.4628	-0.007775	0.5911
GGL	0.000988	0.7700	-0.002445	0.5285
GDPGR			0.014461	0.6534
GDPPC			-0.116381	0.4658
INFL			-0.042529	0.5420
GNS			-0.131410	0.0244**
Adjusted R2	0.746469		0.753666	
Hausman Test	17.351	$X^2_{0.5,\ 6} = 5{,}348$	17.171	$X^2_{0.5,\ 10} = 9{,}342$
F-statistic	8.530584	0.0000***	8.535522	0.0000***

Notes: Significance levels are presented with ***, **,* and correspond to 1%, 5% and 10% respectively. Number of observations: 268.

Table 6: Estimation Results for the whole period (2005 - 2010)

	Bank-specific factors		**Bank-specific and macroeconomic factors**	
	Coefficient	p-value	Coefficient	p-value
LNSIZE	0.615428	0.0000***	0.587347	0.0000***
EQTTA	0.090867	0.0000***	0.085942	0.0000***
COST	-0.021206	0.0000***	-0.022150	0.0000***
LLPTNIR	-0.026939	0.0000***	-0.027220	0.0000***
LTTA	0.010885	0.2112	0.013688	0.1225
GGL	-0.003204	0.1621	-0.003814	0.1004
GDPGR			0.020072	0.6970
GDPPC			-0.093868	0.2516
INFL			0.046125	0.3243
GNS			-0.044336	0.1636
Adjusted R2	0.604660		0.608207	
Hausman Test	12.559	$X^2_{0.5,\,6} = 5{,}348$	12.669	$X^2_{0.5,\,10} = 9{,}342$
F-statistic	8.212347	0.0000***	8.061219	0.0000***

Notes: Significance levels are presented with ***, **,* and correspond to 1%, 5% and 10% respectively. Number of observations: 516.

The cost to income ratio which is defined as bank's operating costs to total revenues was found to be negatively related to bank's performance and statistically significant at 1% significance level (p-value = 0.0000). The aforementioned result is the expected one and suggests that the higher the expenses of a bank, the lower its profits. This is consistent with the findings of previous studies (Athanasoglou et al., 2006; Kosmidou, 2008; Dietrich and Wanzenried, 2010) that examined Balkans, Greece and Switzerland respectively.

We find the coefficient of loan loss provisions to net interest reserves to have a negative and statistically significant at 1% significance level (p-value = 0.0000) relationship with ROAA, whether we take into account the external factors jointly or separately. The result is the expected one, since banks with low quality loans portfolios face increased credit risk. Consequently, they have to increase their loan loss provisions and that causes their profitability to be decreased. Athanasoglou et al. (2008) by examining the determinants of Greek bank's profitability find similar results for credit risk determinant.

As a measure of banks' liquidity risk we use the loans to total assets ratio. The results are a bit different among the entire sample and the sub-samples. We expect

the loans to total assets ratio to be positively related with ROAA, since the higher the amount of loans the higher bank's profits. In the case of the entire period (2005-2010) and the pre-crisis period the results suggest a positive relationship with banks' profits but statistically insignificant. This is consistent with the findings of Athanasoglou et al. (2006). However, our results for the crisis period (2008-2010) indicate a negative impact of loans to total assets on banks' profits, but still statistically insignificant. This change in the relationship between loans to total assets and ROAA resulted from the large number of defaulted loans during the financial crisis, since most of the banks gave lot of loans during the pre-crisis period.

For the determinant of growth of gross loans we do not have previous findings. However, we expect a positive relationship with banks' profitability, since the higher the growth of gross loans the more capable a bank is, in transforming deposits into loans and increasing its profits that derive from the interest margins. Nevertheless, our results support the presence of an inverse relationship between growth of gross loans and banks' performance, in all examined periods but still statistically insignificant. The explanation that could be given is that banks do not use only their own deposits to give loans, but they borrow money from the inter-bank market as well. The latest increases bank's cost of funding and therefore causes decreased revenues.

As far as the effect of macroeconomic determinants on banks' profits concerns, our results among the three examined periods are mixed. We find GDP growth rate to have a positive association with ROAA but statistically insignificant for the entire sample and post-crisis period. Yet, it is negatively related with ROAA but still insignificant for the pre-crisis period. Our findings for the post-crisis period, supports those of previous studies (Kosmidou, 2008; Demirguc-Kunt and Huizinga, 1998; Athanasoglou et al., 2006) which report a positive association between profits of financial institutions and the GDP growth. Moreover, a possible explanation that could be given for the negative association of GDP growth rate and ROAA, is that the examined pre-crisis period is very short and just before the outbreak of the world financial crisis. Therefore, despite the fact of the increasing GDP during the pre-crisis period, banks' profits were declining,

because they may be affected by other determinants, while signaling the imminent financial recession. On the contrary, the GDP per capita, which is defined as the gross domestic product divided by midyear population expressed in dollars constant prices of year 2000, has an inverse relationship with ROAA. This result is in line with the assumption of Demirguç- Kunt et al. (2003) that a high GDP per capita represents a high financial competition and thus lower bank profitability.

Turning to other macroeconomic determinants, the coefficient of inflation is positive whether it is examined individually or jointly with other external factors. However it has a negative impact on ROAA for the post-crisis period 2008-2010. These findings support Perry's (1992) aspects about the effect of inflation on banks' profitability who states that it depends on whether inflation is fully anticipated or unanticipated. Therefore, we could conclude that for the whole period and the pre-crisis period the managers of banks in Greece and Balkans were able to forecast in time the inflation and adjust their interest rates in order to sustain or even improve their profits. On the contrary that is not the case for the crisis period, as inflation was unanticipated because of the financial crisis and the unstable conditions of economy. Finally we should mention that inflation affects insignificantly ROAA except of the case we consider it individually and for the entire period (2005-2010), being significant at 5% significance level.

Considering the external factor of gross national savings expressed as percentage of GDP we find it to be positive and statistically insignificant for pre-crisis period, while it is negative and statistically significant for the crisis period (whether we examine the variable individually or jointly with other macroeconomic factors). The results are consistent with the findings of Dietrich & Wanzenried (2010) suggesting that increased savings during the financial crisis lead the financial institutions in Greece and Balkans to reduced revenues, as happened in Switzerland. The reason is that the increased banks' deposits could not be transformed into loans, because of the current financial situation.

7 Conclusions and Further Research

This paper has examined the way with which bank-specific and macroeconomic determinants affect banks' profitability in Greece and Balkans region during the period 2005-2010. Through this paper we intended to contribute to the limited literature on the impact that has the recent financial crisis on the internal and external factors which are related with banks' performance. Therefore, we created two time intervals, one including the years 2005 to 2007 and named as 'the pre-crisis period' and another one referring to years 2008 to 2010 and defined as 'the crisis and post-crisis period', in order to present the differences in the behavior of these factors. In addition, we created an unbalanced panel data set which consisted of 516 observations, including only active commercial banks of Greece and Balkan countries (named Albania, Bulgaria, Romania, Serbia and FYROM).

Our results indicate that the impact of the examined variables on banks' profitability is not always the expected one and it may diverse between the two periods because of their different financial conditions. What is more, we observe that the explanatory power of our model (in terms of adjusted R^2) did not increase significantly when we include the macroeconomic variables jointly. The F-statistic is significant at the 1% level for all the examined periods.

Our findings analysis concerning the impact of bank-specific variables on banks' profitability reveals that the bank size and the capital adequacy ratio of equity over total assets have a positive relationship. The variable of bank-size is statistically significant only for the crisis period, while the equity to total assets is significant in both periods. The above results indicate that larger and well-capitalized banks, during the financial crisis, achieve greater returns than small and less capitalized banks. On the other hand, the determinant of cost to income ratio and that of loan loss provisions to net interest reserves present the expected results in all examined periods by having a statistically significant and negative impact on banks' profits. Finally the independent variable of liquidity risk presented by loans to total assets and the growth of gross loans are both statistically insignificant with profitability, in all cases. However, the loans to total assets ratio is positively related to banks' performance, during the pre-crisis

period – a result that it was expected – while it has the inverse relation during the crisis period, due to the large number of defaulted loans. Moreover, the growth of gross loans has a negative impact on banks' profits, except for the case of the post-crisis period and specifically when only the bank-specific determinants are regressed.

As far as it concerns the macroeconomic determinants, almost all of them are statistically insignificant except the variable of gross national savings which is significant only during financial crisis. We observe that inflation is positively related with banks' profitability during the pre-crisis period, indicating that it is anticipated by financial institutions, while during the financial crisis period, inflation is unanticipated, as its negative coefficient reveals. Furthermore, the GDP per capita seems to have a negative association with banks' profitability for all the time periods, consistent with prior studies. Yet, the variable GDP growth is negatively related to profitability for the period 2005 – 2007, but positive for the crisis period. Finally, the determinant of Gross National Savings appears to have a positive relationship with ROAA, for the pre-crisis period, while it has a negative one for the crisis/post-crisis period.

Concluding, we would propose further research to be conducted concerning industrial specific factors, such as the concentration ratio, the banks' ownership and other factors.

References

Abreu, M., and Mendes, V. (2001) "Commercial Bank Interest Margins and Profitability: Evidence from E.U. Countries". Preliminary Draft.

Athanasoglou, P., Delis, M., and Staikouras, C. (2006) "Determinants of Bank Profitability in the Southern Eastern European Region". Bank of Greece, Athens, Greece, Working Paper No. 47, September.

Athanasoglou, P., Brissimis, S., and Delis, M. (2008) "Bank-specific, industry-specific and macroeconomic determinants of bank profitability". Journal of International Financial Markets, Institutions and Money 18 (2), pp.121–136.

Baltagi, B.H. (2001) "Econometric Analysis of Panel Data", 3nd ed JohnWiley & Sons, Chichester, England.

Banker's review (2011) http://www.bankersreview.gr/

Beck, T., Demirguc-Kunt, A., and Levine, R. (2006) "Bank concentration, competition, and crises: first results". Journal of Banking and Finance 30 (5), pp. 1581–1603.

Beltratti, A., and Stulz, R. (2009) "Why Did Some Banks Perform Better During the Credit Crisis? A Cross-Country Study of the Impact of Governance and Regulation". European Corporate Governance Institute (ECGI), Bruxelles, Belgium, Working Paper No. 254, July.

Bourke, P. (1989) "Concentration and other determinants of bank profitability in Europe, North America and Australia". Journal of Banking and Finance 13 (1), pp. 65–79.

Claessens, S., Demirguc-Kunt, A., and Huizinga, H. (2001) "How does foreign entry affect domestic banking markets?" Journal of Banking and Finance 25, pp. 891–911.

Demirguc-Kunt, A., and Huizinga, H. (1998) "Determinants of commercial bank Interest margins and profitability: some international evidence". World Bank Economic Review 13 (2), pp. 379–408.

Demirguc-Kunt, A., and Huizinga, H. (2000) "Financial structure and bank profitability". The World Bank., Washington, USA, Policy ResearchWorking Paper Series 2430, January.

Demirguç-Kunt, A., L. Laeven and R. Levine (2003). "Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation". The National Buraeu of Economic Research (NBER), Cambridge, USA, Working Paper 9890, July.

Dietrich,A., and Wanzenried,G. (2010) "Determinants of bank profitability before and during the crisis: Evidence from Switzerland". Journal of International Financial Markets, Institutions and Money 21 (3) , pp. 307-327.

Flamini, V., McDonald, C., and Schumacher, L. (2009) "The Determinants of Commercial Bank Profitability in Sub-Saharan Africa". International Monetary Fund (IMF), Washington, USA, African Department, Working Paper, January.

Fries, S. and A. Taci (2005) "Cost efficiency of banks in transition: Evidence from 289 banks in 15 post-communist countries". Journal of Banking and Finance 29, pp. 55-81.

García-Herrero, A., Gavilá, S., and Santabárbara, D. (2009) "What explains the low profitability of Chinese banks?" Journal of Banking and Finance 33 (11), pp. 2080–2092.

Goddard, J., Molyneux, P., and Wilson, J. (2004) "The profitability of European Banks: a cross-sectional and dynamic panel analysis". The Manchester School 72 (3), pp. 363–381.

Goddard, J., Liu, H., Molyneux, P., and Wilson, J. (2010) "Do bank profits converge?" Bangor University and University of St Andrews, UK, Working Paper, July.

Hellenic Bank Association (HBA) (2011): http://www.hba.gr/

International Monetary Fund (IMF) (2011):
http://www.imf.org/external/index.htm

Investopedia (2011): http://www.investopedia.com/

Kosmidou, K., Tanna, S., and Pasiouras, F. (2005) "Determinants of profitability of UK domestic banks: panel evidence from the period 1995–2002". In: Proceedings of the 37th Annual Conference of the Money Macro and Finance (MMF) Research Group, Rethymno, Greece, September.

Kosmidou, K., Pasiouras, F., Doumpos, M., and Zopounidis, C. (2004) "A multivariate analysis of the financial characteristics of foreign and domestic banks in the UK". Omega: The International Journal of Management Science, 34 (2), pp.189-195.

Kosmidou, K. (2008) "The determinants of banks' profits in Greece during the period of EU financial integration". Managerial Finance. 34(3) , pp.146 – 159.

Mamatzakis, E.C., and Remoundos, P.C. (2003) "Determinants of Greek Commercial Banks Profitability, 1989–2000". Spoudai 53 (1), pp. 84–94.

Mendes, V., and Abreu, M. (2003) "Do macro-financial variables matter for European bank interest margins and profitability?" Second CIEF Workshop European Integration and Banking Efficiency, Lisbon, October.

Millon Cornett, M., McNutt, J.J., and Tehranian, H. (2010) "The financial crisis, internal corporate governance, and the performance of publicly-traded U.S. bank holding companies." Working Paper, January.

Molyneux, P., and Thornton, J. (1992) "Determinants of European Bank Profitability: A Note". Journal of Banking and Finance 16 (6), pp. 1173–1178.

Naceur, S., and Goaied, M. (2008) "The determinants of commercial bank interest margin and profitability: evidence from Tunisia". Frontiers in Finance and Economics 5 (1), pp. 106–130.

Pasiouras, F., and Kosmidou, K. (2007) "Factors influencing the profitability of domestic and foreign commercial banks in the European Union". Research in International Business and Finance 21 (2), pp. 222–237.

Perry, P. (1992) "Do banks gain or lose from inflation". Journal of Retail Banking 14 (2), pp. 25-40.

Staikouras, C., and Wood, G. (2004) "The determinants of European bank profitability". International Business and Economics Research Journal 3 (6), pp. 57–68.

Science Direct (2011) : http://www.sciencedirect.com

Short, B. (1979) "The relation between commercial bank profit rates and banking concentration in Canada, Western Europe and Japan". *Journal of Banking and Finance* 3 (3), pp. 209–219.

Smirlock, M. (1985) "Evidence on the (non) relationship between concentration and profitability in banking". Journal of Money, Credit, and Banking 17 (1), pp. 69–83.

Social Science Research Network (2011): http://www.ssrn.com

Spathis, Ch., Kosmidou, K. and Doumpos, M. (2002) "Assessing profitability factors in the Greek banking system: a multicriteria methodology". International Transactions in Operational Research 9 (5), pp. 517-30.

Tang, H., Zoli, E., and Klytchnikova, I. (2000). "Banking crises in transition economies. Fiscal costs and related issues". The World Bank, Washington, USA, Policy Research Working Paper No. 2484, November.

The World Bank (2011): http://www.worldbank.org/

To Vima (2011): http://www.tovima.gr/finance

Xiao, Y. (2009) "French Banks Amid the Global Financial Crisis". International Monetary Fund (IMF), European Department, Working Paper, September.