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THE DETERMINANTS OF BANK CAPITAL STRUCTURE

By

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Abstract

The aim of this study is to examine the determinants of the capital structure of banks in European Union. The data spans a six year period from 2007-2012. In this study we investigate whether the standard determinants of capital structure apply to banks during the financial crisis period. Fixed effects panel data analysis is employed with dependent variable, book leverage. Our findings, suggest that the standard determinants of capital structure have an explanatory power on book leverage. Though, the direction of impact is not always the prospective.

Keywords: capital structure, banks, panel data analysis

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1. Introduction

The recent global financial crisis generates a renewed interest for banks due to their influence within a financial system and the economy. Since banks affect the economy a crucial issue is what governs their capital decisions. The need to determine these factors are the cumulative impairment losses of bank loan portfolio, losses of deposits and the extended need for financing from the European Central Bank.

In general, capital structure refers to a variety of alternatives sources of funds with which a firm finances its overall operations and growth. It is a combination of a company's long-term debt, specific short-term debt, hybrid securities, common equity and preferred equity. Requirements in short term funds change from period to period for this reason there is no such strict policy for the sources of these funds. On the other hand, a policy is crucial in order to generate long term funds. A financial decision making process focuses on the determination of optimal capital structure.

The determinants of capital structure are very hot issue in the literature of finance. The famous Modigliani and Miller (1958) proposition states that in an efficient market in the absence of taxes, bankruptcy costs, agency costs, and asymmetric information a firm's value is not affected by its chosen capital structure. It does not matter whether the capital is acquired by issuing shares or selling debt. This theory is considered the basis of modern thinking on capital structure and it is also known as "Capital structure irrelevance principle". Following the generative work of Modigliani and Miller (1958), a theoretical literature developed, which led to other substitutional theories, such as the static trade off theory, pecking order theory and agency cost theory.

Many researchers, by studying the above mentioned theories conducted surveys on capital structure .They include in their research different bank specific, industry specific and macroeconomic variables and they managed to identify some key determinant factors. Although researches

on capital structure of non financial firms have been made on a great extent, there is need for further investigation for capital structure of financial firms.

One of the most significant articles for the bank capital structure is this of Reint Gropp and Florian Heider (2010). However, there is little literature examining the influence of the recent economic crises on the determinants of bank capital structure. Michele Nascimento Juca, Almir Ferreira de Sousa & Albert Fishlow (2012) examine the capital structure determinants of North American Banks before (2003-2006) and during the systemic crisis period (2007-2010).

The purpose of this thesis is to examine the determinants of capital structure of commercial banks of the European Union of 15 countries during the financial crisis (2007-2012), with intention to contribute to the limited literature. In order to conduct our study, we use a panel data regression analysis. We run one regression with only bank specific variables and another one including macroeconomic variables in order to detect their impact to leverage. The bank specific variables we use are: LN(total assets), ROAA, the ratio fixed assets to total assets, the ratio net loans to total assets, the ratio Liquid Assets to Deposits & Short term Funding and the ratio loan loss provisions to total assets and the macroeconomic variables are: inflation and GDP growth rate.

The rest of this study is organized as follows. In the second section we analyze the role of supervisory authorities. In the third section we analyze the capital structure theories. In the fourth section we review the literature on the determinants of bank capital structure. In the fifth section we analyze the determinants of capital structure that we use in our analysis. In the sixth section we empirically analyze the determinants of bank capital structure using regression analysis. Furthermore in this section we analyze our data and the methodology we use. Finally in the seventh section we draw conclusions.

2. The role of supervisory authorities

The financial sector and especially commercial banks constitute the most strictly supervised companies. They had the capability of issue money where this increases the liquidity of an economy, furthermore affects the inflation and other financial figures. Moreover the citizens of a country trust the banks to save their money. So the handling of money should be done with caution and prudence.

For a long period banking regulation was national. Governments and their regulatory agencies promoted rules and banking supervisory guidelines particular to the country's needs. Regulatory rules were fairly different between countries. Not until 1988 when Basel I accord was released, did international banking regulations take shape. Basel accords outline regulatory guidelines for international banks' operation and risk management. The Basel Committee acknowledged a need to strengthen the international banking systems' ability to endure shocks. The Committee wanted to level the competitive field by standardizing national capital requirements. Lower capital requirements or higher leverage reveal that a bank can use more debt in order to finance the loans it makes and this lead in reduction of the cost of funds and in increase of profitability.

In July 1988, the Committee released Basel I accord. The accord was the first international attempt to relate the risks a bank takes with banks' equity .Both regulators and economists admitted that banks which operated prudently are characterized by higher capital ratios. Moreover they take fewer risks and suffer from losses not as often as other banks. Also the more equity they have the greater the possibility to absorb losses. The accord provided a common framework for capital assessment as a function of the riskiness of assets. Basel I addressed only credit risk although it recognizes that banks must also guard against other kinds of risk.

The accord created two minimum capital ratios:

- “Tier 1” A bank’s core capital which was to be at least 4% of risk weighted assets and
- “Capital ratio” a bank’s total capital which included “Tier 2” components and was to be at least 8% of risk weighted assets

For regulatory capital purposes, banks could hold capital in two tiers: Tier 1-core capital and Tier 2-supplementary capital. Tier 1 and Tier 2 with some adjustments equal the regulatory capital.

In 1999 the Committee issued a proposal for a new capital framework to replace Basel I. The new accord suggested a connection more closely of capital requirements with concrete risks incurred by banks. As well it intended to widen the risks that banks take into consideration when calculating their minimum capital requirements. In 2004, after many conferences a new capital framework, Basel II was introduced. Basel II Accord consists of three pillars to accomplish consistent capital adequacy requirements for active international banks.

- Pillar 1: Minimum capital requirements
- Pillar 2: Supervisory review process
- Pillar 3: Market discipline

The aim of Pillar 1 is to set capital requirements as a function of credit, market and operational risk exposures of bank .Tier 1 and Tier 2 were first defined in Basel I and remained substantial the same also in Basel II .But there is an appearance, of Tier 3, which includes a wider range of subordinated debt than that of Tier 2 and can contain profits from bank’s trading activities. “Tier 3 can only be used to support the market risk the bank takes in its trading book”. Instruments which can be estimated as Tier 3 are very risky to be used for material portions of bank’s capital computations. Some items cannot be included in a bank’s computation of regulatory capital. These are goodwill, stocks held by the bank in another bank and investments

in subsidiaries with business in banking and similar activities under specific circumstances. Pillar I requires banks to measure the riskiness of their assets using the approaches presenting on the table below with respect to credit, market and operational risk.

Table 1: Methods for calculating capital according Basel II

Credit risk	<ul style="list-style-type: none"> • Standardized approach • Foundation IRB • Advanced IRB approach
Market risk	<ul style="list-style-type: none"> • Standardized approach • Internal Models approach
Operational risk	<ul style="list-style-type: none"> • Basic Indicator Approach • Standardized Approach • Advanced measurement approach

From the above the following values have derived:

- Total risk weighted assets for credit risk (RWAC)
- Market risk capital requirements (CRM)
- Operational risk capital requirement (CRO)

So the total risk weighted assets value of a bank can be computes as:

$$RWAT = RWAC + 12,5 * (CRM + CRO)$$

The eligible regulatory capital (RC) would be computed as:

$$RC = \text{Tier 1 capital} + \text{Tier 2 capital} - \text{Deductions}$$

The Basel II minimum capital requirements:

$$RC/RWAT \geq 8\%$$

Pillar 2: Supervisory review process

The supervisory review ensures compliance with minimum capital requirements and also emboldens banks to develop and use better risk management techniques in monitoring and managing risks. It provides a framework for dealing with risks a bank may face, like pension risk, systemic risk, concentration risk, reputational risk, strategic risk, liquidity risk and legal risk, which the accord combines under the title of residual risk. It gives banks a power to review their risk management system. Moreover Internal Capital Adequacy Assessment Process (ICAAP) is the result of Pillar II. Supervisors might also oblige banks to maintain additional capital if they are not persuaded that that current capital is adequate for the risks faced by the assets of the bank.

Pillar 3: Market Discipline

The intention of Pillar 3 is to complement the supervisory review process and the minimum capital requirements by developing a set of disclosure requirements that will allow the market participants to assess the capital adequacy of an institute. Disclosure requirements ensure that corporate entities give information for their financial performance to investors. Firms are obligated to conduct financial statements and these must be signed by external auditors. Moreover publicly traded companies ought to make additional disclosures required by the exchange on which their shares are traded. Pillar 3 is concentrated on capital information and not in financial performance. It addresses the firm's capital adequacy, risk exposures and capital structure. Banks are required to make their disclosures at least twice a year.

Finally when market participants have an adequate understanding of a bank's businesses and the controls it has in place to manage its exposures, they can better distinguish between banking organizations so that they can

reward those that manage their risks prudentially and punish those that do not.

Basel III is a global regulatory standard on bank capital adequacy, stress testing and market liquidity risk agreed upon by the members of the Basel Committee on Banking Supervision in 2010-11, and programmed to be introduced from 2013 until 2018. Basel III was developed in response to the vacancies in financial regulation disclosed by the late-2000s financial crisis. Basel III goal is to:

- Strengthen banks' transparency and disclosures
- Amend risk management and governance
- Amend the ability of banks to absorb shocks arising from financial and economic stress whatever the source

In conclusion Basel III strengthens bank capital requirements and introduces new regulatory requirements on bank liquidity and bank leverage. However it is useful to mention the opinion of critics who believe that that rigorous regulation is responsible for the slow recovery from the financial crisis and that Basel III requirements will heighten the incentives of banks to game the regulatory framework and that could induce the stability of the financial system negatively.

3. Capital structure theories

The theory of business finance in a modern sense begins with the “Capital structure irrelevance principle” of Modigliani and Miller (1958). Their theorem states that in an efficient market a firm’s value is not affected by its capital structure. According to theory, all have the same information and it assumes that no transactions cost, bankruptcy cost or taxation exist. A firm’s value is not induced whether its capital is acquired by issuing stock or selling debt, neither from its dividend policy. Following the generative work of Modigliani and Miller (1958), a theoretical literature developed, which led to

other substitutional theories. Four key theories were developed over the years: the static trade off theory, pecking order theory and agency cost theory and market timing theory.

According to the static trade-off theory a firm concludes how much debt or equity financing to use by weighting the costs and profits. Kraus and Litzenberger (1973) provide a classic statement of the theory, who considered that optimal leverage, reflects a trade-off between the deadweight costs of bankruptcy and the tax saving benefits of debt. Myers (1984) states that according to the trade -off theory a company determines a target debt to equity ratio and then tries to approximate the target. Debt financing is regarded as better than equity financing since the first gets tax shields on interest while equity is subject to corporate tax. The target is determined by balancing interest tax shields of debt against costs of financial distress. The company is balancing the costs and benefits of borrowings, keeping stable its assets and investment plans.

Pecking order theory indicates the preference of companies to generate internal funds (like retained earnings or excess liquid assets) from external funds. The theory tries to capture the costs of asymmetric information. Managers are supposed to know the true condition of the company and when they issue new shares investors believe that they think that the company is overvalued and that they are trying to take advantage of this over-valuation. Investors rationally discount the company's share price when managers issue equity rather than riskless debt.

Myers and Majluf(1984) draw attention to the use of debt to omit the inefficiencies in a firm's investment decisions that would be caused from information asymmetries. Myers (1984) developed the Pecking order theory which is based on the previous work of Donaldson (1961) .According to Myers (1984) companies prefer internal funds because they do not present flotation costs and do not need additional disclosure financial information about the firms' investment opportunities and their potential gains. If a company has to use external funds it will define its hierarchy of its financial sources as: debt ,convertible securities, preferred stock, and last common stock . Empirical

evidence support both trade off theory and pecking order .According to a study of Fama and French (2002) to detect whether the pecking order or the trade-off theory is a better predictor of capital structure they found support for both theories.

Agency cost theory states that company's capital structure is specified by agency costs, which includes the costs for debt and equity issue. Costs related to equity issue can be: the monitoring expenditures of the equity holders and the bond expenditures of the manager. On the other hand debt issue increases the manager's motive to invest in risky projects which yield higher returns but also increases the possibility of failure where debt holders have to share if it is materialized. If debt holders expect such a situation they will require a higher premium which will result in an increment of the costs of debt. The extent of these costs is limited by how well the owners supervise the actions of the managers.

The theory deals with a conflict of interest among two parties. Michael Jensen and William Meckling (1976) were the first who developed a theoretical model of agency costs. According to their theory two types of conflicts exist: conflicts between shareholders and managers and conflicts between shareholders and bondholders. For example a conflict arises when a manager instead of acting for the interest of the shareholders of a company, maximizing their wealth, he takes decisions in his own interest. On the other hand conflicts between shareholders and bondholders exist due to the fact that shareholders or their representatives take decisions removing wealth from bondholders to shareholders.

The market timing theory of capital structure suggests that companies time their equity issues. They issue new stock when the share price is considered overvalued, and buy back own shares when there is undervaluation. There are two interpretations of equity market timing. The first reckons economic agents to be rational. Firms are supposed to issue equity immediately after a positive information release, which decreases the asymmetry problem among the company's management and shareholders. The second theory reckons that agents are irrational (Baker and Wurgler,

2002). Due to irrational behavior there is a time-varying mispricing of the share of the firm. Managers issue equity when they believe its cost is irrationally low and repurchase equity when they think its cost is irrationally high. The second interpretation of market timing does not indicate that the market must be inefficient.

Baker and Wurgler (2002) specified a market timing measure, which is a weighted average of external capital needs over the past few years, where the weights used are market to book values of the company. They discovered that leverage alterations are strongly and positively related to their market timing measure, so they inferred that the capital structure of a company is the cumulative result of past efforts to time the equity market. We can say that Market timing theory has challenged the precedent theories. But all theories have weak parts, so it is not strange that there is a lot of research on this issue.

4. Literature review

Capital structure is one of the major topics amongst scholars in finance. Many researchers by studying the above mentioned theories conducted surveys about the capital structure of non financial firms and they managed to found various determinants that affect it. These factors may include size, growth opportunities, profitability and other. Among these researchers, De Angelo and Masulis (1980) developed a model of corporate leverage choice in the presence of personal and corporate taxes. They tested some hypotheses with reference to time series and cross sectional properties of companies leverage decisions and also to personal tax rates implicit in market prices. Their model determines an optimal capital structure taking into consideration corporate and personal taxes. They stated that the optimal capital structure decision depends on the industry because tax rates differ among industries.

Although there is a large literature on the determinants of capital structure of non financial companies a small number of researchers have dealt with capital structure decisions of banks. Moreover it's a common belief that capital structure of banks does not need any research due to capital regulations which affect financing decisions. According to Mishkin(2000) «Because of the high costs of holding capital (...), bank managers often want to hold less bank capital than is required by the regulatory authorities. In this case, the amount of bank capital is determined by the bank capital requirements ». Below we report the most significant studies on capital structure of banks.

Berger , Herring and Szegö (1995) investigated the role of capital for financial institutions, specifically they concentrated on commercial banks in United States. They stated that many departures from the frictionless world of Modigliani and Miller can explain market capital `requirements'(the ratio of equity to assets) for banks, these are: taxes, cost of financial distress and asymmetric information problems and transaction costs. Interest payments decrease tax payments, on the other hand dividends do not decrease them, as a result banks will prefer debt in their capital structure. Moreover Berger (1995) found a positive relationship among capital ratios and earnings for USA banks during 1980s . In that period the possibility of a bank to fail and the expected costs of financial distress raised market capital requirements.

Furthermore the authors found that asymmetric information and transactions costs of issuing new shares affect costs of internal against external finance. Both of them can increase or decrease the capital held in equilibrium. They also identify two crucial factors: the federal safety net(it includes federal deposit insurance, access to the discount window ,payment guarantees, etc.) which tends to decrease bank's capital and the regulatory capital requirements that increases the capital of some banks.

Hai Chin Yu(2000) examined capital structure of banks in Taiwan. He splitted banks in three groups: small medium and large by their asset size. He examined equity ratio and its relationship with five independent variables(liquidity, intermediation spreads, profitability, bank size and money

market funds).He found that large banks had lower capital ratio from small banks.This happens because large banks surrogate bank capital for regulator's capital because they think that they are 'too big to fail' and as a consequence they rely on interior cash flows for capitalization. According to his research the main determinants of capital ratios for Taiwanese banks are :size, liquidity and profitability . The relation among equity to assets ratio and liquidity ratio is negative and significant for medium size banks but positive and significant for small banks. Moreover, medium-sized banks in Taiwan utilize liquidity as a substitute for bank capital, on the other hand small banks with low liquidity usually have lower capital ratios.

Amidu (2007) conducted a research in order to identify the determinants of capital structure of banks in Ghana.As dependant variables he used leverage(the ratio total debt to total capital), the long term debt ratio (total long term debt to total capital) and the short term debt ratio (total short term debt to capital).He used as independent variables profitability,risk,tax,sales growth,asset structure and size.He suggested that profitability ,growth,bank size,asset structure and corporate tax influence financing decisions. Moreover he found a negative relation among leverage and profitability.Amidu in his survey found that more than 87% of assets of Ghanaian banks are financed by debts and short term debt constitutes more than three quarters of the capital .

Asarkaya and Ozkan(2007) examined the determinants of capital structure of Turkish banks for the period 2002-2006.They used panel data and they used the generalized method of moments in order to estimate their model.They tried to find the reason that banks hold more capital than that required by the regulation.They used as dependant variable capital adequacy ratio and as explanatory variables risk(the ratio risk weighted assets in total assets), GDP (quarterly growth rate off gross domestic product),average capital adequacy ratio of the sector, ROE(inflation –adjusted return on equity),assets size adjusted by the consumer price index and share of deposits in non –equity liabilities.

They used once ROE and portfolio risk as endogenous variables and then as exogenous. They found that lagged capital has an important effect on current capital. Asset size, portfolio risk and share of deposits are negatively correlated with capital adequacy ratio. However, the growth rate of GDP and the average capital adequacy ratio of the sector are positively correlated with the capital adequacy ratio. The negative effect of asset size is because big banks hold less capital. The negative relation with share of deposits is due to the fact that banks when they have this ratio high they are thought less risky and as a result they ought to have less buffer capital.

Regarding the negative correlation with portfolio risk, this is reasonable since banks with higher portfolio risk ought to have more capital to provide a buffer toward losses. Regarding the average capital adequacy ratio of the sector, when this increases, banks in order to be competitive believe that they have to increase their capital. Turkish banks in economic growth periods hold more capital since in these periods banks surrogate the reduction of capital during periods of economic downturn. Finally, they found that Return on equity is insignificant but when they use deeper lags, ROE becomes significant in explaining the dependent variable.

Brewer, Kaufman and Wall (2008) in their paper inquired capital structure of banks and the impact of bank-specific variables, country-level macroeconomic conditions, country-level financial characteristics, significant public policy and bank regulatory characteristics of the home country. They used an unbalanced panel of seventy-eight largest private banks in the world based in twelve industrial countries for the period 1992-2005.

The last two variables induced banks' capital structure by inducing the magnitude of a bank's safety-net, the tautness of contention in the banking sector, the capability of bank regulators to interfere effectively in troubled banks and the width of capital standards. Capital structure is measured by two ratios: the ratio of tier 1 capital to Basel I risk-weighted assets in book values and the ratio of book value equity to total book value on-balance sheet assets (leverage ratio). The country-specific macro variables invoke the size of the banking sector in the home country and alterations in GDP. The bank-

specific variables invoke asset size, profitability and credit risk. The country regulatory and public policy variables invoke seven variables representing the magnitude of the bank safety-net, the tenseness of external corporate governance in the home country and the strength legislation. Also a number of control and fixed effect variables are specific. Due to alterations in the variables banks are supposed to reconcile their capital ratios in order to get the equilibrium prices.

The results notify that independent variables explicate the leverage ratio better in the hypothesized direction than the Basel risk-weighted ratio. They found that alterations in tier 1 capital ratio are correlated with most of the independent variables. However alterations in leverage ratio are highly correlated with public policy variables but less correlated with the other variables. Bank specific variables affect the capital ratios of banks. They state that banks keep higher capital ratios in countries where banking sector is small and in countries that have effective corporate governance structures and have more rigid capital requirements.

Moreover Alfon et al (2004) found that banks in the United Kingdom has an individual capital adequacy requirement and Wong et al. (2005) arrived to the same conclusion for banks in Hong Kong. The differences of capital ratios among countries may be explained up to an extent by the regulatory regimes and public policy of each country. These differences it seems that constraint efforts of Basel I to deduct differences in cross-country capital ratios between banks.

Gropp and Heider (2010) study the determinants of capital structure of large banks in Europe and United States for the period 1991 to 2004. Moreover they compared their findings with those of the empirical literature of non financial companies. The dependent variables they used are : market and book leverage, market and book deposits, market and book non-deposit liabilities and Tier 1 capital ratio. As explanatory variable they used size, profit, market to book ratio, collateral, dividend, asset risk, GDP growth, stock market risk, term structure spread, inflation, coverage (GDP) and coverage (Deposits).

First they took as dependent variable market leverage and as explanatory variables they took market to book ratio, profitability, the natural logarithm of total assets and collateral. They found all coefficients statistically significant at 1% level apart from collateral which was significant at 10% level. Bank's leverage was positive correlated with collateral and size and negative with the market to book ratio, dividends and profits. Also when they took as dependent variable book leverage the results were similar to that of market leverage. All coefficients were significant at 1% level. Then they added in the regression the independent variable risk which had negative coefficient for both book and market values. In this regression the other standard corporate finance determinants variables remained significant except market to book ratio on book leverage which was found insignificant.

When they used as dependent variables non deposits liabilities and deposits the signs of the coefficients, apart from profits, when the variable was non deposit liabilities were the same as before. However the signs were different when the variable was deposits. Moreover risk was insignificant for all components of leverage.

When they added to the model as explanatory variables coverage per capita GDP and coverage per average capita deposits it was found a low impact on book leverage and great correlation to market leverage. When they used Tier 1 capital ratio in line with Basel 1 they reached similar findings with those when they used as dependent variable leverage. They stated that capital regulation was of second order importance in determining the capital structure. The only difference was that banks with more collateral were more levered and keep more Tier 1 capital.

But Barth et al (2005), Berger et al (2008) and Brewer et al. (2008) noticed that banks hold more capital than the regulatory minimum. This happens maybe due to the fact that raising equity on short notice, in order not to fall below the regulatory minimum, is expensive. Adding GDP, inflation, stock market volatility and the term structure of interest rates as independent variables to market and book leverage regressions Gropp and Heider (2010) found that only volatility of stock market was significant at 10% level for book

and market leverage. They reached same conclusions when they made separate analysis for European and US banks alone. Summarizing Gropp and Heider(2010) stated that unobserved time invariant bank fixed effects are the most significant determinants of banks capital structure and that banks leverage converges to bank concrete ,time invariant targets.

There are and other researchers who advocate that capital requirements are of second order importance in determining the capital structure of banks and that banks optimize their structure like non financial companies. Flannery(1994), Myers and Rajan(1998), Diamond and Rajan(2000) and Allen, Carletti and Marquez(2009) developed theories in which they alleged that capital requirements were not constraining.

Octavia and Brown(2010) examined whether the standard determinants of capital structure apply to banks in developing countries. They found that they explained both book capital and market leverage. But the direction of the impact is not always the prospective. Moreover the buffer theory of excess capital can interpret the amount of excess book capital that banks keep but the excess market capital kept from banks is determined more by market pressures.

Juca, De Sousa and Fishlow (2012) studied the determinants of capital structure of North American Banks for the period before (2003-2006) and during the economic crisis (2007-2010). They used panel data and their sample was constituted by thirty banks. The purpose of their study was to find if determinants of non financial firms, risk off assets, deposit insurances and the compensation program for executive managers for the periods 2003 to 2006 and 2007 to 2010 can explain the financial leveraging level of banks at market value.

They used as dependant variable financial leveraging at market value and as explanatory variables size, profit ,growth opportunity , guarantees , payment of dividends, compensation program for executive managers , risk , market value of deposits and market value of non-deposits .All explanatory

variables are found significant except guarantees which has been excluded from their model.

Juca et al(2012) found that leveraging at market value was higher during 2007 to 2010 than the period 2003 to 2006. The negative relationship with size exists for smaller banks however bigger banks behave according to the financial theory so they observed that the higher the bank size the higher the leverage. Regarding profitability and growth opportunity they found a negative relationship with leverage. Guarantees were found negatively related to leverage where this outcome is contradictory to financial theory. Risk had a significant but negative relationship with leverage. They found a positive coefficient among market value of deposits and leverage. At last compensation program for executive managers had low significant level and a negative relation with the dependent variable. They observed that despite in 2009 was the lowest amount of payment per capita of executive managers (US \$ 11.71 million) in that year was the highest percentage of leveraging (92.10%).

Allen, Nilapornkul and Powell (2013) examined the determinants of capital structure of Thai Banks for the period 1999-2008 and they compared with Japanese and Malaysian banks. In their study they use not only internal bank variables but also market based risk variables. They employed fixed effects panel data analysis and used market and book leverage as dependent variables. As explanatory variables they used bank size, growth opportunity, profitability, loan ratio, non performing loan, risk weighted asset distance to default, conditional value at risk and GDP growth rate.

Profits and non performing loans were found negatively correlated with market leverage. But non performing loans had a positive relation with book leverage. Risk weighted assets had a positive relationship for market and for book leverage however statistical significance at 5% for book leverage. Conditional value at risk and distance to default were negatively correlated to both leverages but with no significance. Regarding GDP growth rate, it had a negative correlation for both leverages, however it was significant at 1% for market leverage.

In Japanese banks market based variables influence market leverage because of the fluctuations in the market price of equities and assets. Also bank size, growth opportunity and profitability were significant at 1% level to book leverage. Furthermore conditional value at risk was significant at 1% for book leverage.

Regarding Malaysian banks, Allen et al (2013) found that non performing loans had a positive correlation at significance level of 1% ,on the other hand risk weighted assets and loan ratio had a negative correlation to market leverage at 5% significance level. Moreover profitability, distance to default, bank size, non performing loans and conditional value at risk were significant at 1% for book leverage.

Capital requirements have also been examined in the market discipline literature. Despite that bank market discipline is interested in banks' risk taking, it also impacts their capital structures. According to the surveys of Morgan and Stiroh(2001), Calomiris and Wilson(2004), Ashcraft(2008) and Flannery and Rangan(2008) relied on the market view ,capital structure of banks is affected by the pressures of debt holders, shareholders and depositors. Their findings suggest that regulatory capital requirements are not a constraining factor for capital structure decisions.

Concluding, there have been efforts to reform the regulatory environment due to the recent financial crisis. Brunnermeier et al. (2009), just as Grop and Heider (2010) distinguished regulatory from a market based concept of bank capital. Greenlaw et al (2008) when searching the roots of the financial crisis, they argue that active management of banks capital structure in relation to internal value at risk was the important destabilizing factor and not the regulatory constraints.

5. Determinants of capital structure of banks and variable selection

This part of the study provides information regarding the dependent and independent variables which we use to examine the capital structure of banks. Moreover we analyze the findings of former literature corresponding to these variables. We use as dependent variable leverage and as explanatory variables LN(total assets), ROAA, the ratio fixed assets to total assets, the ratio net loans to total assets, the ratio Liquid Assets to Deposits & Short term Funding, the ratio loan loss provisions to total assets, inflation and GDP growth rate. The details of the variables are presented in table 2.

Table 2.: The mnemonic, definition and expected sign of the explanatory variables

Variables	Mnemonic	Definition equation	Expected sign
Dependent			
Leverage	BKL	$1 - (\text{book value of equity} / \text{book value of assets})$	
Independent			
Size	BZE	$\ln(\text{total assets})$	+
Profitability	ROAA	$\text{Net income} / \text{Average total assets}$	-
Tangibility	TANGIB	$\text{Fixed assets} / \text{Total assets}$	+
Liquidity	NLTA	$\text{Net loans} / \text{Total assets}$	+/-
Liquidity	LASTF	$\text{Liquidity assets} / \text{Deposits \& short term funding}$	-
Assets quality	LLPTA	$\text{Loan loss provisions} / \text{Total assets}$?
GDP growth rate	GGR	$\text{GDP growth (annual \%)} \text{ (in constant US\$ 2005)}$	+/-
Inflation	INFL	$\text{Consumer prices (annual \%)}$	+/-

Source: Bank specific variables obtained from Bankscope Database. Macroeconomic factors obtained from the World Bank.

We use as dependent variable leverage which we calculate as 1 minus the ratio of equity to total assets in book values(BKL). This variable includes both debt and non debt liabilities. We choose to use leverage than debt because according to Welch (2007) leverage in contrast to debt is well defined. Moreover we construct leverage in this way since it can be linked readily to the regulatory view of banks' capital structure. The reason for taking book value is that capital regulation is imposed only on book values. Also leverage formation augments the sensitivity of equity to the underlying performance of the company. Leverage as dependent variable is also used in other studies like these of Gropp and Heider(2010) ,Octavia and Brown (2010) and Allen et al.(2013).

Concerning the independent variable size we measure it as in the most studies as the logarithm of total assets(BZE) .Trade of theory states that big companies in contrast to small choose debt financing since they have lesser financial distress costs. On the other hand pecking order theory states the existence of an reverse relationship among size and dept ratio since large companies can issue equity readily. The results for the relation among banks size and leverage are ambiguous. Gropp and Heider (2010) when examining large US and European banks found a positive association between leverage and the size of banks. Octavia and Brown (2010) also concluded that there is a positive relationship between leverage and size.

Juca et al.(2012) found that large banks behave according to finance theory and only smaller banks have a negative relationship among size and leverage. Allen et al (2013) found for Thai banks a negative relation between leverage and size of a bank but a positive relation was found for the developing country Malaysia and for the developed country Japan. This positive relation is verified by most surveys and for non financial firms with few exceptions. For example Rajan and Zingales(1995)when examining firms in G-7 countries and Frank and Goyal (2004) for US firms found a positive relation. Although Rajan and Zingales (1995) found a positive association for G7 countries there was the exception of Germany.

We use ROAA in order to measure banks profitability .ROAA is computed as the net income of a bank divided by average total assets.It is frequently used by banks and other financial institutions as a means to estimate their performance.The association between leverage and profitability is based on the theory used.

Trade-off theory states that profitable companies have more needs to shield income from corporate tax and should borrow more than less profitable companies.Pecking order theory predicts an inverse association between profitability and leverage.Companies are assumed to prefer internal to external financing.Companies use retain earnings first and if retain earnings are inadequate then they use external financing. When companies have to choose between bonds and equity they prefer debt from equity issue. So profitable companies borrow less since they have adequate internal funds but on the other hand less profitable companies use debt because of less available internal funds. According to agency cost theory there is a positive association between profitability and leverage. In a signaling framework, profitable companies are assumed to utilize debt as a signal of the company's quality.

Gropp and Heider (2010),Octavia and Brown (2010) and Juca et al (2012). found that banks leverage depends negatively on profits.They suggest that more profitable banks prefer less leverage financing.Allen et al.(2013) found for Japanese banks a negative association among leverage and profitability.For Malaysian banks a negative relationship between book leverage and profitability but a positive with market leverage.Moreover they found for Thai banks a negative relationship between market leverage and profitability but a contradictory sign for book leverage.In empirical studies for non financial firms there is also confirmation of the negative association between profitability and leverage while a positive association is scarcely supported by studies.A negative relation was found in the studies of Titman and Wessels (1988) Rajan and Zingales(1995) and Frank and Goyal (2004).

Regarding the independent variable tangibility we use the ratio of fixed assets to total assets(TANGIB) since this ratio is most often used in studies.

Tangibility of assets is used to reckon the level of collateral a company renders to its debtors. Theories suggest the existence of a positive association between leverage and tangibility since a high fraction of tangible assets helps the lender to reduce the risk suffering from the agency cost of debt. According to pecking order theory selling secure debt can be good for the firm since it decreases the cost of the information asymmetry between insiders and outsiders. Companies with more intangible assets have higher costs of capital due to the fact that monitoring is more difficult. So companies with lot tangible assets are expected to have more debt.

Most of the empirical studies found a direct association between the level of debt and tangible assets. Gropp and Heider (2010) found a positive relationship between leverage and collateral. Octavia and Brown (2010) found a negative association both for market and book leverage when they used as cross section identifier bank. But positive when they used as cross section identifier CAP (CAP includes the minimum capital ratios enjoined on banks so that banks from various countries but with same minimum capital ratio are considered coming from the same group). They observed that the magnitude of the coefficient is small. This happens maybe because of the fact that banks in developing countries keep a higher percentage of collateral than developed countries. The benefit of having one extra dollar of collateral to secure debt could be reduced. They stated that the negative association shows that having more collateral is value decreasing for banks in issuing new debt.

Moreover Rajan and Zingales (1995) stated that lenders give loans more easily if a balance sheet of a company has a high amount of tangible assets and this results to higher leverage. Some other studies of non financial firms, with the same findings of a positive relationship between leverage and tangibility are those of Frank and Goyal (2004) and Shah and Khan (2007). Shah and Khan studied the determinants of capital structure of non financial firms in Pakistan.

In many studies liquidity is used as explanatory variable to measure its effect on leverage of a company. In 2006 the International Monetary Fund (IMF) published a series of Financial Soundness Indicators based on a

common methodology for 62 countries, including European Union Countries, the Compilation Guide on FSIs. Liquidity indicators are utilized to show the level of liquidity which influences the capacity of banks to withstand shocks. Banks should maintain a level of liquidity in order to confront their obligations differently they may go bankrupt. So according to supervisory authorities a ratio that is suggested for research is liquid assets to short term liabilities. Moreover according to pecking order theory companies prefer internal financing from external. So if companies have sufficient liquid assets to finance their investments there will be no need to raise external funds. Thus liquidity is expected to be negatively correlated to leverage.

In our thesis we use two liquidity ratio net loans to total assets(NLTA) and liquid assets to deposits & short term funding (LASTF).Net loans to total assets evinces the percentage of total assets which bounded for the granting of loans.So when this ratio increases liquidity decreases.The ratio liquid assets to deposits and short term funding measures the ability of a bank to meet its short term obligations from its current assets.Allen et al(2013) when examining the relationship between leverage and the ratio net loans to total deposits found a negative association between them. Ozkan(2001) examined UK firms and he found a negative effect of liquidity on the borrowing decisions of firms. Also Guney et al.(2011) found a negative association between leverage and liquidity when studying Chinese listed firms.

We also examine in our thesis the loss loan provisions that a bank makes. Loss loan provision is an expense that is reserved for defaulted loans or credits. It is an amount set aside in the event that the loan defaults.Banks adjust each year the level of loan loss provisions based on the riskiness of the loans in their portfolio. Bank regulators demand frequently screening of bank loan portfolios, classifying each asset or group of assets by market conditions, collateral condition, and other business risk factors. In a case of a loss, the bank can utilize the amount set aside to cover the loss and not having a loss in its cash flows.The ratio provisions to total assets shows the quality of the assets of a bank and a high ratio reveals a bad quality of the assets furthermore shows that more provisions are needed to be taken from a

bank. In our thesis we take the ratio loan loss provisions to total assets. According to Basel II banks ought to take more provisions because of the high volume of the non performing loans which lead in a reduction in equity. We expect a positive relationship between leverage and the ratio loan loss provisions to total assets since an increase to provisions leads to a decrease to equity and as a consequence a bank will have to use external funds to cover its obligations.

In our study we also examine two microeconomic variables since banks are affected by external factors. We examine the influence of annual percentage growth rate of GDP at market prices and inflation. GDP is the sum of all the products and services that are produced in an economy expressed in financial units. It is the market value of all officially identified final goods and services produced within a country in a year, or other given period of time regardless these products are produced from manufacturing units belonging of residents from other countries. It includes, private inventories government purchases, personal consumption, paid-in construction costs and the foreign trade balance. The GDP Annual Growth Rate shows a percentage change in the GDP value compared to previous year. GDP has an effect on nearly everyone within an economy. The growth of GDP reveals that an economy blossoms and has a positive influence on firms, on the other hand a negative GDP growth influence negatively firms since is a sign that an economy is in recession.

Gropp and Heider (2010) found a positive correlation between leverage and GDP growth for book leverage but a negative for market leverage. Octavia and Brown (2010) found a negative association between market and book leverage and GDP growth. Moreover they stated that adding this macroeconomic variable does not alter the statistical significance and the sign of the coefficients of the standard determinants of capital structure. Allen et al. (2013) found a positive relationship between market leverage and GDP growth for Japanese and Malaysian banks but negative for Thai banks. But for book leverage they found a negative relationship for all countries.

Inflation is considered an important indicator since it is the rate at which the general level of prices for goods and services is increasing, and, subsequently, purchasing power is decreasing. Inflation as measured by the consumer price index shows the annual percentage alteration in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Generally, the Laspeyres formula is used.

Gropp and Heider (2010) stated that they obtained similar results with non financial firms and that controlling for macro economic factors does not increase the fit of the leverage regressions. Specifically, they found a positive relationship between book leverage and inflation and a negative with market leverage. A positive correlation was found and from Frank and Goyal (2004) when examining American firms. They stated that for book leverage the effect of inflation is not reliable and that when inflation is expected to be high, firms tend to have high leverage.

6. Empirical analysis

6.1. Data

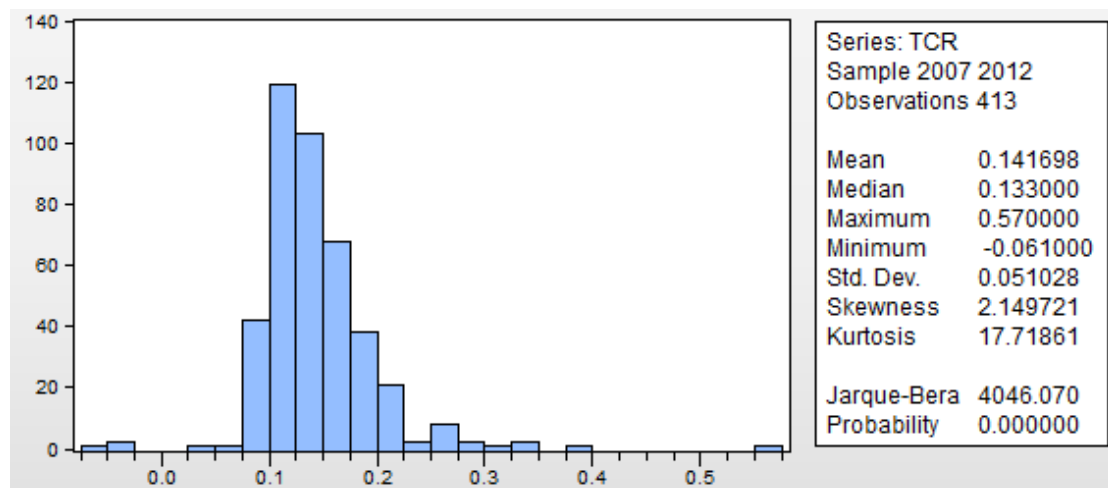
The target population of our study refers to listed commercial banks in European Union of 15. The countries are : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom . The final sample is comprised by 76 banks. We select listed banks since they are considered a homogenous group of companies with a comparable production technology. Our data come from two sources. We obtain data for the dependent and explanatory bank specific variables from the Bankscope database of the Bureau van Dijk. Data for the macroeconomic variables we obtain from the World Bank.

The information for the variables we take it from the consolidated balance sheets and income statements of the banks. The period we examine is 2007 until 2012 because at that point the global financial economic

recession started and we want to examine its impact to the financing decisions of banks, if the crisis changes what until then influence banks decisions. Moreover we choose as starting point 2007 because in that year Basel II started to be implemented despite the fact that it was initially published in 2004 ,since it was difficult to be implemented in the regulatory environment prior to 2007.

Firstly we try to use as dependent variable the total capital ratio in order to find the impact of regulation to capital structure decisions but Bankscope database has many missing values so we conclude to use only leverage as dependent variable. However from the graph below we observe that with only a few exceptions ,when data is available, banks have higher total capital ratio than the regulatory minimum. Banks hold a significant discretionary total capital ratio and as Gropp and Heider(2010) stated it is difficult to show a first order effect of regulation for banks capital structure.

Figure 1: Distribution of total capital ratio



Finally we use leverage as dependent variable and size, profitability, tangibility liquidity, assets quality, gdp growth and inflation as explanatory

variables. Our sample consists of 452 observations. Table 3 provides descriptive statistics for the variables we use.

Table 3: Descriptive statistics

	Mean	Median	Maximum	Minimum	Std Dev	Skewness	Kyrtosis
BKL	0.905475	0.926776	1.039305	0.191388	0.091406	-4.464512	29.37096
BZE	23.29183	22.87769	28.75110	17.89531	2.830346	0.178109	1.860537
ROAA	0.003249	0.004455	0.202530	-0.211010	0.021388	-1.601770	46.81727
TANGIB	0.013099	0.009818	0.244019	0.000157	0.023469	7.617491	68.02296
NLTA	0.579374	0.627595	0.916280	0.014350	0.196493	-1.271918	3.958341
LASTF	0.286127	0.206250	2.000000	0.008180	0.249007	2.279517	10.77934
LLPTA	0.007935	0.005015	0.148430	-0.038181	0.012371	5.114000	47.84099
GGR	-0.002850	0.003735	0.065568	-0.085386	0.029291	-0.704264	2.775744
INFL	0.021706	0.022977	0.048799	-0.044799	0.011256	-1.054960	7.792982

See table 2 for the definition of variables.

We point out some interesting findings from the descriptive statistics. We observe that the mean value of book leverage is 0.905475 which is relative similar to those of Gropp and Heider(2010) who found a mean 0.926. Its standard deviation is 0.091406, its minimum value is 0.191388 and its maximum value is 1.039305. It is obvious a wide range in its rates. The ranking of the mean value of bank size is 23.29183 however we find a high variability (standard deviation). Profitability is quite low and this is in line with Gropp and Heider(2010) who stated that banks are low return industry. Tangibility has a wide range of values, a maximum value of 0.244019 and a minimum of 0.000157. Liquidity ratios have both a high variability but the mean value of the ratio net loans to total assets is two times greater than the ratio liquid assets to deposits and short term funding. Loan loss provisions to total assets have a low mean value of 0.007935. Regarding the two macroeconomic indicators inflation has a mean value of 0.021706 and GDP growth a negative mean value of 0.002850.

Table 4 shows the correlation matrix among the variables used in the regression analysis. Larger banks tend to have lower profits, higher leverage and lower collateral value. More profitable banks tend to have lower leverage. Leverage is positive correlated with the loss loan provisions that a bank makes. An interesting finding is the negative correlation between profitability and the ratio net loans to total assets although we would expect a positive correlation since the higher the amount of loans the higher the profits of a bank. This association maybe resulted from the large number of defaulted loans. We find the highest negative correlation among the variables leverage and tangibility. Furthermore we observe a high negative correlation between the variable loan loss provisions to total assets and profitability. The results show no collinear variables because no correlation exceed 0.8 as reported in table 4. Generally, the majority of the correlations corresponds to the findings in capital structure literature.

Table 4: Correlations of variables

	BKL	BZE	GGR	INFL	LASTF	LLPTA	NLTA	ROAA	TANGIB
BKL	1.00000								
BZE	0.49921	1.00000							
GGR	-0.03685	0.01727	1.00000						
INFL	0.05301	-0.06117	0.26950	1.00000					
LASTF	-0.29421	0.20433	0.12260	-0.12520	1.00000				
LLPTA	0.09232	-0.12608	-0.34715	0.04701	-0.20866	1.00000			
NLTA	0.29294	-0.12320	-0.11024	0.13891	-0.67739	0.26481	1.00000		
ROAA	-0.43951	-0.12285	0.27234	-0.08981	0.20473	-0.66470	-0.19005	1.00000	
TANGIB	-0.76172	-0.29076	-0.00802	-0.00935	0.31780	-0.01469	-0.23098	0.25564	1.00000

See table 2 for the definition of variables.

6.2. Methodology

Having reviewed a number of literature for capital structure of firms we will now conduct an empirical study on commercial listed banks of European Union of 15 countries. We will try to answer the following research questions:

- What are the determinants of banks capital structure?
- How are these determinants influence banks borrowing decision?

For the examination of the influence of bank specific and macroeconomic factors on banks leverage we use the following equation

$$y_{it} = a + bx_{it} + u_{it}$$

where y_{it} is the dependent variable, a is the intercept, b is a $K \times 1$ vector of parameters to be estimated on the independent variables and x_{it} is a $1 \times k$ vector of observations on the independent variables, $t=1, \dots, T$ and $i=1, \dots, N$ and U_{it} is the error term.

We use panel data in our analysis, since panel data have two dimensions, a time dimension and a cross section dimension. They consist observations on a number of economic units over a number of time periods. We decided to use panel data because as we mentioned above we want to examine our variables through time, period 2007-2012. Firstly we estimate an equation with only the bank specific variables and at a second step we recalculate our model by adding the macroeconomic factors.

All statistic and econometric methodology has been employed in Eviews 7 with the method of Least Squares also we have used Microsoft Excel. Firstly we estimate a model with only bank specific explanatory variables and then a model with all explanatory variables both bank specific and macroeconomic factors. We estimate both models with neither fixed nor random effects which implies a simple pooled regression. But pooled regression assume that the intercepts are the same for each bank and for every year. This is an inappropriate affair because normally this does not

happen. Instead we estimate a fixed effect model for both regressions with only cross section fixed. Next in order to determine if fixed effects are essential we run a Redundant fixed effects-Likelihood Ratio test for both regressions. The results suggest that the appropriate model to use for both regressions are cross sectional fixed effects and period fixed effects. The probability values related with the test statistics notify that the restrictions of the Redundant fixed effects-Likelihood Ratio are not verified by the data.

Furthermore in order to decide if it is better to use the random effect rather than fixed effect we conduct the Hausman Test. In both regressions the p-value of the test is less than 1% ,this suggests that we have to reject the null hypothesis that Random effect model is appropriate and this means that the fixed effect model is to be preferred. We conclude to the following two equations

$$Bk_{ict} = b_0 + b_1 BZE_{ict} + b_2 ROAA_{ict} + b_3 TANGIB_{ict} + b_4 NLTA_{ict} + b_5 LASTF_{ict} + b_6 LLPTA_{ict} + c_t + c_c + u_{ict} \quad (1)$$

$$Bk_{ict} = b_0 + b_1 BZE_{ict} + b_2 ROAA_{ict} + b_3 TANGIB_{ict} + b_4 NLTA_{ict} + b_5 LASTF_{ict} + b_6 LLPTA_{ict} + b_7 GGR_{ct} + b_8 INFL_{ct} + c_t + c_c + u_{ict} \quad (2)$$

6.3. Results

As we have mentioned above in order to examine the determinants of bank capital structure for the period 2007-2012 we initially assess a regression with only bank specific variables (equation 1) and another with bank specific and macroeconomic variables (equation 2). The results are presented in the following manner. Table 5 presents the regression results for equation (1) and table 6 presents the regression results for equation (2).

Considering table 5 with the dependent variable book leverage we observe that all explanatory variables are significant at 1% level except the ratio loan loss provision to total assets (LLPTA) which is insignificant. Size of banks is significant at 1% level and has a positive correlation with book leverage. This is consistent with the findings of previous studies (Gropp and Heider (2010), Octavia and Brown (2010)).

The ratio liquid assets to Deposits & short term funding and net loans to total assets are both significant at 1% level and correlate negatively to book leverage. As we have mentioned the ratio liquid assets to deposits and short term funding measures the ability of a bank to meet its short term obligations from its current assets. Our findings are consistent with those of Allen et al. (2013). Net loans to total assets evinces the percentage of total assets which are bounded for the granting of loans. The higher the ratio the lower the liquidity of a bank. So as more capital is constrained in order to grant loans this shall result in higher leverage for a bank. So we would expect a positive correlation with leverage but we find a negative. Moreover high amount of loans usually results to more profits and this results to more equity and as a consequence the firm can be internally financed. But in our study there is a negative correlation between the ratio net loans to total assets and ROAA and this maybe the reason for our finding.

Loss loan provision is an expense that is reserved for defaulted loans or credits. It is an amount set aside in the event that the loan defaults. Provisions is an element of the balance sheet which reflects capital which is relegated in order to meet obligations in the future. Loss loan provisions consists a basic element of the equity of banks. The bank use its equity or borrowed funds in order to acquire assets which will generate profits. We expect a positive relationship between leverage and the ratio loan loss provisions to total assets since an increase to provisions leads to a decrease to equity and as a consequence a bank will have to use external funds to cover its obligations. Our finding suggest that the ratio loss loan provisions to total assets is statistically insignificant and exist a negative correlation.

In this thesis we use ROAA as proxy for profitability. We find ROAA statistical significant at 1% level with a negative correlation with leverage. The result is the expected one. A high profitability increases the equity of bank through retained earnings. Retained earnings are profits that are not distributed to shareholders and remain to the firm in order to be reinvested. As a result the highest the retained earnings the lesser banks use external funding. Our finding is consistent with the majority of empirical studies which

confirm the negative correlation between profitability and leverage (like Gropp and Heider (2010), Octavia and Brown (2010) and Juca et al (2012)).

Regarding tangibility we measure it as the ratio fixed assets over total assets. We find tangibility significant at 5% level but with a negative correlation. This is in contrast to the theories of capital structure which state that tangibility is positive related to leverage. Because tangible assets can be utilized as collateral in external borrowing. Moreover Gropp and Heider (2010) found a positive relation between leverage and collateral. This happens may be due to the fact that banks have investment in opaque assets and this amplifies the chances of bankruptcy. Furthermore it's difficult for outsiders to assess the risk of banks. Moreover our findings are consistent with those of Octavia and Brown (2010) who also find a negative correlation. Moreover a study of Dakalalis and Psilaki (2008) when examining non financial firms they also stated the existence of negative correlation. They explained that this possible happens because companies with lots of tangible assets may have found a stable source of return which provides them more internally generated funds and discourage them from turning to external financing.

Table 5 : Regression results with only bank specific variables

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.098583	0.139256	-0.707925	0.4794
BZE	0.045316	0.005847	7.750479	0.0000***
LASTF	-0.061034	0.007447	-8.196178	0.0000***
LLPTA	-0.061034	0.115987	-0.407664	0.6838
NLTA	-0.047284	0.017450	-2.682874	0.0076***
ROAA	-0.622957	0.059460	-10.47696	0.0000***
TANGIB	-0.338814	0.168913	-2.005850	0.0456**
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.975356	Mean dependent var	0.905475	
Adjusted R-squared	0.969466	S.D. dependent var	0.091406	
S.E. of regression	0.015972	Akaike info criterion	-5.263068	
Sum squared resid	0.092862	Schwarz criterion	-4.462174	
Log likelihood	1277.453	Hannan-Quinn criter.	-4.947464	
F-statistic	165.5914	Durbin-Watson stat	1.154573	
Prob(F-statistic)	0.000000			

Notes: (*), (**) and (***) reflect in significance at level of 10%, 5% and 1% respectively.

See table 2 for the definition of variables.

Concerning table 6 we observe that when we add in our model the two macroeconomic variables neither the significance of the other variables is influenced nor the sign of their correlation with the dependent variable. There

are minor alterations in the magnitude of the coefficients but they are insignificant. We find GDP growth to have a negative relation with book leverage but is statistically insignificant. The results from other empirical studies are ambiguous. Gropp and Heider (2010) found a positive correlation between leverage and GDP growth for book leverage but a negative for market leverage. Allen et al. (2013) found a positive relationship between market leverage and GDP growth for Japanese and Malaysian banks but negative for Thai banks. But for book leverage they found a negative relationship for all countries.

Regarding the macroeconomic factor inflation is significant at 5% level but the dependent variable book leverage depends upon inflation negatively. Gropp and Heider (2010) find that lower inflation is related with significant higher market but not book leverage. Generally inflation increases bank debt but it does matter if inflation is anticipated or unanticipated. Since our examined period is the crisis period the inflation was unanticipated because of the economic crisis and the unstable economy so this may be the reason for our finding.

Table 6 : Regression results with bank specific variables and macroeconomic variables

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.137411	0.139437	-0.985474	0.3250
BZE	0.047159	0.005868	8.036402	0.0000***
GGR	-0.096384	0.059862	-1.610094	0.1082
INFL	-0.246717	0.121405	-2.032181	0.0429**
LASTF	-0.060558	0.007414	-8.168085	0.0000***
LLPTA	-0.061428	0.116955	-0.525226	0.5997
NLTA	-0.045058	0.017360	-2.595537	0.0098***
ROAA	-0.590723	0.060915	-9.697534	0.0000***
TANGIB	-0.351194	0.168307	-2.086630	0.0376**
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.975784	Mean dependent var	0.905475	
Adjusted R-squared	0.969830	S.D. dependent var	0.091406	
S.E. of regression	0.015877	Akaike info criterion	-5.271711	
Sum squared resid	0.091252	Schwarz criterion	-4.452615	
Log likelihood	1281.407	Hannan-Quinn criter.	-4.948934	
F-statistic	163.8933	Durbin-Watson stat	1.139978	
Prob(F-statistic)	0.000000			

Notes: (*), (**) and (***) reflect in significance at level of 10%, 5% and 1% respectively. See table 2 for the definition of variables.

7. Conclusion

The purpose of this study was to examine the determinants of capital structure of banks by using panel data analysis. Our sample consists of listed commercial banks of the European Union of 15 countries and the examining period is 2007 until 2012. Our first sample consisted of 85 banks but we find many missing values for some banks so we conclude to a final sample of 76 banks and 452 observations. We run two regressions: one with only bank specific variables and another with bank specific and macroeconomic factors.

We find that the standard determinants of capital structure have an explanatory power in financing decisions of banks during the financial crisis. We find statistically significant at 1% level the following variables: size of a bank, profitability, the ratio liquid assets to Deposits & short term funding and the ratio net loans to total assets. We find statistically significant at 5% level tangibility but the ratio loan loss provisions to total assets is insignificant.

When we include in our model jointly inflation and GDP growth we observe that neither the significance of the other variables is influenced nor the sign of their correlation with the dependent variable. Furthermore we find that GDP growth is statistically insignificant while inflation is significant at 5% level.

Through this study we intended to contribute to the limited literature on the influence that has the recent financial crisis on the factors that are related with banks leverage. Though, it must be noted that this study is not intended at exhausting the issue addressed and arriving to definitive deductions. Its basic purpose is a better understanding of the determinants of the capital structure of banks during the financial crisis period.

Concluding we propose the performance of future studies with larger sample and concerning some other factors like concentration ratio, share price volatility and the diversification of managers compensation.

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