EU Bank Capital Structure and Capital Requirements

What is the importance of CRD IV in determining bank leverage?

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Abstract

This paper studies the determinants of bank capital structure and discusses how traditional theories of capital structure apply to banks in the light of financial regulation. The purpose is to find out the impact, to EU in particular, of the new regulatory framework that has been pushed through because of the financial crisis post 2007. This is done by a review of capital structure theories and the main amendments to capital requirements globally and with a focus on the EU. Subsequently, an empirical study of the determinants of bank capital structure is performed with panel-data from 51 large European banks 1994-2010 with book leverage as dependent variable. The study finds inconsistency between empirics and theory, suggesting that there is inadequate theoretical ground for bank capital structure. The paper also finds that there are arguments in favour of a non-risk based capital ratio as a regulatory instrument.

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1.Introduction and Summary

1.1. Background and Purpose

In the wake of the 2007- financial crisis, the need for tighter regulation policy became apparent. The current rules had not been effective in containing a stable financial system. Because of this, the Basel Committee on Banking Supervision[1], prepared a new regulatory framework referred to as "Basel III". Within this new framework the capital requirements for banks are harsher in terms of holding higher capital ratios and better quality and liquidity. The first jurisdiction to implement the new guidelines into law will be the European Union with the proposals known as "Capital Requirements Directive IV" (CRD IV).

The higher capital and liquidity requirements may have implications for the banks' cost of capital. The classical Modigliani-Miller theorem (1958) show that the cost of capital is independent of whether the banks are financed with debt or equity, this is related to the fundamental finance question of whether an investment is worthwhile undertaking or not. According to the M-M theorem the instrument of choice is irrelevant to this question. The most prevalent theoretical assumption is that it is costly for banks to increase their capital. The cost of a capital requirement appears to depend on the bank's private optimal capital ratio. The present paper examines the theory of capital structure and its applicability to financial institutions. Furthermore, the relevancy of the theorem in the context of financial regulation is discussed, with a focus of the EU implementation of the Basel III guidelines.

The **purpose** of this paper is to shed light bank capital structure and review the corporate capital structure theories applicability to financial institutions, and hypothesise on the determinants of bank capital structure. Further, to examine the determinants empirically and discuss the impact of the new regulatory framework of capital requirements being implemented in the EU.

1.2 Problem and Related literature

Previous literature states that the interest for examining bank capital structure is of no interest, since it should be determined by the capital requirement posed on banks (Mishkin 2000). Besides holding capital according to requirement, another more dynamic effect of this regulatory instrument and related to asymmetric information; is that the cost of raising equity

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[1] Committee of banking supervisory authorities established by the central Bank Governors of the group of ten countries in 1975 and permanent secretariat located at Bank for International Settlements

for different banks in case of falling short in certain circumstances, affect their leverage. Gropp and Heider (2009) find evidence that there are more similarities between corporate capital structure and bank capital structure than previously thought. They also conclude that capital regulation may only be of second order importance when determining the capital structure of banks.

The EU has adopted a view of "levelling the playing field", when it comes to regulation, despite the differing financial systems of member countries. Investment firms and universal banks are thus subject to the same capital requirements which distorts competition. The social costs of default differ substantially between these types of intermediaries, and the capital requirement for investment firms is not optimal in this respect. The costs of higher requirements may ultimately be carried by the consumers with higher prices from the banking industry (Szegö 1995).

Levine and Laeven (2009) show that banks with more powerful owners take greater risks, and that the impact of bank regulation depends on the ownership structure of the bank. Hence, the bank capital regulation, deposit insurance and activity restrictions on bank risk activities need to be analysed taking the ownership structure into consideration.

Capital requirements focus (surprisingly) on the amount of equity capital held in proportion to the bank's risk weighted assets (RWA). Since the principal concern of reforming the regulatory framework relates to the equity capital ratio and bank leverage, it would be of great interest to evaluate the effect of higher requirements. Theoretically and empirically.

1.3 Method and Data

First, to establish a foundation for the problem's identification, the theories of capital structure are reviewed, together with bank capital structure and the determinants of leverage. The policy aims and implications of implementing the new Basel guidelines in the EU are also considered.

The empirical study of this paper investigates traditional determinants of capital structure derived from theory and previous studies, and how they affect bank leverage. This is performed using a sample of 51 of the 100 largest banks in Europe with a panel-data approach. A regression method of generalised least squares is employed with leverage as dependent variable, and the independent variables; market-to-book value, size, profits and dividends. The results of the regression and the how well the determinants of capital structure

explain bank leverage is further discussed, comparing the results to theory and previous studies. For useful comparison the study by Gropp and Heider (2009) on bank capital structure and the study by Frank and Goyal (2009) on firm capital structure will be employed. The determinants are further addressed in the context of the new Basel III regulatory requirements and the implementation in the EU.

1.4 Outline

This paper is organised as follows: Section two is devoted to theory, with first a background concerning the financial system, followed by a review of the main theories of capital structure. The classical ones concern corporate capital structures and the optimal equity to debt ratio that precipitates into the lowest capital cost. Part of the problem of capital structure decisions is also asymmetric information and ownership structure, and the conflicts that arise because of this. The theories will be addressed, including pecking-order theory, trade-off theory and signalling. Subsequently, how these theories relate and can be applied to banks are subject to the section that follows. Section three will review recent developments of financial regulation, globally through the Basel guidelines and the EU capital requirement directive. In section four the implications of financial regulation for bank capital structure will be discussed. Section five will enter the empirical study of the paper and will be followed by data descriptive statistics. Finally the results of the empirical study will be discussed in section six, relating to the theories of capital structure and financial regulation.

2. Theory

2.1 Financial Institutions and the Safety Net

Why do we have banks? The existence of financial intermediation is motivated mainly by two theories, in which one of them focuses on the asset side and the other one on the liability side. The asset side is motivated by lower costs due to banks' market monitoring abilities. The liability side argues the contribution of banks by improving liquidity and risk sharing. This is achieved through the design of contracts that give a desired future payoff related to a higher early payoff to investors, which in the non-intermediary case, the investor would have had to choose in which state to collect their payoff (in a framework with investors and entrepreneurs). With a failure of the function of these contracts, there is a risk of bank-runs. This problem is mitigated with the introduction of deposit insurance. The theories regarding the trigger mechanisms for these kinds of bank-runs differ, although models of adverse

information have received most attention. Deposit insurance would prevent bank-runs based on adverse information, but it is not socially costless. The value enhancing existence of banks have empirically been evidenced (considerably, according to Bhattacharya et al. 1998), thus there is little doubt that the existence of banks need to be.

Unanticipated shocks that arise (such as price-level ones) may cause liquidity problems for short-term borrowers and therefore cause banks' to be reluctant to lend (credit-crunch), difficulties related to this, and over-all costs associated with bank failures, promotes the existence of a **federal safety net**. But the safety can in itself give rise to moral hazard issues. Deposit insurance give incentive for banks to engage in excessive portfolio risk and hold less liquid reserves than socially optimal (Merton 1978). In the need to mitigate these effects there is *market discipline*. The consensus for how to create efficient market discipline is not theoretically resolved, but there are several approaches to optimal financial regulation. The governmental-body implication of measures for market discipline most noted in actuality is financial regulation through capital requirements and monitoring.

The deposit insurance is shown by Merton (1978) that it can be valued as a put option. The insurance gives the depositors an option to sell their claims on the bank to the FDIC (Federal Deposit Insurance Corporation) at its face value. Black et. al. (1978) argues that the most optimal solution of bank regulation is a correctly priced deposit insurance premium. How to correctly price the deposit insurance is another problem. A fair level of pricing is where the price levels with the administrative costs and the ex ante value of the insurance (Marcus and Shaked 1984). The authors further find that the deposit insurance renewal is almost unconditional upon examinations, suggesting a lax monitoring (however, the framework for supervision is another issue). Their empirical findings state that deposit insurance is overpriced, exceeding their estimated values in a sample of forty banks. One caveat of the model is that it shows the aggregated overpricing of banks' deposit insurance premia and does not consider the banks on the margin. The valuation is also extremely sensitive to the standard deviation of total asset returns. The estimate of this volatility clouds the valuation of the deposit insurance due to its sensitivity. The sensitivity of the standard deviation does however depend on time or i.e. the examination interval. The policy implication of this sensitivity is that banking agencies can manage the frequency of the examination interval once a potential problem with the bank has been identified (Shaked, Marcus 1984). The indicative result of the study is that although the premiums may be overpriced, it is on an aggregate level suggesting

that a price level appropriate for the system but non-risk based, might lead to a majority of safer banks subsidising a few high-risk ones.

The financial systems of Europe and US differ, but in short the largest difference is that Europe has universal banking with commercial and investment banking in one institution, while the US has a separated banking with more stand-alone investment banks. The universal banking system is opposed with the arguments that it increases conflicts of interests, adversely affect the development of the capital markets, and that larger banks can pervade tax-payer money to large exposures under the "Too-Big-To-Fail" Doctrine, that systemically important banks will always be saved by the government (Black et. al. 1997).

The pro-arguments state that universal banking has better use of information, and that it has less moral hazard related to borrower specific asset-substitution. So the design of the financial system is suggested to be a victim of trade-off (Bhattacharya et. al. 1998). The bank as a provider of liquidity becomes more and more fragile in contemporary banking theory, putting more pressure on central banks and the safety net (regulation and insurance).

Historically, in the 1950s and -60s, the moral hazard problem of deposit insurance did not seem to pose any problem regarding the capital to asset ratio (Keeley 1990). The ratios in these decades where on average 5-7 percent, whereas in the late 1970s fell to about 2-3 percent. Keeley argues that the fall of ratios and excessive risk-taking of banks is due to increased competition stemming from a liberalization of a variety of regulatory barriers in the mid 1960s (note, that this is in the U.S, may not be applicable to the EU). The cure for this is the policy implication of the tendency of the banks with a high "charter" or market to book value to take on less risk because in case of bankruptcy, they would lose this valuable charter.

The regulation of the European financial service industry sector is connected with **European integration**, where "the first Bank Directive" 1977 adopted; "freedom of establishment within home country rules and control". This solution required that financial institutions satisfy an order of minimal requirements and capital adequacy standards. Subsequently, these stated standards were implemented through a range of directives (1986-1989). Worth noting, is the EC Directive 92/121 that came 1992, and has innovative features. Regarding "Large Loans" it complements the Basel guidelines with principles for prevention of loan concentration. Regulators have here taken notice of the importance of the correlation factor in credit risk, and the directive limits loans to any group of borrowers characterised by the property that "if one of them defaults, others may follow" (Szegö 1995). In retrospect,

thinking of the 2007- financial crisis, this was a farsighted and prudent move by regulators. The reason that these policy measures proved insufficient can be discussed; interconnectedness of the global financial system and implementation of measures could bear part of the blame.

2.2 Theories of Capital Structure

The Modigliani-Miller papers from 1958 and 1963, examines the nature of capital structure together with the cost of capital and corporate valuation. They make two propositions based on a number of assumptions leading to the famous conclusion; that the cost of capital is independent of capital structure, a finding that has given rise to a seemingly inexhaustible source for research. However it is subsequently shown, when relaxing some of the assumptions the conclusion do not change remarkably. Departures from the Modigliani & Miller propositions have thoroughly been analysed and originated into three major areas; Agency costs, trade-off theory and pecking-order theory. These theories are interrelated and examine the costs and benefits related to financial decisions, and consider relaxations of some of the assumptions of the M-M theory.

2.2.1 The Modigliani - Miller Theorem

Before the theorem by Modigliani – Miller, the economic theory concerning capital structure assumed that physical assets yielded sure and known streams. This implied that the cost of capital was equal to the market rate of interest. The supply curve for borrowed funds then obtained a rising one. This follows from the rational decision-making criterions under certainty; Maximisation of profits and; the maximisation of market value. The asset is worth acquiring if it increases the net profits of the owners of the firm, or if it increases the value of the owners' equity. By capitalising the stream that the asset generates at the market rate of interest you obtain how much it adds to the value (if and only if its yield exceeds the rate of interest). The difference between financing through debt or equity has no differing implication for the cost of capital, as it in both cases is the interest rate on bonds. In the theory of capital structure, there have also been room for uncertainty. Traditionally, performed by adding a risk premium to the market rate of interest or subtracting the expected yield with a risk discount. According to the Modigliani and Miller paper from 1958, the traditional views had not been satisfactory in depicting risk. With risk, the authors argue that the outcomes of value maximisation and profit maximisation are no longer equivalent. The profit maximisation becomes a random variable and related to a utility function of the owners. This is also a

difficult framework to analyse the cost of capital in, as it becomes a subjective notion. The market value maximisation approach, however does not pose this problem, as the owners' preferences are not relevant in determining if the project will raise the market value. The market price of the stock will reflect owners and potential owner preferences, and will hence adjust. The contribution of Modigliani and Miller to the discipline is in how the financial structure affects the market valuation and the implications of the cost of capital.

Their approach is a partial-equilibrium one, but with results relevant to a general one, focusing on one firm and the "industry". Prices of certain income streams are treated as constant and exogenous in the model. The uncertainty of the streams of profit is related to the mean value over time, and not its variability, as a variability can be certain. They also group firms into classes, and thus allow for homogeneity among classes and expected returns. From this assumption it follows that in a perfect capital market the price of every share in any given class must be proportional to its expected return. Where the constant ρ_k denotes this proportionality; the market rate of capitalisation for the expected value of the uncertain streams generated by the kth class of firms. The homogeneity of the classes will be challenged by introducing debt in the model, the different classes will be subject to different risk with different leverage. From these assumptions, two main propositions on how to value securities in firms that have different leverage follow below.

2.2.1.1 Proposition I.

The proposition I. is a simple arbitrage argument.

In a world without taxes, a levered firm's market value can be no different from that of an unlevered firm with equal cash flows, the reason is that an agent owning stock in a levered firm that is valued more than an unlevered firm, can sell these, borrow on a personal account, invest in the non-levered firm and thus earn a higher return because of the "excess market value" invested. With the same assumptions, allowing for deduction of interest payments on debt as an expense, the firms' market value would increase with debt, suggesting a debt ratio of 100 percent.

$$(3) \qquad V_j \equiv \left(S_j + D_j\right) = \bar{X}_j/\rho_k \quad for \; any \; firm \; j \; in \; class \; k$$

$$\rho_k = \frac{\bar{x}_j}{p_j}$$

where p_j = price, $\bar{x}_j$ = expected return per share of the jth firm in class k

$\bar{X}_j$ = the expected return on assets own by the firm
D_j = the market value of the debts of the company
S_j = the market value of its common shares
$V_j \equiv S_j + D_j$ — the market value of the firm

(3) Shows that the firm's market value is independent of its capital structure

The ratio of the firms expected return to the market value, $\bar{X}_j/V_j = \rho_k$ - or also, the firm's average cost of capital (capitalisation rate).

$$(4) \qquad \rho_k = \frac{\bar{X}_j}{V_j} \equiv \frac{\bar{X}_j}{(S_j + D_j)}$$

"The average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalisation rate of a pure equity stream of its class" (pp. 269 Modigliani, Miller 1958). This equality will be restored by arbitrage in case of disruption, independently of risk the prices of shares will adjust;

If (3) or (4) do not hold for any two firms of the same class, arbitrage will take place. In equilibrium the value of the levered and unlevered firm will be the same (M & M 1958).

As mentioned, under the assumption of homogeneity of expected returns, if the value of an unlevered firm V_1 is less compared to a levered one, V_2 investors will eliminate this discrepancy by borrowing on personal account until the values are the same. If the value of the levered firm is less than that of the unlevered firm, the inequality will be erased by the opportunity for investors to sell their holdings of firm 1, since the return on the portfolio of shares in firm two is greater (the reference to portfolio choice is illustrative and this theory will not be reviewed).

2.2.1.2 Proposition II

Proposition II introduces financial risk into the model.

From the proposition I and equation (3)

$$(3) \qquad i_j = \frac{\bar{X}_j - D_j}{S_j}$$

$$(9) \qquad \bar{X}_j = \rho_k(S_j + D_j)$$

Substituting (3) into (9) you obtain:

$$(8) \qquad i_j = \rho_k + (\rho_k - r)D_j/S_j$$

The expected yield of a share of stock is equal to the appropriate capitalisation rate ρ_k for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between ρ_k and r (Modigliani, Miller pp. 271 1958).

Modigliani and Miller (1958) consider extensions of the model, by relaxing the assumptions and allowing for tax, multiplicity of bonds with different interest rates and imperfect market conditions.

With the presence of taxes, the form of the equations in the propositions is unaffected, but need to be interpreted differently. ρ_k is no longer the "average cost" of capital in the same way but also subject to the internal investment planning in the firm. Allowing for corporate tax, the cost of capital will decline with debt increase, thus the value of the firm will increase with more debt. The results of the relaxation of the tax assumption is in the paper: "Corporate Income Taxes and the Cost of Capital: A Correction" (1963) revised. The tax advantage of debt is greater than believed in their first paper. They conclude that in the long run, the assets of a firm are financed through a mixture of both debt and equity. The firm's mixture will fluctuate around a long-run "target" debt ratio. The closest to the papers consideration of a capital requirement regards the statement:

"No investment can meaningfully be regarded as 100 debt financed when lenders impose strict limitations on the maximum amount a firm can borrow relative to its equity (and when most firms actually plan on normally borrowing less than this external maximum as to leave themselves with an emergency reserve of unused borrowing power)" (pp. 441 Modigliani, Miller 1963).

This shows the importance of having a capital requirement in a lender-borrower situation, otherwise financing may be done with full leverage. Reference is also made to holding something similar to a "capital buffer". The new framework for financial regulation by Bank for International Settlement and subsequently the European Union capital requirement directive CRD IV, stresses these two points as crucial in containing a stable banking system.

The contribution of their findings of the theorem contrasts the traditional view in several respects. According to the traditional view, the cost of capital should decline with leverage up until a certain point (stable firms that increase debt should only slightly add to the riskiness of the firm), suggesting an optimal capital structure. The M – M propositions conclude though, that there will be no optimal capital structure as they all will be equivalent in equilibrium, since the cost of capital will be the same. Empirical implications of their findings of relevance to this paper, is that the cost of capital should not show tendency to fall with debt increase. According to proposition II the expected yield on common stock should increase with leverage.

2.2.2 Departures and Developments from the M – M Theory

2.2.2.1 Agency Theory

Agency costs are derived from the relationship between the principal, who engage an agent to perform a service on their behalf. The agent will not always act in the best interest of the principal, given that both have an objective to maximize their own utility. The agency costs that result from this problem are the monitoring expenditure by the principal, the bonding expenditures by the agent and the residual loss (Jensen, Meckling 1976).

Agency costs can arise with the conflict between managers and shareholders. By increasing leverage, these conflicts can be reduced. The conflict arises when shareholders are unable to effectively monitor the managers' decisions. With a higher debt, there is a higher pressure on the managers to generate positive cash flow and protect human capital in the firm. This may give managers greater incentive to work hard and make quality investment decisions. Shareholders can also increase the managers' stake holdings in the firm to increase their incentives. The increase of debt lessens the incentives for managers to keep the firm going beyond the point where shareholders would gain from liquidation. But the impact of the conflicts is ambiguous. There is in conclusion a trade-off between the agency costs from conflict of interests; The agency problems of shareholder- creditor, the shareholder- manager

and avoidance of expropriation and aggravating interest conflicts between shareholders and managers (Berger 1995).

2.2.2.2 Trade – off theory

The capital structure of a firm is, according to the trade-off theory, determined by the trade-off between the benefits of debt and the costs of debt. There are various theories to this obtained by the cost-benefit analysis. The most relevant one here regards the "tax-bankruptcy trade off" which weighs the tax advantage of debt against the costs in case of bankruptcy. The probability of bankruptcy increases with the use of debt (risk).

As mentioned above, within the trade-off theory there is an agency perspective with the conflict of interests between managers and shareholders and debt holders. To avoid bankruptcy, the debt financing must be repaid, thus debt financing discipline the managers versus the shareholders. While debt financing mitigates manager-shareholder conflict, it increases conflicts between shareholders and debt-holders.

The trade-off theory can further be divided into two parts, whereas the first part is static trade-off theory and the second is dynamic trade-off (or target adjustment behaviour). Static trade-off is when the firm's leverage follows a one period trade-off between bankruptcy costs and tax benefit of debt. The firm follows dynamic trade-off if it sets a target leverage and deviations of that target are removed over time (Frank, Goyal 2008).

The main predictions from the trade-off theory are that; increased costs from financial distress reduces the optimal level of leverage; An increase in non-debt tax shields, reduces the optimal debt level; An increase in the personal tax rate on equity increases the optimal debt level; The optimal level of debt is decreased when the marginal bondholder tax rate is increased; The effect of risk has shown to be ambiguous (although most likely there is a negative relation between debt ratio and volatility). The static model is difficult to empirically test since elements are not directly observable (Frank, Goyal 2008).

The dynamic trade-off theory considers a more than one period framework. In a multiple period or continuous time model, expectations and adjustment costs are of importance. The financing decisions then typically depend on the financing margin that the firm anticipates in the next periods. This means that there is difference among firms; some expect to pay out funds in one period, while others expect to raise funds. The raising of funds involves debt or equity. Whichever the choice or combination of them, is determined by factors as profitability

of the firm and tax. The result drawn from this is that more profitable firms have lower leverage, because for a profitable firm, it can be more advantageous to retain its earnings and invest them rather than paying out to shareholders. Also, the tax situation of the shareholders affects the firms behaviour of retaining earnings or not. The introduction of transaction costs to the model affects the rebalancing or adjustment from one period to another (Frank and Goyal 2008). In summation, the dynamic perspective express that the optimal financial choice today depends on what the optimal choice tomorrow is expected to be.

There are contradictions to the trade-off theory. One main argument is that corporate income tax are only about a century old and debt financing has been around for much longer than that the only benefit of it would be tax deductions (Frank, Goyal 2008).

2.2.2.3 Pecking order theory

The pecking order theory is mostly discussed in the framework of asymmetric information, but it can also be derived from considering tax, agency cost or behavioural contexts.

The theory considers three available sources of funds; Equity; Retained earnings and Debt. The preference order of financing can be cleared with a-point-of view analysis, an outside investor interprets the decisions of the agents inside the firm. Equity is riskier than debt to an outside investor, and he will thus re-evaluate the firm, when the firm announces a security issue (since he assumes that the inside manager has information that he does not have). Equity is a last resort source of finance due to adverse selection, debt is subject to minor adverse selection, retained earnings are preferred to both. A manager argument for holding a capital buffer (in different form), is that the firm does not want to issue stock on short notice in case a valuable investment opportunity arises, this will affect the firm negatively if the stock is undervalued. This situation is apparent when managers have more information than shareholders. (Myers, Majluf 1984).

2.2.2.4 Concluding remarks

The implications of capital structure theories like pecking order and trade-off are not entirely consistent. One reason for the capital structure problem being subject to inconsistent theory is suggested by Frank and Goyal (2009) to be stemming from the fact that many empirical studies aim to bring support for a theory in particular. The vast available empirical evidence facilitates varying ideas. Myers (2003) argues that there are useful theories providing

framework to analyse capital structure, but that there is no universal one theory of capital structure, and different factors apply to different firms under different circumstances.

2. 3 Bank Capital Structure

According to Berger et. al. (1995), banks systematically have the highest leverage of firms in any industry. On the question of whether the $M - M$ theory can be applied to banks, Miller argues that it can (1995), but points out the fact that the propositions are ex. ante and thus implicitly that they cannot be verified empirically. In Black et al (1978) the $M - M$ propositions serve as a basis to argue for how the regulation of bank holding companies should be designed accordingly, involving the pricing of the deposit insurance premia (as mentioned earlier in the theory section).

The market definition of the optimal capital structure would come down to the capital ratio which maximises the value of the bank in absence of regulatory capital requirements. This "market requirement" would be two sided, as too much or too little capital can cause the value of the bank to decline (Berger et. al 1995). In the light of the M-M theory this is related to their notion on a long-run target ratio for capital. With the trade-off theory, this can be seen as (in presence of tax and costs related to insolvency), the optimal ratio where the tax advantages of debt are just offset by the increase in the expected costs of financial distress of the bank. Note that financial distress may not necessarily result in bankruptcy (in the presence of Too-Big-to-Fail).

2.3.1 Banks and Agency Costs

With relaxing the assumption of symmetric information in the $M - M$ framework a number of theories emerge. Banks produce private information regarding their loan customers. This creates an asymmetric information problem between the banks and the capital markets. The bank managers then have more information than the capital markets regarding future earnings and prospects. According to Stiglitz and Weiss (1981) and Myers and Majluf (1984) and the signalling theory, the capital markets evaluate the actions of managers. The amount of the capital ratio gives rise to a signalling equilibrium, where a higher capital ratio could mean valuable private information, or a low capital ratio could indicate an expected better future performance. According to Berger et al (1995) there has not been sufficient empirical evidence to support these equilibrium theories.

The problem with asymmetric information also extends to conflicts between shareholders and creditors, as mentioned earlier they have differing interests. Decisions that lead to an overall maximisation of claims, may not lead to a maximisation of the particular claims of the shareholders. They then may have an incentive to exploit the creditor to shift the wealth. They can take on riskier assets in exchange for safer ones if creditors have insufficient information in order to react, which creates moral hazard. If the bank is near bankruptcy, the shareholders could deny value-enhancing investments, since the creditors would be the only beneficiaries by such a move. The banks operating status can also be kept beyond the point of which it should have been liquidated because shareholders still have an interest in maintaining the option value of their claims. The problems of "expropriation" of creditor value is apparent when the debt has a long maturity and is difficult convert in the short term. The longer the maturity, the more likely are shareholders to expropriate value before creditors react by raising rates or withdrawing credit. An increase in the capital ratio of the banks can assure the creditors of its safety. In this way the agency problems gives an incentive for the shareholders to increase the capital ratio regardless of regulation to assure creditors of the safety of their money (Berger et. al. 1995). The current Basel III guidelines have been amended in this respect, constraining which elements of capital that are eligible for inclusion in the definition of regulatory capital. The section that follows will review current financial regulation.

3. Financial Regulation

3.1 The Basel Guidelines

In December 2009, the Basel Committee on Banking Supervision published for consultation a package of proposals to strengthen the global capital and liquidity regulations with the goal of creating a more resilient banking system. These proposals were endorsed by the oversight body of the commission (GHOS) in mid- 2010.

In the framework for Basel III the definition of capital is distinct but extensive, inherent in the area of accounting standards, a detailed and full review is beyond the scope of this paper. However the main changes to the capital definition and its implications will be discussed here.
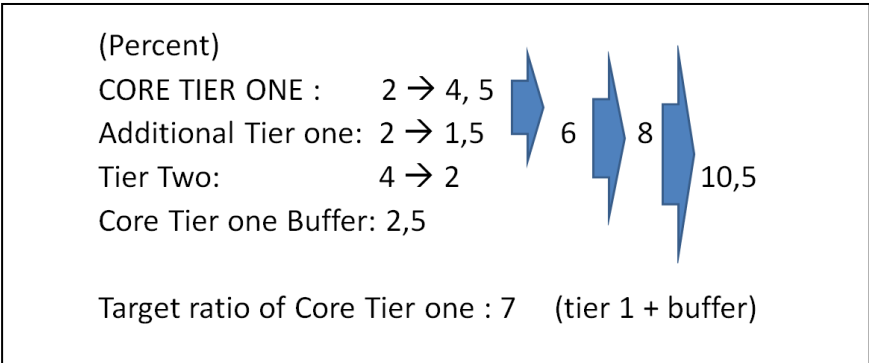
The regulatory capital has the purpose of absorbing losses that a financial institution does not expect to make. The two main types are divided into capital absorbent on a "going" concern basis; ensure the institution can continue its activities and prevent insolvency, and a "gone"

concern basis; help to ensure that the depositors and senior creditors get repaid in case of bankruptcy (Bank for International Settlements 2010).

The main concern for banks of the new capital ratio is not just the level of the new requirement, but the changes in the **definition** of capital.

The main changes between Basel II and Basel III to the definition of regulatory capital is here discussed in terms of what will count as eligible capital under the different Tiers. The Tier 3 requirement in Basel II is abolished. The Tier 2 capital that consist mainly of undisclosed reserves and subordinated debt, is not substantially altered but the required capital Tier 2 is decreased from four to two percent. The additional Tier 1 capital consists in Basel III of "some preference shares" and portions of minority interests. The hybrids with innovative features will no longer be eligible for inclusion and Tier 1 additional capital, is reduced from two percent to one-point-five percent. However, the most important and substantial change is made to the Core Tier 1 Capital, which requirement is increased to four-point-five percent from two percent. Core Tier 1 in Basel III consists of common equity and retained earnings, preference shares are generally excluded, silent partnerships are generally excluded, portions of minority interests are excluded and minus all existing and additional deductions. In terms of deductions, there are items which now will receive limited recognition as common equity, these are; deferred taxes arising from "temporary differences"; significant investments in the equity of unconsolidated financial and insurance entities; and mortgage servicing rights (which is a particular intangible asset prevalent in the US). Furthermore the Core Tier one will be supplemented by a capital buffer of 2, 5 percent, making the target ratio of Core Tier one to 7 percent. The main requirement changes to the common equity Tier is shown below in figure I. below:

Figure I. Changes in capital requirements between Basel II and Basel III, where the large arrows point to the total requirement when summing up the different Tiers.

(Percent)
CORE TIER ONE :   2 → 4, 5
Additional Tier one: 2 → 1,5   6   8
Tier Two: 4 → 2   10,5
Core Tier one Buffer: 2,5

Target ratio of Core Tier one : 7   (tier 1 + buffer)

The additional part of Tier 1 that now is set at 1,5 percent, is required to be loss-absorbent on a going concern basis. At a going concern basis, the instruments must be subordinated, have fully discretionary non-cumulative dividends or coupons and neither have maturity date or an incentive to redeem. The Tier 2 capital will be simplified by removing existing sub categories and in order to be loss absorbent the included instruments need to be subordinated general creditors and have a maturity date of at least five years (Basel Committee on Banking Supervision 2010). This can be related to the discussion on shareholders' expropriation of creditors value in the previous section, stating that these kind of instruments increase this problem.

The core Tier 1 capital **ratio** refers to the capital divided by the risk weighted assets (RWA). According to the impact assessment by the European Commission (2011), the proposal package with the change in **definition** of capital will for group 1 banks[2] in the EU, will as shown in figure II below, reduce the eligible common equity Tier 1 (CET1) with 42 percent. The risk weighted assets of group 1 banks will be increased with 24,5 percent. In combining the impact of the reduction in the Tier 1 capital due to changes in definition of capital and the increase of RWA you can picture the impact on the ratio. Seeing the quotient between Tier 1 and RWA as "constant", the new quotient would have to increase 2,17 times compared to the old definition of the ratio.

Figure II. Impact assessment of the regulatory ratio, had the new definitions been in place (2011).
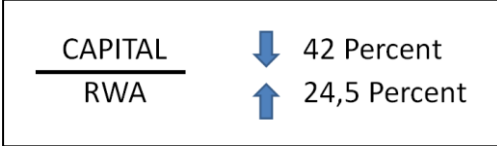
3.1.1 Leverage Ratio

The Basel committee developed a non-risk-based measure as a supplementary measure to the risk-based requirement. The leverage ratio will include Tier 1 capital measure (numerator) and a total exposures measure (denominator) (European Central Bank 2010)

The Basel Committee also aims to introduce a counter-cyclical capital framework, to require banks to build up capital buffers above the regulatory minimum in good times. The so called

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[2] Banks with assets in excess of 3 billion euro.

"counter-cyclical buffer" proposes a capital conservation buffer of 2,5 percent of common equity Tier 1, established above the minimum, which could be extended up to an additional 2,5 percent of common equity Tier 1 or other fully-loss absorbing capital in periods of excessive credit growth. The actual value of the buffer would be equal to the weighted average of buffers across countries, based on the principle of reciprocity in cross-border application (Bank for International Settlements 2010). Independent of the risk-based ratio, had the new definition of Tier 1 capital been in place 2009, approximately 42 percent of the group 1 banks would have been constrained by a 3 percent leverage ratio (Quantitative Impact Study, 2010, Bank for International Settlements).

3.2 Financial Regulation and the EU

3.2.1 The Capital Requirement Directive

The capital requirements directives (2006/48/EC and 2006/49/EC) aim is to ensure the financial soundness of banks and investment firms. Together these directives stipulate how much banks and investment firms must have of their own capital in order to cover their risks and protect their depositors. As presented above, since the financial crisis of 2007-2009 the global framework for regulation has been pushed for a change through Bank of International settlements with the new 'Basel III'. The EU has amended the capital requirements directives and introduced changes by Directive 2010/76/EU. The main changes to the directive include; better remuneration and policies within banks, where the supervisor would have the authority to sanction banks that have policies which do not comply with the new requirements (as encouraging excessive risk-taking); higher capital requirements for re-securitisations; Disclosure of securitisation exposures, and finally; higher capital requirements for the trading book. The higher capital requirements will be implemented in two phases, first on the 1 of January 2011, and second one by 31 December 2011 (European Commission 2011).

Within the proposal for CRD IV, to be counted as eligible common equity Tier 1 capital 14 strict criteria must met in accordance with Basel III.

The European Commission has with concern to the excessive leverage build-up on banks' balance sheets investigated the possibility of a new policy measure regarding a non risk-based leverage ratio (as also proposed in Basel III). This measure is considered to be a highly effective approach according to the European Commission. The introduction of a leverage ratio could pose problems in terms of the comparability of different countries differing

reporting framework. The effectiveness of this ratio as defined in the Basel III rules text is to be evaluated during a period full credit cycle, prior to it becoming a binding measure, proposed 2018. A minimum Tier 1 leverage ratio of 3 percent will be tested during a parallel run period (2013-17). Based on these results, the leverage ratio may be included in Pillar 1 as of 2018.

Worth mentioning, is that there is also a liquidity framework that has been developed. The main measures Liquidity Coverage Ratio (LCR) which establishes a minimum level of high-quality liquid assets to withstand an acute stress scenario lasting one month, and a structural long term measure; the Net Stable Funding Ratio (NSFR) that ensures that longer term assets are funded by more stable medium or longer term liability and equity financing. These measures are complemented by a set of tools to facilitate the on –going monitoring of liquidity risk exposures and information exchange among supervisors.

According to the committee of banking supervisors (CEBS 2011) assuming that full implementation of the proposals would apply to the data collected for banks in 2009 the Group 1 banks in the EU would have an average CET1 ratio of 4,9 percent, compared to the current one of 10,7 percent, which indicates a shortfall of 5,8 percentage points.

4 Bank Capital Structure and Financial Regulation

4.1 Instruments for regulation

The ability of the regulatory instruments to discipline, absorb losses and decrease risk varies. Equity, does reduce the leverage risk, but may not always reduce the overall risk. It has been shown, depending on the bank's utility function, it will increase or decrease its portfolio risk in response to higher capital requirements. This is also related to the investments of the bank. If bank investments are subject to decreasing returns, a value maximising bank may increase portfolio risk. How capital requirements affect bank risk taking has not yet received full theoretical understanding. But an empirical evidence point to that higher equity is related to lower overall bank risk (Berger et. al. 1995).

Bank holding companies differ from other firms in the way that they are protected by a regulatory safety net. This includes deposit insurance, unconditional payment guarantees and the discount window (possibility to lend favourably from the central bank). This safety net would most likely put a pressure on the banks target ratio, since it shields stakeholders from the full consequences of bank risk taking. The safety net may also affect the risk-pricing of

uninsured debt through them acting as a subsidy to a bank, or that the market believes that the debt is insured in the end (Berger et al. 1995). As became apparent in the 2007- financial crisis, with the excessive risk-taking of many banks, this theory cannot be dismissed of importance.

The principal concern of regulators is coping with systemic risk. In the case that certain banks fail, imperfect information regarding banks' status to the public may cause panic runs; other solvent but illiquid banks may then be regarded as uncertain by the public and the public may impose their failure by demanding their deposits. Berger (1995) argues that failure of solvent banks affect monetary policy negatively; during a bank panic the ability to manage the quantity of bank loans would be difficult. Bank failures can also affect the payments system by interfering with the flow of money; seeking the spot that yields the highest return. Concern regarding the social costs related to systemic risk is also an engine for the regulatory requirements to be set high and a motivation for the safety net itself.

According to Black et. al. (1978), the government should operate their market discipline through the pricing of deposit insurance premiums. But the regulators reliance on capital requirements remains high, since the premiums have been shown that they do not reflect the risk in an adequate way.

The obvious regulatory optimal solution would be to require banks to hold as much equity so that the probability of default is negligible. But if banks where to raise the amount of their equity, this would also affect their cost of capital and reduce the bank's value. The costs of regulatory requirements are most likely to be passed on to the customers. Related to the trade-off theory of capital structure, the capital requirement trade-off would be the social benefit of reducing the risk of bank failure opposed to the social cost of diminishing intermediation. Ideally, the regulators would be able to tailor a capital requirement for banks; this is impossible though since they lack information on exact social costs and benefits (Berger et. al. 1995).

4.2 Impact of regulation

In order to comply with the higher capital ratio, banks need to increase capital. To meet the requirement banks may take on larger risks and suffer large losses before the insurer can detect them. Depending on how far the capital ratio is from its closure level, in this way, a moral hazard incentive to take advantage of the safety net arises. The capital ratio can also

make the bank hold less equity than it would absent regulation, e.g. below their target ratio, since they can take advantage of the safety net (Berger et.al 1995).

The committee on banking supervision conducted a quantitative impact study of the new requirements, with data collected by national supervisors. The weighted average leverage ratio with the new definition of Tier 1 capital and the agreed upon exposure by GHOS with collected data between the period 2004-2009, is 2,8 percent for Group 1 banks (where group 1 banks are banks with excess 3 billion euro assets and well-diversified). The impact study is mainly illustrated by comparing the banks' capital positions with current regulatory framework to the positions that would have been if the new rules were in place. The actual impact is also expected to be less than estimated due to gradual adjustments by the banking sector. Because of differing jurisdictions between countries and the changes to the definition of capital, the impact will vary widely across banks. The definition of capital affects both the numerator (Tier 1) and denominator (RWA) of the CET1 ratio. The denominator (RWA) is affected also by changes in **counterparty credit risk** (mainly from applying a higher asset value correlation against exposures to financial institutions or deterioration in counterparty creditworthiness) and changes to banking book **securitisations**, for example; higher risk weights for re-securitisation exposures.

In a more long-term perspective, higher requirements could also mean higher entry costs and affect competition. With less competition there would be more opportunity for existing banks to attain higher profits.

5 Empirical Model and Data

5.1 Corporate Finance style determinants of leverage applied to banks

Opinions on what constitutes a good measure of leverage differs, both book leverage and market leverage are employed across studies. An argument for using book leverage is that managers usually focus on book leverage for their financial decisions (Frank, Goyal 2009). One caveat of using book leverage is the fact that it is backward looking, while markets are forward looking. Market leverage is usually defined as total debt to the market value of assets and book leverage as the debt to equity or one minus equity divided by total assets.

Summing up, and as shown in table II below, in theory, the included variables in the empirical study should affect leverage as follows:

Leverage and profitability. According to the static trade-off theory, profitable firms should use more debt since they face lower costs of financial distress and have more use of tax shield. This suggests a positive relationship between leverage and profits. The dynamic trade-off theory however, speaks for a negative relationship between leverage and profitability.

Leverage and firm size. The trade –off theory predicts that large firms should have a larger amount of debt because the face lower risk of default. They also have smaller agency costs related to debt, since old big banks tend to have a good reputation. Thus there should be a positive relationship between firm size and leverage.

Leverage and market-to-book ratio. A firm that is in growth faces larger costs in case of bankruptcy, and also a high market-to-book ratio increase agency problems related to debt. Thus the predicted effect of high market-to-book value on leverage is negative.

Leverage and tangibility. The value of tangible assets is easy for outsiders to estimate. Hence the distress costs related to tangible assets are lower. It is also difficult for shareholders to replace tangible assets with high-risk ones. Therefore, the total predicted effects of tangibility and leverage are positive because of lower distress costs and fewer debt-related agency problems. Measure used for tangibility in the empirical study of this paper is collateral.

Leverage and dividends. How the leverage is related to dividends is similar to the market-to-book value. Stemming from the agency theory, dividend paying banks should face lower costs of issuing equity and thus be more levered, since they can issue equity cheaply in case of distress. Thus there ought to be a positive relationship between dividends and leverage. However, in Frank and Goyal (2009) it is found that dividend-paying firms tend to have lower leverage.

Table I. Predicted affects according to theory

Predicted Effects	Size	Market-to-book	Profits	Collateral	Dividends
Leverage	Positive (+)	Negative (-)	Positive(+)/Negative(-)	Positive (+)	Positive (+)

Gropp and Heider (2009) find that the level of the capital buffer that banks hold is not consistent with theory, they also find that banks that should face a lower cost of raising equity

at short notice; banks with high market to book value and dividend paying banks, tend to hold more capital.

5.2 Empirical Method

The determinants of Bank Capital Structure are derived from the theory described and picked from the empirical study by Gropp and Heider (2009). Panel-data regression with Generalised Least Squares is run with the variables as defined in Table. III below. To control for random and fixed effects, a Hausman test is performed, the test showing which model is appropriate. The results of the regression are compared to those for Gropp and Heider (2009) concerning bank capital structure, and also to the results of Frank and Goyal (2009) on their determinants of firm leverage. The results are further discussed in relation to the new capital requirements of the Basel framework and the EU capital requirement directive.

The **empirical model** estimated in this paper is as follows:

$$L_{it} = \beta_1 + \beta_2 MTB_{it} + \beta_3 Profits_{it} + \beta_4 Size_{it} + \beta_5 Collateral_{it} + \beta_6 DividendDUM + u_{it}$$

The variables used are size, market $-$ to $-$ book value, collateral, profits and dividends. The variables are defined in Table III. below:

Table II. Definition of variables used in empirical model

Variable	Definition
Book Leverage	1-(equity capital and reserves / Total Assets
Market to Book Value	Market to book value excluding intangibles
Profits	Pre-tax profit / Total Assets
Size	Ln (Total Assets)
Collateral	Total Intangibles / Total Assets
Dividend Dummy	One if the bank pays a dividend in a given year

5.3 Data

The data consists of a cross-section of 51 different European banks in 16 countries, and time-series data stretching from 1994-2010 (the 51 banks in the sample are listed in the appendices, together with the country of origin). The different banks chosen for the sample is retrieved from Standard & Poor, "the largest 100 European banks" (2011). The banks that were

included in the sample were those with sufficient available data, which concluded to 51 European banks (listed in the appendix). This data on Banks' balance sheets and income statements were obtained from Thomson Reuters' Datastream. Thus the study employed a panel-data approach, combining time-series and cross-section observations. Two countries are included in the sample, although not part of the European Union, Norway and Switzerland. Since still situated in Europe, these observations are assumed not to bias the results significantly.

Table III. Unique banks and bank-years across countries in the sample.

Country	Unique Banks	Bank-years
Austria	1	17
Belgium	1	17
Denmark	2	34
Finland	1	17
France	3	50[3]
Germany	3	46[4]
Greece	4	49[5]
Ireland	3	49[6]
Italy	8	136
Netherlands	2	34
Norway	1	17
Portugal	2	34
Spain	5	82[7]
Sweden	4	68
Switzerland	7	119
United Kingdom	4	68
Total	51	837

5.4 Limitations

The study limits to include book values from Thomson Datastream. It would have been desirable to include Tier 1 capital ratio in the empirical study, which is Tier 1 capital divided

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[3] Excluded observation Societé generale 1994
[4] Excluded observations for Deutsche Postbank 1994-98
[5] Excluded observations EFG eurobank Ergasias 1994, 1995
[6] Excluded observation Irish Lf & Perm. Bank 1994, Bank of Ireland 2009
[7] Excluded observations Banco de Sabadell 1994,1995,1996

by the bank's risk weighted assets. This can be obtained individually from the banks' balance sheets and income statements with time and effort. With each year and bank this would have been beyond the scope of this paper, but presumed not impossible with access to clever databases.

The caveat for using historical data across countries is that the data is inconsistent across jurisdictions. According to the Bank for International Settlements (2010), it is quite impossible to isolate the effect of certain events, such as comparing the differing regulatory regimes Basel I and Basel II or different capital definitions. They also argue that the data is a result of the then prevailing system which "certainly will not be the equivalent to the future one". The advantage of historical data though is that they reflect actual realised outcomes for large banks across jurisdictions on a macroeconomic level (BIS 2010).

The realised losses and revenues of banks may during the period 2007-2009 in particular, be biased through official sector activities of liability guarantees, capital injections and liquidity facilities. Also the survivorship bias may be present, as the losses from failed banks might not be fully captured.

To further avoid biasedness, the study concentrates on large banks. This is consistent with regulatory framework, as studies on impact of regulation tend to group banks according to their sizes (BIS quantative impact study 2010). The consistency problem is attempted to be dealt with by using ratios to total assets, so that the data for each bank in each country over the years can be more fairly comparable.

6 Results and Discussion

6.1 Sample Descriptive Statistics

In figure I. the graph over the aggregate leverage of the banks in the sample show that the leverage was fluctuating around the same ratio between 1996 and 2007, with a spike in 2008 and a dip pre -96 and returning to this level in 2009. This can reflect the leverage build up of the financial crisis -07 and subsequently the official sector activities of guarantees and capital injections, making the leverage ratio return to its previous level. In terms of interpretation, note that a dip is "good" in the respect of holding a high equity capital ratio, and that a high leverage implies a low equity capital ratio.

Figure III. A graph over the aggregate leverage for the banks in the sample
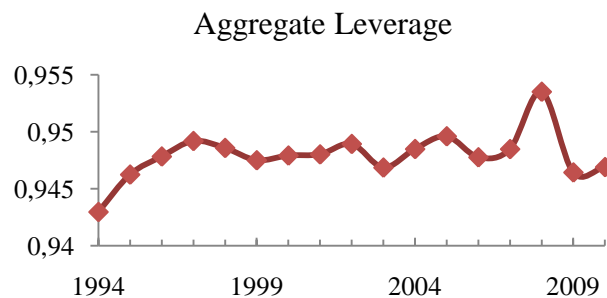
As shown in the Table V below, the median book leverage for the banks in the sample is 95, 2 percent. Compared to median book leverage for financial firms in Frank and Goyal (2009), which is 23 percent (However, their measure for leverage is different since they employ long-term debt to total assets). But still it illustrates and points out the difference of leverage in financial firms compared to non-financial firms, which raises questions regarding the applicability of corporate capital structure theory to banks. Compared to Gropp and Heider (2009) their median leverage ratio is 92,6 percent (their sample includes EU-15 and USA 1991-2004).

Worth noting since the mean market to book ratio is 2,1, the highest market-to-book value is from Mediobanca 1999 (Italy) with 15,53 and lowest is Alpha Bank 2008 (Greece) with 0,1. Next year in 2009, the Alpha Bank market- to- book ratio is 1,38, which seems a bit odd. However, since the recent troubles in the Greek banking system, maybe not so surprising.

Table IV. Descriptive Statistics of the variables. (all variables are in a ratio to total assets, except MtB and dividends which is a dummy variable.)

Variable	Mean	Median	St. Dev.	Max	Min
Leverage	0,95	0,952	0,025113	0,99	0,77
Size	18,57	18,49	1,77	22,38	12,73
MtB	2,09	1,82	1,45	15,53	0,1
Collateral	0,007	0,003	0,008	0,054	0
Profits	0,009	0,008	0,008	0,064	-0,085
Dividends	0,83	1	0,38	1	0

As a further illustration of the bank leverage, the capital to asset ratio is also depicted in Table IV below. Where the median capital – to – asset ratio is 4, 75 percent. Compared to the new regulatory requirement of target core tier 1 equity ratio of 7 percent there is a shortfall for the banks on the aggregate level. However, the ratio of book equity to book assets is an understatement of the regulatory Tier-1 capital ratio, since the latter has risk-weighted assets in the denominator (p.7 Gropp 2009).

Table V. Statistics for the capital ratio which is "the other side" of the leverage variable (=equity capital and reserves / Total Assets)

	Mean	Median	St. Dev.	Max	Min
Equity capital* to Total Assets	5,20	4,75	2,51	23,02	1,40

*Plus Reserves

As shown in figure II. the distribution of the capital to asset ratio shows that the majority of the capital – to – asset ratios in the sample are situated between 2 percent and 8 percent.

Figure IV. The distribution of capital-to-assets ratio for the sample

Distribution of book capital ratio (equity capital + reserves / total assets)
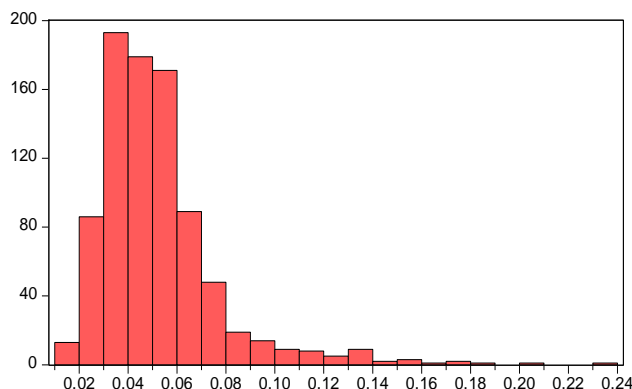
Summing up, the descriptive statistics show that the European banks in the sample are a fairly homogenous group when it comes to leverage, and with little variation across the determinants, but fairly variable concerning the Market- to- book value and size. This suggests that these variables would be extra interesting to analyse in the regression results.

6.2 Results and Analysis

The Table VI. below show the correlation between the dependent variable Leverage and the independent variables. Leverage is positively correlated with size, market-to-book value and negatively correlated to profits, collateral and dividends. When comparing this to Table II of predicted effects, the theory is consistent for size and profits (ambiguous), but collateral, market-to-book value and dividends show opposite relation. This suggest that the empirical findings in this paper prove lacking coincidence with the theoretical predictions.

Table VI. Correlations between the explanatory variables

	Leverage	Size	MtB	Profits	Collateral	Dividends
Leverage	1,00					
Size	0,302	1,00				
MtB	0,076	-0,011	1,00			
Profits	-0,490	-0,210	0,290	1,00		
Collateral	-0,149	0,107	0,269	-0,066	1,00	
Dividends	-0,111	-0,070	0,160	0,323	-0,007	1,00

Moving on to the regression results, a Hausman test is performed and the test statistic show that the null hypothesis of no misspecification cannot be rejected, and thus the test provide

argument for using the fixed effects model and not the random effects model. Also the fixed effects model is more appropriate when focusing on a specific set of *N* firms (Harris and Sollis 2003), as can be said to be done here with banks being a specific group of firms.

As shown in Table VII. below, all coefficients are statistically significant at the one percent level, except the for the dividend dummy, not significant even on the ten percent level. The insignificance of the dividend dummy may be because the data on dividends per share showed a large spread, and depicting dividends with a dummy might not be the best choice. However, when including dividends per share as a variable it also proved insignificant. Banks leverage depends positively on market-to-book value and size, and negatively on profits, collateral and dividends (note the dividend dummy is insignificant). The predicted effects of the variables on leverage, as described in the theory and explicitly in section 5.2, shows only to be confirmed in the case of firm size, and profits in the dynamic trade- off model. According to the trade-off theory there should be a positive relationship between leverage and firm size, which the regression coefficient confirms. As discussed earlier a dividend paying bank with high market-to-book value and profits should face lower cost of raising equity at short notice, and thus have a positive relation with leverage since they do not need to hold capital above the requirement. This holds for the market-to-book ratio, but not for profits and dividends (note, dividend dummy is insignificant).

Table VII. GLS with cross-section fixed effects. (1994-2010)

Variable	Market-to-book ratio	Profits	Size	Collateral	Dividend dummy
Leverage	0,003	-0,74	0,005	-0,91	-0,002
SE	(0.0003)	(0,071)	(0,0006)	(0,07)	(0,002)
	Significant	Significant	Significant	Significant	Insignificant
R2: 0,80					

The determinants do seem to explain majority of the variation in the sample with an R^2 of 0,80.

The Table VIII. show a comparison between the results of this paper and two other studies. The signs of the coefficient in this study are different from the ones in the Gropp and Heider (2009) study, when it comes to market-to-book ratio and collateral. Otherwise they have the same sign for profits, size and dividends (Note dividends dummy is insignificant). Comparing

to the study by Frank and Goyal (2009) concerning firms, the signs are equal with the only exception of collateral. The results are consistent with those of Frank and Goyal (2009), that firms that have more profits tend to have less leverage, the coefficient for profitability on leverage is -0,74. This may imply argument pro that the theory of corporate capital structure can be applied to that of bank structure in terms of leverage.

Table VIII. Comparison of results to Gropp and Heider (2009) and Frank and Goyal (2009). With standard errors in parenthesis. All their variables are significant.

Dependent Variable Book Leverage	Results in this study	Gropp and Heider (2009) Table V. pp. 35	Frank and Goyal (2009) Table V. Panel B. pp. 22
Market-to-book ratio	0,003	-0,066	0,002
	(0.0003)	(0,016)	(1,7)
Profits	-0,74	-0,210	-0,252
	(0,071)	(0,063)	(-28,9)
Size	0,005	0,006	0,001
	(0,0006)	(0,001)	(0,8)
Collateral	-0,91	0,032	0,126
	(0,07)	(0,009)	(17,5)
Dividends	-0,002	-0,009	-0,077
	(0,002)	(0,003)	(-26,2)

It is hard to explain why banks are so highly leveraged and in aggregate, more leveraged than non-financial firms. The corporate finance theories and Gropp and Heider (2009) suggest four hypothesis regarding this matter:

(I)   tax-benefits are higher for banks than firms

(II)   bankruptcy costs for banks are smaller than for firm

(III)   banks are lead into more leverage because of agency problems

(IV)   asymmetric information is more important for banks in raising the cost of equity

These factors may also interact. The first suggestion is dismissed, since there is no evidence that banks are subject to more tax benefits than non-financial firms. There has also been no evidence for bankruptcy costs to be systematically lower for banks than for firms, there is on the contrary more likely that banks have higher costs of bankruptcy.

The agency costs and asymmetric information can be an explanation for the higher leverage of banks than that of non-financial firms, since it is more difficult for outsiders to monitor the assets that they invested in, which gives more opportunity for asset substitution. This also gives rise to the possibility that banks face higher costs in issuing equity than non-financial firms, since outside investors find it difficult to understand what it is that they are investing in.

Gropp and Heider (2009) conclude that there are bank specific effects in determining bank leverage. This paper also shows that the cross-section fixed effect model is appropriate in depicting the determinants of bank leverage. The inconsistency between empirical results and theory implies that there is need for more theoretical ground to what determines bank capital structure.

7 Conclusion

The financial sector is a confusing area. In the light of asymmetric information theory, perhaps this confusion is necessary for its survival in its current form. The de-levering of banks will take time, and assuming they aspire to maintain current returns, somehow it cannot be neglected the possibility that despite the harsher definition of capital, there can still be room for manipulation of balance sheets regarding the Tier 1 capital ratio. A mitigation of this can be achieved through the proposal on a supplementary non-risk based leverage ratio. CRDIV can become more important in this respect, there will be less possibility of manipulation of the denominator of risk-weighted assets, when total exposures is just total exposures and not adjusted with different risk weights.

The relevancy of the Modigliani – Miller theorem to the analysis of bank capital structure and capital requirements is apparent, since their findings is largely a foundation for behaviour of the capital markets. Their statement that no firm will desert to using a hundred percent of equity in their capital structure as lenders will impose a restriction on the debt relative to equity, implies that it is the lenders that must ensure this restriction. But more theoretical ground to the behaviour of the capital markets is needed, similar to the M-M framework. Even though Miller argues (1995) that the framework is relevant for banks, the fact remains that a bank is an intermediation service and not a firm. Thus, in a simple framework there are three parties involved. Restricted by lenders, there appears to be a more natural requirement by firms to hold sufficient equity in terms of assets to sustain the firm's survival compared to that of banks. In the financial markets due to moral hazard of the safety net and opacity of banks, this "natural" capital requirement seems to vanish. In today's climate where the subsequent

bailing out of banks by governments has turned into so much government debt, that countries are near default and need to be bailed out by other countries. The conclusion drawn from this is that lenders have not imposed a sufficient restriction on the borrower. The undoing of leverage though in terms of financial institutions demand there being agents available of undoing leverage. When the equity supply available to Europe runs out what will happen?

The monitoring of banks performed by supervisory bodies of the EU and national government is not sufficient. Lenders need to become more aware of risks and realise that they themselves should monitor the managers of their money. The monitoring would be more difficult the larger the bank. As Adam Smith in the Wealth of Nations 1776 states that "Negligence and profusion must always prevail" in the management of a company of other people's money than their own. Raising the awareness of the riskiness of banks to the public might cause bank runs. But, with the failure of big banks, giving rise to a new "infrastructure" of the financial system, I believe this will be socially beneficial in a long run perspective.
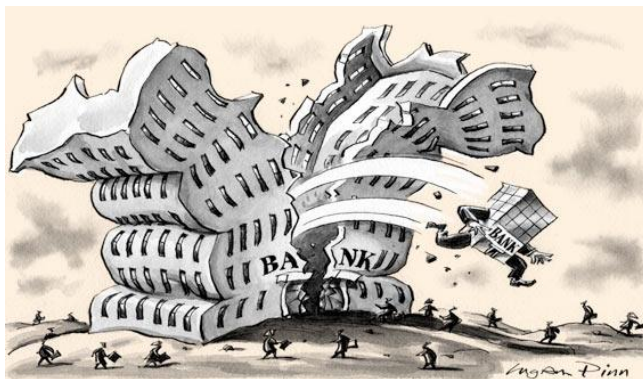
Source: Financial Times Illustrations 10 August 2011 "The coming world of smaller banks" by Ingram Pinn

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Appendix

List of European banks included in the sample (Standard and Poor, "Europe's 100 largest banking groups" 2010)

Bank	Country headquarter	Member of EU
1. BNP Paribas	France	Yes
2. BASELLANDSCHAFTLICHE KB.	Switzerland	No
3. RABOBANK GROEP	Netherlands	Yes
4. BANCO SANTANDER	Spain	Yes
5. BANK OF PIRAEUS	Greece	Yes
6. NATIONAL BK.OF GREECE	Greece	Yes
7. EFG EUROBANK ERGASIAS	Greece	Yes
8. ALPHA BANK	Greece	Yes
9. ALLIED IRISH BANKS	Ireland	Yes
10. BANK OF IRELAND	Ireland	Yes
11. IRISH LF.& PERM.GHG.	Ireland	Yes
12. BANCO ESPIRITO SANTO	Portugal	Yes
13. BANCO BPI	Portugal	Yes
14. BANCO POPULAR ESPANOL	Spain	Yes
15. BANCA POPOLARE DI MILANO	Italy	Yes
16. BANCA PPO.EMILIA ROMAGNA	Italy	Yes
17. BANCA CARIGE	Italy	Yes
18. CREDITO EMILIANO	Italy	Yes
19. BANCA MONTE DEI PASCHI	Italy	Yes
20. COMMERZBANK	Germany	Yes
21. DANSKE BANK	Denmark	Yes
22. BANCO DE SABADELL	Spain	Yes
23. JYSKE BANK	Denmark	Yes
24. BANKINTER	Spain	Yes
25. KBC GROUP	Belgium	Yes
26. DEUTSCHE POSTBANK	Germany	Yes
27. BANQUE CANTON.DE GENEVE	Switzerland	No
28. ABN AMRO HOLDING	Netherlands	Yes
29. SWEDBANK	Sweden	Yes
30. ERSTE GROUP BANK	Austria	Yes
31. UNICREDIT	Italy	Yes
32. SEB 'A'	Sweden	Yes
33. VONTOBEL HOLDING	Switzerland	No
34. ROYAL BANK OF SCTL.GP.	United Kingdom	Yes

35.	UBS AG NAMEN AKT	Switzerland	No
36.	DEUTSCHE BANK	Germany	Yes
37.	STANDARD CHARTERED	United Kingdom	Yes
38.	SOCIETE GENERALE	France	Yes
39.	MEDIOBANCA	Italy	Yes
40.	INTESA SANPAOLO	Italy	Yes
41.	DNB NOR	Norway	No
42.	CREDIT SUISSE GROUP	Switzerland	No
43.	CREDIT AGRICOLE	France	Yes
44.	BARCLAYS	United Kingdom	Yes
45.	SVENSKA HANDELSBANKEN	Sweden	Yes
46.	POHJOLA PANKKI	Finland	Yes
47.	NORDEA BANK	Sweden	Yes
48.	BBV.ARGENTARIA	Spain	Yes
49.	HSBC HDG	United Kingdom	Yes
50.	BANQUE CANTON.VE.	Switzerland	No
51.	LUZERNER KANTONALBANK	Switzerland	No