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MASTER THESIS

Capital Structure: Testing Pecking Order Theory and Static Trade-Off Theory in the Current Crisis

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

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Abstract

This thesis aims to explain the choice of capital structure in the times of crisis (2007-2009) for the U.S.A. real sector companies. The two main theories used are the trade-off theory and pecking order theory. The essential of the pecking order theory is that manager's capital structure decisions are influenced by the market perceptions of managers' superior information. The trade-off theory provides support for manager's trade off between benefits and costs of debt. The conventional model is also used in the analysis in order to increase the robustness of the results. We find that the dynamic partial-adjustment model of the trade-off theory seems to explain better the choice of capital structure in the analyzed period than pecking order theory.

Keywords: capital structure, crisis, pecking order theory, static trade-off theory, partial-adjustment model.

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Acronyms

CDO – collateralized debt obligations

CFO – chief financial officers

DJIA – Dow Jones Industrial Average Index

EBIT – earnings before interest and taxes

GDP – gross domestic product

IMF- International Monetary Fund

IPO – initial public offering

NPV – net present value

PO – pecking order

POH – pecking order hypothesis

TARP - troubled asset relief program

USD – United States dollars

STOH- static trade-off hypothesis

Chapter 1

Introduction

The financial crisis of 2007-2009 has been called the worst financial crisis since the one related to the Great Depression by leading economists (Reuters, February 27, 2009) , and it contributed to the failure of key businesses, declines in consumer wealth and a significant decline in economic activity (Brookings, June 2009). The financial crisis began in 2007 on the US mortgage market. During the autumn of 2008 it developed into a global liquidity crisis. The functioning of many credit markets seriously deteriorated and in some cases the markets practically stopped to function at all. The banks, for example, found it very difficult to issue securities at longer maturities. The countermeasures of the central banks have largely aimed at securing the banks' supply of liquidity (Monetary Policy Report, February 2009). The reluctance of banks to lend, even amongst each other, froze the credit markets, making it difficult for corporations and individuals, even those with a consistent track record of repayment or strong credit scores, to use debt to finance purchases of everything from equipment to auto loans (Associated Press, June 2007).

Given the conditions stated above, it can be easily deduced that corporations during liquidity crisis face a lot of problems concerning their activity (financial, operational, investment) which is affecting their choice of capital structure. The purpose of this Master Thesis is to explain the composition of corporate capital structure and choice of financing decisions in times of the current crisis. This will be done with the help of the primary existing theories of corporate capital structure explaining firms' financing decisions that can be categorized as the trade-off and pecking order theories.

The Pecking Order model states that firms prefer internal equity (i.e. retained equity) to external financing, but in the event of external financing debt is preferred to equity. Therefore debt ratios are the result of cumulative financing decisions over time as opposed to moving closer to a long run target. Hence financial deficits are the driving force behind debt issues.

Pecking Order hypothesis's predictions about leverage are that debt typically grows when investment exceeds retained earnings and falls when investment is less than retained earnings as opposed to a more complex view of the model. Fama and French (2002) have tested some qualitative predictions of the pecking order theory against the qualitative predictions of the Trade-Off model. In their findings suggest that more profitable firms are less levered and it is consistent with the Pecking Order. Also according to this theory, firms do not have a strong incentive to rebalance their capital structures. It suggests a very slow adjustment speed towards a target debt ratio.

The Static Trade-Off Model predicts an optimal level of debt as a result of trade-offs between tax advantages from interest and costs of financial distress (bankruptcy). Empirically this suggests mean reverting behaviour from actual debt ratios towards the optimum assuming that target debt ratios are constant. Also Fama and French (2002) in their paper show that the firms with greater investment opportunities and corresponding higher profitability are more levered as predicted by the Trade-Off theory. In the trade-off theory, firms select target leverage ratios based on an exchange between the benefits and costs of increased leverage (Modigliani and Miller, 1963, Jensen and Meckling, 1976, Myers, 1977, Stulz, 1990, Hart and Moore, 1995, and Ross, 1977). In the absence of any adjustment cost, firms would continuously offset deviations from target. The presence of large adjustment costs would likely slow down the adjustment time. These are the classical assumptions concerning POT and STOT, but the decisions concerning corporate structure are not driven only by the theory, they are influenced by the current market conditions and the existing trends in the world economy.

Before the current crisis business investment was highly dependent on debt, now the credit condition is tightened and is very difficult to obtain a loan. New loans to large borrowers fell by 36% during the peak period of the financial crisis (August-October 2008) relative to the prior three-month period and by 60% relative to the peak of the credit boom (May-July 2007). New lending for real investment (such as capital expenditures) fell to the same extent as new lending for restructuring (Ivashina and Scharfstein, November 5, 2008).

Also during the current period the world's financial markets are experiencing an enormous deleveraging that has crippled the global economy making enormous amounts of money virtually evaporate. It is the first time in history that this phenomenon of deleveraging has become so massive and its effects - already apparent in almost all the financial sectors- are expected to create long lasting problems (Enzine articles, November 9, 2008). At the same time with deleveraging the companies are retaining the liquidity, fact that reduces the

availability of funds to real economy and slows down the economic development. Having these conditions is interesting to see how the real sector U.S. companies make their capital structure and financing decisions.

Accordingly, there can be formulated a set of hypothesis concerning the choice of capital structure which are tested.

- Leverage of the firms will decrease in time of current crisis.
- In the time of current crisis any deficit that companies have is financed less by debt issuance.
- Firms in the crisis are adjusting to a target debt level in order to achieve an optimal capital structure.
- The debt and profitability are expected to be inversely related.

I start the analysis of firm's capital structure by investigating the level of debt and its evolution during the analyzed period of time. In his paper Bris et. al. (2004), shows that the leverage increases prior to a crisis and continues to increase after the crisis. These results are not consistent with this study, which registers a decrease in the level of debt after the economy is hit by a crisis. Kim and Stone (1999) find out that highly leveraged firms facing a cut-off of capital inflows are threatened by bankruptcy. These firms respond by eliminating investment and selling their capital goods at a discount to try to stay afloat. The results of their study are consistent with the current situation and empirical evidence from our research in which is registered a decrease in the amount of assets owned by companies.

Having these results, I use then the pecking order theory and trade-off theory, which are testing if traditional capital structure theories are able to empirically explain the composition of corporate capital structure. The pecking order theory of capital structure is among the most influential theories of corporate leverage. In this paper, I study the extent to which the pecking order theory of capital structure provides a satisfactory account of the financing behaviour of publicly traded American firms over the 2007-2009 periods. The test is based on the idea that if firms follow the pecking order, then in a regression of net debt issues on the financing deficit, a slope coefficient of one is observed. Shyam-Sunder and Myers (1999) find strong support for this prediction in a sample of 157 firms that had traded continuously over the period 1971 to 1989. While Goyal and Frank (2002) in their study show that evidence does not support this hypothesis.

In testing the trade-off theory, the selection of studies is based on Myers' (1984) insight, that the key question to differentiate between competing capital structure theories is whether firms

adjust to some target following shocks to their capital structure. This is due to the fact, that trade-off theories suggest that firms try to maintain some "optimal" debt ratio.

Respectively, I discuss the study by Welch (2004), who examines adjustment behaviour following shocks to the market-value based debt ratio due to changes in the equity value of companies, the study by Flannery/Rangan (2006), which takes dynamic adjustment behaviour of firms explicitly into account in the design of the empirical model. The most important objective of capital structure study using dynamic partial adjustment models is to approximate the speed of adjustment. Flannery and Rangan (2006) investigate whether United States firms really have long-run target capital structures and if they do, then how quick they adjust to this target. I complement the empirical models of studies on firms' adjustment behaviour to capital structure shocks by adding additional factors that may influence capital structure decisions, but have gained only recently attention in the literature. For instance, Kisgen (2006) considers for the first time the role of ratings from external rating agencies (like S&P or Moody's) in the capital structure context. This seems an important contribution due to the eminent role that rating agencies play in capital markets nowadays. Also I consider the effect of expected inflation and industry median debt on the speed of adjustment of capital structure.

I briefly address studies that focus on shocks from macroeconomic factors and the competitive and regulatory environment. With their help I make an extension of the partial-adjustment model by including the effect of macroeconomic determinants. As macroeconomic determinants serve term spread, default spread, growth rate of GDP and price-output ratio, which were first used by Korajczyk and Levy in 2003.

Even when a theory is not correct, it still can do a better job in organizing the evidence, when compared to other theories. The pecking order is a rival to other majority of empirical models of corporate leverage. Main empirical alternatives such as the model tested by Rajan and Zingales (1995) uses other information set to report for corporate leverage. For that reason it is of interest to see how the financing deficit performs in a nested model that also encompasses conventional factors. The financing deficit ought to wipe out the effects of other variables according to the pecking order theory. If the financing deficit is simply one factor among many that firms trade-off, then what is left is a generalized version of the trade-off theory. The current study finds that the financing deficit does not wipe out the effects of conventional variables. The information in the financing deficit appears to be factored in along with many other things that firms take in consideration. This is true across firm sizes and across time periods.

The structure of the rest of this paper is as follows. The second chapter includes the theoretical framework which is divided in three parts. In the first part the general characteristics and key macroeconomic determinants of the recent crisis are discussed. We start analyze with the beginning of financial crisis, in 2007 on the US mortgage market, and its development during the autumn of 2008 into a global liquidity crisis. In the second part there is a review of the main capital structure theories, such as: Modigliani and Miller theory, Static Trade-Off Theory and Pecking Order Theory. The third part contains empirical evidence concerning the tested hypothesis and a general motivation of those hypotheses. In the third chapter is presented the methodology, are defined data and variables, testable models and assumptions. The forth chapter includes the empirical findings of the study. There is also an analysis of these findings and their correspondence with the stated theories of capital structure in the times of crisis. Finally, conclusion is presented in the fifth section.

Chapter 2

Theoretical Frameworks

2.1 Institutional Setting of the Current Crisis

The current crisis has begun from the real estate and the subprime lending crisis. The values of commercial and residential properties were increase sharply in a real estate boom that began in the 1990s and increased continuous for almost a decade. The United States housing boom peaked in approximately 2005–2006 and high default rates on subprime and adjustable rate mortgages, began to increase quickly thereafter (Lahart Justin, June 2008).

In the years before the start of the crisis in 2007, significant amounts of foreign money flowed into the U.S. from fast-growing economies in Asia and oil-producing countries. This inflow of funds made it easier for the Federal Reserve to keep interest rates in the United States too low which contributed to easy credit conditions, leading to the United States housing bubble. An increase in loan incentives such as easy initial terms and a long-term trend of rising housing prices had encouraged borrowers to assume difficult mortgages in the belief they would be able to quickly refinance at more favorable terms. However, once interest rates began to rise and housing prices started to drop moderately in 2006–2007 in many parts of the U.S., refinancing became more difficult (New York Times, September 24 2008). Foreclosure and default activity increased dramatically as easy initial terms expired, home prices failed to go up as anticipated, and adjustable rate mortgages interest rates went higher.

Increases in housing prices coincided with a period of government deregulation that not only allowed unqualified buyers to take out mortgages but also helped erase the lines between traditional investment banks and mortgage lenders. Real estate loans were spread all the way through the financial system in the form of CDOs and other complex derivatives in order to

dissolve risk; however, when home values failed to rise and home owners failed to keep up with their payments, banks were forced to acknowledge huge write downs and write offs on these products. These huge write downs found several institutions at the edge of insolvency with many being required to raise capital or go bankrupt (Investment Education, September 2009).

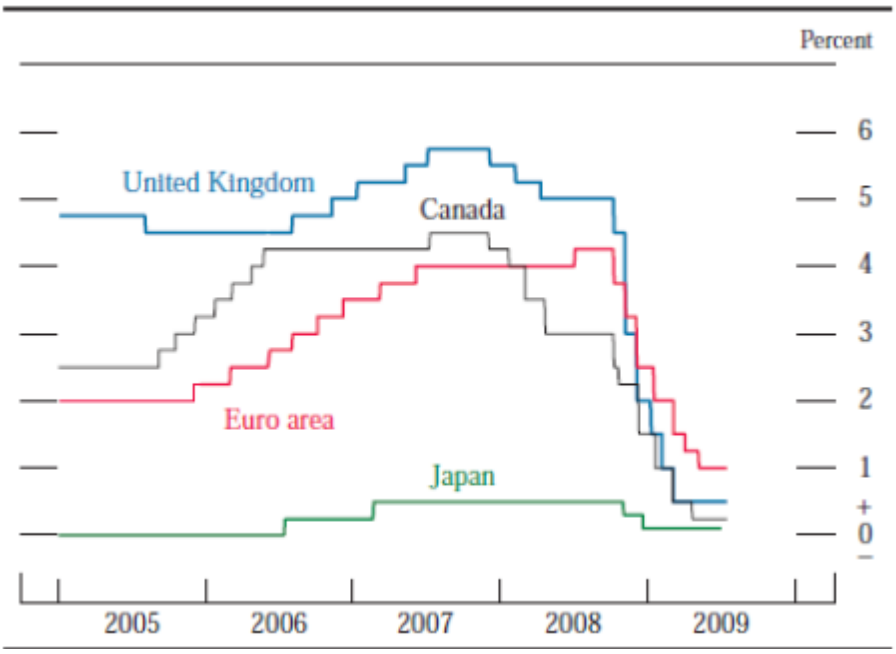
In 2008, a series of bank and insurance company failures triggered a financial crisis that effectively halted global credit markets and required extraordinary government intervention. Global equity markets have declined sharply, banks and government-sponsoring housing enterprises have either failed or have been bailed out (Bear Stearns in March, Freddie Mac/Fannie Mae in September, among others), several banks were taken over (Merrill Lynch by Bank of America, Washington Mutual by JPMorgan Chase, Wachovia by Wells Fargo), as well as five European Banks, one large investment bank has gone bankrupt (Lehman Brothers in September), and the remaining two of the former Big Five US investment banks converted into traditional commercial banks (RASG, December 2008). On top of that some commodity prices spiked and then drooped as crude oil reached a very high value of USD 147 per barrel in July 2008 and then went down to USD 50 in November 2008(RASG, December 2008). These failures caused a crisis of confidence that made banks reluctant to lend money amongst themselves, or for that matter, to anyone.

The central banks intervened swiftly and aggressively by providing various liquidity facilities and heavy cuts in interest rates (figure 1). In addition, policy makers tried to calm markets with various initiatives, such as TARP (troubled asset relief program) in the US. In order to help to revive the economy the central banks around the world have cut the interest rates to low levels. These cuts did not have their normal effect, due to the credit crunch. For most companies (and consumers) credit is more expensive than before. While many of the current problems were initially apparent in the residential housing sector, commercial real estate, auto loans, credit card debt, etc. become soon also under pressure.

Since the credit crunch started in summer 2007 financial institutions have been selling their assets to reduce their balance sheets, thus reversing the long-term trend of credit creation. Before the current crisis, leverage largely increased across the economy. For example, total debt in the United States increased from $20,7 trillion to $31,7 trillion, or by nearly 53 percent, from year-end 2002 to year-end 2007, and the ratio of total debt to gross domestic product (GDP) increased from 1,96 to 2,26 , or by 15 percent, during the same period (GAO, July 2009). All this happened as a result of the fact that consumers were encouraged to

borrow in an environment of low unemployment, declining interest rates and rising asset prices.

Figure 1. Central banks reduce interest rate in unison.



Source: FED (Michal Mejstrik, Banking Lecture Notes, fall 2009).

The most import development in the state of the banking crisis was the transmission of that crisis to the rest of the economy and its interaction with the more general economic crisis which was emerging. The most obvious issue here is the beginning of recession. The essential reason for the recession was the dependence of consumer demand in particular but also business investment on high levels of debt over the last two decades. When lending was contracting this debt-sustained expansion was no longer possible and a sharp economic slowdown looked inevitable. The fall in house prices was also worsening the slowdown in consumer spending as households and firms were no longer able to borrow against rising equity values.

There are two fundamental reasons for the reliance on debt. Consumption has come to depend on debt because of the contradiction between driving wages down to generate profits in production and needing to ensure demand in order to sell the goods produced and realize these profits. The most obvious manifestation of this is growing income inequality and it is no accident that the build-up of debt has been worst in countries with the greatest disparity in incomes, notably the UK and USA (R. Wade, September-October 2008).

In this way the production in general, but especially investment, has come to rely on debt as a result of the weakness of profitability in the productive sector. As a result, without debt being available to fund expansion recession appeared inevitable. The government response to the recession has been firstly to increase their own borrowing and secondly to encourage central banks to cut interest rates. But both of these create their own problems. Government borrowing is limited by the cost of the bank bail-outs. High levels of borrowing can also push up interest rates or reduce currency values. Both of these effects lower firms and household real incomes and decrease spending provoking the original purpose of the borrowing (International Viewpoint, December 2008).

In the current crisis only the most stable companies with the highest credit ratings have access to cash. Other firms are affected because their target consumers no longer have any discretionary income.

Cutting interest rates is also difficult. Central banks only directly control short-term interest rates and private banks have simply refused to cut long-term rates in response to central bank policies. Cuts in interest rates also have the effect of lowering both the actual returns and the prospective returns both of which may lower consumption.

More basically, the room for government policy to sustain the economy is limited and as long as spending and producing depends on debt and because new debt is not forthcoming, the slowdown will not be over passed so easily.

Having presented the conditions and main characteristics of the current crisis now we will turn to the theories concerning the capital structure and the financing decisions of companies.

2.2 Capital Structure Theories

2.2.1 Introduction to Capital Structure Theories

Capital structure is the combination of a company's long-term debt, specific short-term debt, common equity, and preferred equity; the capital structure is the firm's various sources of funds used to finance its overall operations and growth. Debt comes in the form of bond issues or long-term notes payable, whereas equity is classified as common stock, preferred stock, or retained earnings. Short-term debt such as working capital requirements also is considered part of the capital structure (The Free Dictionary by Farlex).

In analyzing a firm's capital structure the proportion of short-term and long-term debt is considered. As usual when someone refers to capital structure, most likely is talking about a firm's debt/equity ratio, which provides insight into how risky a company is. Usually a company financed heavily by debt poses greater risks because it is highly leveraged.

As Brigham and Earhart (2002) states in their book, Financial Management, the capital structure is an important instrument where firms can maintain the control of a firm or lose it. Capital structure is also related with the bankruptcy risk that the creditors will face due to the proportion of capital provided by stockholders. By using more leverage shareholders can magnify their return (profitability) but if things go wrong the opposite situation would occur, which is the downside risk of having too much debt in the capital structure. Therefore, it is an important financial instrument that firms should consider carefully in their financial policies.

A complex set of decisions creates the capital structure of a firm. Capital structure dictates the funding sources tapped by the company and allocates risks and control rights to various parties. Pursued wisely, the capital structure decisions should enhance value in financial markets. Key decisions include the overall mix of debt and equity, the forms, terms and maturity structure of debt, the allocation of voting control among equity classes, the timing of security issuance, and a host of issues regarding particular types of financial claims.

In finance, capital structure refers to the way a corporation finances its assets through some combination of equity, debt, or hybrid securities. A firm's capital structure is then the composition or 'structure' of its liabilities. The Modigliani-Miller theorem, proposed by Franco Modigliani and Merton Miller, forms the basis for modern thinking on capital structure, though it is generally viewed as a purely theoretical result since it assumes away many important factors in the capital structure decision.

In what follows will be presented a couple of capital structure theories starting with the Modigliani Miller Theory. After that will be discussed Static Trade-Off Theory, Pecking Order Theory, and their views regarding capital structure and firm performance.

2.2.2 Modigliani-Miller Theorem

The Modigliani-Miller theorem proposed by Franco Modigliani and Merton Miller forms the basis for modern thinking on capital structure, though it is generally viewed as a purely theoretical result since it assumes away many important factors in the capital structure decision. The theorem says that, in a perfect market, how a firm is financed is irrelevant to its

value (MIT Sloan Lecture Notes, 2003). Starting with this statement it is possible examine real world reasons why capital structure is relevant, or, why company's value is affected by the capital structure it employs. This might be for reasons that include bankruptcy costs, agency costs, taxes, information asymmetry and others. This analysis can then be extended to look at whether there is in fact an optimal capital structure: the one which maximizes the value of the firm.

In a perfect capital market there is perfect information, no bankruptcy or transaction costs; firms and individuals can borrow at the same interest rate, taxes and investment decisions aren't affected by financing decisions. Modigliani and Miller made two findings under these conditions. Their first proposition was that the value of a company is independent of its capital structure. Their second proposition stated that the cost of equity for a leveraged firm is equal to the cost of equity for an unleveraged firm, plus an added premium for financial risk. That is, as leverage increases, while the burden of individual risks is shifted between different investor classes, total risk is conserved and hence no extra value created (Modigliani, F.; Miller, M. (1958).

Their analysis was extended to include the effect of taxes and risky debt. Under a classical tax system the tax deductibility of interest makes debt financing valuable; that is, the cost of capital decreases as the proportion of debt in the capital structure increases. The optimal structure then would be to have virtually no equity at all.

In his paper Stein Frynderberg (2004) presents several strict constraints that Modigliani and Miller assume in their original articles:

- First, capital markets are assumed to be without transaction costs and there are no bankruptcy costs;
- All firms are in the same risk class;
- Corporate taxes are the only government burden;
- No growth is allowed since all cash flows are perpetuities;
- Firms issue only two types of claims, risk free debt and risky equity. All bonds (including any debts issued by households for the purpose of carrying stocks) are assumed to yield a constant income per unit of time, and the income is regarded as certain by all traders regardless of the issuer;
- Information is symmetric across insider and outsider investors;
- Managers are loyal stewards of owners and always maximize stockholders' wealth.

If capital structure is irrelevant in a perfect market, then imperfections which exist in the real

world must be the cause of its relevance. The theories below try to address some of these imperfections, by relaxing assumptions made in the Miller and Modigliani model.

2.2.3 Static Trade-Off Theory

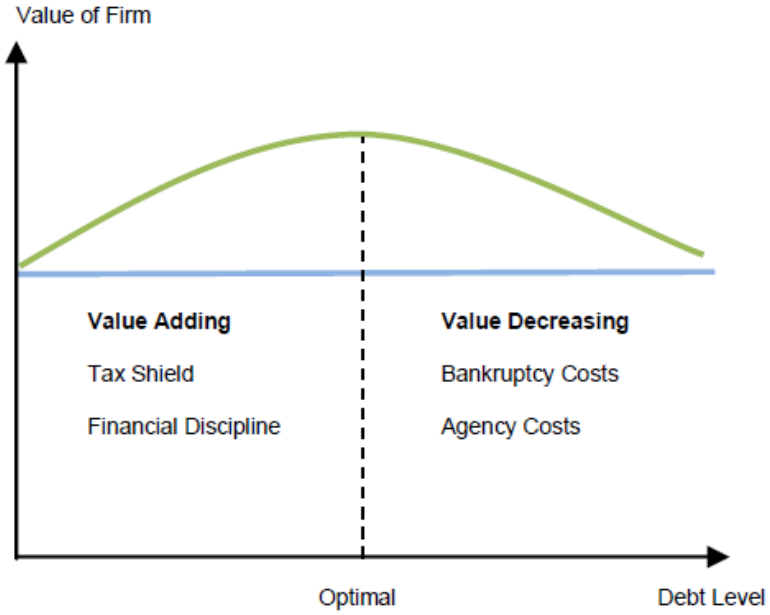
The traditional approach is to present Modigliani and Miller's capital structure irrelevance hypothesis (Modigliani & Miller, 1958) and then build in the effects of taxes, financial distress, and agency costs until the model of optimal capital structure emerges. This is called the "Trade-Off Model" that is easily understood under the basic tendency of optimizing value - and thus shareholder wealth - by choosing a capital structure combination which gives the lowest possible cost of capital for the firm. Once the firm finds this optimal combination of financing sources (that is, the mix of debt and equity sources that equates the benefits of the tax shield provided by debt with the increased costs of financial distress borne by the firm's equity holders) the assumption is that every new dollar of financing is raised in the same proportions of debt and equity financing.

Based on this theory, optimum leverage is determined by balancing of the corporate tax saving advantage of debt against the costs of bankruptcy. This has been extensively discussed in DeAngelo and Masulis (1988), Bradley, Jarrell and Kim (1984), Barclay and Smith (1999) and Myers (2002). Static Trade-Off Theory predicts that more profitable firms should carry more debt since they have more profits that need to be protected from taxation. Other criticized this prediction such as Myers (1984), Titman and Wesels (1988), and Fama and French (2002).

Debt enables the possibility to deduct interest charges raising incentive for higher leverage in order to maximize the tax shield. By doing this the firm value increases with the value of the tax shield (Graham, 2000). Damodaran (2001) stretches the increased financial discipline for managers as a consequence of higher debt levels. Therefore, according to the Trade-Off theory, an optimal debt level which maximizes the value of the firm does exist, when attaining a trade off as balancing the benefits of debt against the cost of financial distress (Figure 2). Naturally, it lies in every firm's interest to find an optimal balance between internal and external financing.

This is consistent with the Trade-Off theory. A firm that has a target level of debt and if deviations from that target are gradually removed over time, a firm is said to exhibit target adjustment behavior (Frank and Goyal, 2007).

Figure 2. Trade-off between the costs and benefits of debt. According to the trade-off theory, optimal capital structure supposes that firms balance the financial discipline and marginal present values of interest tax shields against the costs of financial distress. Equity financing is shown by blue line and debt financing is shown by green line.

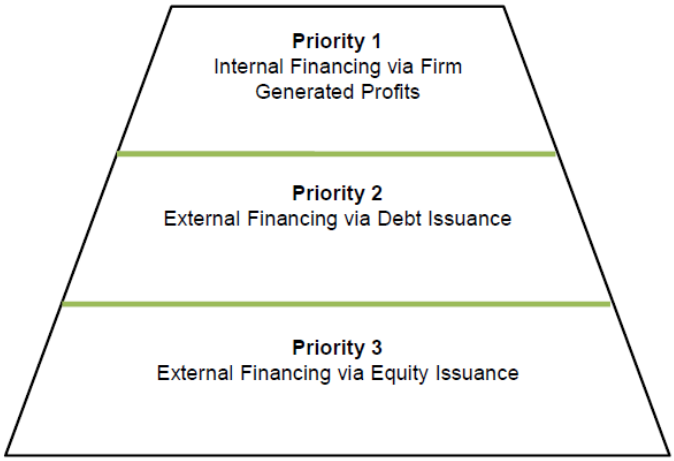


***Source*:** H. Shmidt, S. Shmidt, 2008, Capital Structure: A Swedish Real Estate Study.

2.2.4 Pecking Order Theory

Pecking Order theory of capital structure states that firms have a preferred hierarchy for financing decisions. The highest preference is to use internal financing (retained earnings and the effects of depreciation) before applying to any form of external funds (external financing). Internal funds incur no flotation costs and require no additional disclosure of proprietary financial information that could lead to more severe market discipline and a possible loss of competitive advantage. If a firm must use external funds, the preference is to use the following order of financing sources: debt, convertible securities, preferred stock, and common stock (Myers, 1984). The financing choices given by the pecking order theory are represented in figure 3. This order reflects the motivations of the financial manager to retain control of the firm, reduce the agency costs of equity, and avoid the inevitable negative market reaction to an announcement of a new equity issue (Hawawini & Viallet, 1999).

Figure 3. Pecking order of financial hierarchy.



***Source*:** H. Shmidt, S. Shmidt, 2008, Capital Structure: A Swedish Real Estate Study.

Implicit in pecking order theory are two key assumptions about financial managers. The first of these is asymmetric information, or the likelihood that a firm's managers know more about the company's current earnings and future growth opportunities than do outside investors. The use of internal funds saves managers from having to make public disclosures about the company's investment opportunities and potential profits to be realized from investing in them. The second assumption is that managers will act in the best interests of the company's existing shareholders. The managers may even forgo a positive-NPV project if it would require the issue of new equity, since this would give much of the project's value to new shareholders at the expense of the old (Myers & Majluf, 1984).

Pecking Order hypothesis's predictions about leverage, debt typically grows when investment exceeds retained earnings and falls when investment is less than retained earnings as opposed to a more complex view of the model. More recent study on pecking order hypothesis documented Fama and French (2002) have tested some qualitative predictions of the pecking order theory. In their findings suggest that more profitable firms are less levered and this is consistent with the Pecking Order.

The main objective of the pecking order theory is to point out that asymmetric information and signaling problems exists between managers and less-informed outside investors. In this order firms tend to exhaust their internal funds first, use safe debt second and riskier external equity as a last resort. A financial hierarchy is apparent which exemplifies that when firms are facing financial deficits they tend to go further down the pecking order.

Studies have shown a negative relation between leverage and profitability, which can be

explained by the pecking order theory. According to Brealey et al (2006) the pecking order theory work best for large and mature firms that have access to public bond markets, prefer internal financing and rarely issue equity. In case of smaller growth firms the pecking order theory seems to be inconsistent with empirical studies. Brealey et al (2006) mentions that when external financing is required these smaller firms are more likely to rely on equity issuance which is against the theory of Pecking Order.

The presented above theories are the main framework explaining the choice of capital structure. Having these theories and the current crisis set-up I will try to explain the structure of capital financing by formulating a set of hypotheses based on previous empirical evidence.

2.3 Review of empirical literature and hypothesis motivation

As it was mentioned before the purpose of this paper is to analyze the structure of corporate financing in the current slowdown of the market. From the theory we know that a corporation finances its assets through some combination of equity and debt. In the conditions of financial crisis we are interested more in the debt side of the corporate financing since this crisis was triggered by liquidity short fall and reduced credit availability in the United States banking sector (Douglas/Elliot, June 2009).

Also prior to the financial crisis, roughly 40% of lending was eventually supplied by buyers of securitized packages of loans. These end-investors were mutual funds, pension funds, and other investors who had traditionally not been the main loan providers, as an alternative providing credit predominantly through the acquisition of corporate bonds. Securitization has collapsed to a fraction of its previous volume and these sources of credit capacity have largely withdrawn, leaving a gap (Douglas/Elliot, June 2009). As a result is possible to say that the crisis influenced the companies more through debt side of corporate financing. That is why I will start my analysis by studding the level of corporate debt in 2007-2009 periods.

A few empirical studies have been performed concerning the level of leverage in the times of crisis. Bris et. al. (2002), conducted a study using company-level data from 17 countries that experienced a currency crisis during the past decade. They also include data from three control countries, whose currencies were under attack but remained quite stable. First, they studied leverage on the company-level before and after the currency crises. They documented increasing leverage before the onset of the crises for Europe, Asia, and Latin America. After the respective crises, they show that leverage further increases in Asia and Latin America but

not in Europe. Furthermore, the increasing leverage during the pre- and post-crisis periods was restricted to the countries forced to devalue their currencies during the crisis.

Bris et al. (2002) also assumes that it is also possible that the results were mere accounting artifacts: since they also document that firm profitability declines prior to a currency crisis, a reduction in earnings could automatically increase the debt-to-value ratios. Finally, leverage increases could be completely unrelated to currency crises, only a result of the preference for debt over equity during the 1990s.

Nigel et. al. (2005) in his work concentrates on the analysis of the recent Asian Crisis and highlights the moral hazard problem of bad loans in poorly supervised and regulated East Asian economies. He concentrates on the process of dynamic adjustment of the actual leverage towards the optimum in time of crisis. Compared with the least affected countries there seems to have been a greater reliance on debt in the worst affected countries throughout crisis period. It is well documented that many East Asian corporations in the worst affected countries were heavily reliant on debt during crisis period. Following the crisis, however, the share of debt generally decreased in all these countries though the decrease was more perceptible in Korea where the average share of debt was even lower than that in the pre-crisis period average. Also Gunay (2002) in his work shows he impact of economic crisis in Turkey (1999-2001) on the capital structure of corporations, which are traded in Istanbul Stock Exchange. He proves that the leverage of firms increased on average after economic crisis as a result of interest rate increase and devaluation.

Ariff et al. (2008) studies capital structure adjustment dynamics and, in addition, estimates the factors driving capital structure adjustment of financially distressed and healthy firms. He finds out that prior to the crisis, the debt ratio of distressed firms was higher compared with one for healthy firms: the difference was not significant. Second, after the crisis had done its damage, debt level increased more for the distressed cases than for the healthy firms. These differences in debt ratio are significant. Further, statistics show that the proportion of short-term debt dominating the distressed firms, increased with more than half in contrast, to the healthy firms' share of short-term debt.

It is clear from the empirical evidence that an economic slowdown influences the level of debt that companies have. In what follows I will turn to the conditions of current financial crisis and their impact on the level of debt.

In the current crisis global financial markets are in turmoil. Share prices have fallen drastically, the cost of corporate and bank borrowing has risen substantially, and financial

market volatility is at levels that have rarely been seen. While the chaos in financial markets is in full view, its effect on the real economy is less clear. Recent press accounts (New York Times, October 24, 2008) suggest that banks are indeed scaling back on new loans, thereby reducing corporate investment and output, while a recent working paper by V.V. Chari, Lawrence Christiano and Patrick Kehoe (CCK, 2008) suggests just the opposite. In their paper, Ivashina and Scharfstein (November 5, 2008) describe bank lending during the financial crisis through October 31, 2008. They show that there has been a steep decline in new loans to large corporations. The decline started a year ago as the credit bubble deflated, and has accelerated during the peak period of the financial crisis. From August – October 2008 new loans were 36% less than they were in the prior three-month period. The drop was particularly large in October, 2008. Lending for productive investment such as physical and working capital has fallen as much as lending for leveraged buyouts (LBOs) and mergers and acquisitions (M&A). Revolving credit facilities have fallen more than term loans, and non-investment grade lending has fallen more than investment grade lending.

During late 2007, the federal funds rate went up as banks became fearful of loaning to each other. The Fed eventually had to lower the federal funds rate in order to calm fears and restore confidence in the financial markets. In September of 2007, the Fed cut the federal funds rate 0, 5 point to 4, 75%. By January 2008, that rate had to be cut to 3%.

It didn't seem, by 2008, that lowering interest rates was working to restore confidence in the financial markets and restore credit flow. Lehman Brothers failed, Bear Stearns and AIG were bailed out, and the TARP program was passed in order to provide funds to big financial institutions that were in danger of failing. By October of 2008, the federal funds rate was 1% and in November 2009, it was around 12% (Federal Reserve Statistical Release, 6 November 2009).

As a conclusion of the facts stated above, I can say that there is a reduced availability of credits, decrease of federal funds and the deleverage effect presented in economy, together with the detainment of liquidity. This leads to the idea that the level of debt in the companies decreased in the crisis period. But still there is a question whether the companies decreased their leverage because debt became unavailable or because companies wanted have a safe capital structure. If that is the case, then companies more probably were backing off on debt also because of the increasing bankruptcy costs. The main criteria in measuring bankruptcy costs are such indicators as: unprofitable business, presence of overdue liabilities, total liabilities exceeding total assets, inability to pay off current liabilities by current assets and

decreasing of market value of shares and securities. Many of these criteria fit the conditions in which market is activating in this period so there is present an increase in the bankruptcy costs for companies. This might be one of the reasons which could partially explain the decrease in leverage of companies and deleveraging effect together with the tightening of credit conditions and detainment of liquidity. The above discussion leads to the following testable hypothesis:

Hypothesis 1: Leverage of the firms will decrease in time of current crisis.

From the empirical evidence analyzed above we can deduce that a typical feature of an economic slowdown is that the level of debt increased before and after the event. What follows from the conditions of current crisis is that debt indeed increased before the crisis but during the crisis registered a sharp decrease. Assuming the fact that companies have a lower share of debt in their capital structure raises the question of the way the companies will finance their operations and investment. There are two competing theories about the way how the companies decide about capital structure financing taking in consideration the evolution of debt: Pecking Order and Static Trade-Off theory.

According to the Pecking Order hypothesis, firms follow the hierarchical structure of preferred source of external finance described before because the amount of mispricing and loss of wealth to their shareholders depend on the type of security issued. The amount is least for debt and highest for external equity because the potential impact of new information on the value of a security, if the information is released to the market after the security is sold, depends on the type of security it is. Such information will have the least impact on the value of debt because of the high priority of claims to the income and assets of a firm that is usually accorded owners of debt. But the information will have the highest impact on the value of equity because its owners usually have only a residual claim to the income and assets of a firm.

According to Shyam-Sunder and Myers (1999) the Pecking Order assumes that every capital outflow causes a financing deficit by the same amount of capital. In order to reduce this deficit the firm raises debt. Equity will only be issued as a last resort due to significant costs of financial distress. They also argue that under the Pecking Order hypothesis, after an Initial Public Offering (IPO), equity issues are only used in extreme circumstances. By constructing a financing deficit variable from information on corporate cash flow one can test if the Pecking Order theory is relevant. The deficit variable is constructed by the sum of dividends, net investments, change in working capital and internal cash flow.

Abimbola Adedeji (2002) makes a test of the Pecking Order theory on UK companies and shows that new debt issues do not have the one-to-one relationship with internal funds flow deficits that pecking order hypothesis predicts. It appears from the evidence that only about 20-30% of internal funds flow deficit are financed by new debt issues and that while Pecking Order hypothesis does not explain new debt issues better than Static Trade-Off theory, the theory explains levels of long term debt ratio much better than the hypothesis. Another interesting observation of the study is that Pecking Order hypothesis explains new debt issues much better at high debt ratio levels than at low debt ratio levels. Obviously, this is contrary to the suggestion of Shyam-Sunder and Myers (1999) that Pecking Order hypothesis should explain new debt issues better at low debt ratio levels than at high debt ratio levels. In other study by Nazrul and Hisham (2009) the Pecking Order model suggests that the internal fund deficiency is the most important determinant that possibly explains the issuance of new debt in Malaysian capital market despite the lower predicting power. Static trade-off model is not fit to explain the issuance of new debt issue in Malaysian capital market. Also Gunay (2002) shows that Turkey companies in time of crisis choose their capital structure according to the pecking order theory.

As it was said before, in the current crisis companies are dealing with tightened credit conditions and deleverage. Companies with bad business models as well as strong ongoing businesses burdened by overleveraged balance sheets need to confront the reality of today's credit and economic environment. Borrowers meet the current challenges by exploring the deleveraging devices and other options that are evolving during the remainder of this restructuring cycle. Companies are seeking deleveraging opportunities so as to minimize the risk that they will not be able to pay upcoming maturity of, their loan facilities, or the risk of financial covenant defaults and at the same time they are trying to maximize their chances of surviving this recession (CapitaLens, September 2009).

While the financial and economic crisis is a current subject on everyone's agenda for some time, the impact of the crisis on the real economy is now being felt. Banks are much more risk-aware, thus leading to credit squeeze and companies experiencing difficulties with credit access. In this context, there is need for state aid in order to tackle the crisis. Consequently, while companies are focused on identifying the most suitable funding option(s) for their business in the current context, states are undertaking state aid actions to support companies facing financial distress. Worsening access to credit is forcing companies to cut costs. Many firms had to scale down their activities due to the lack of finance, also postponed or cancelled planned investments. Cash flow problems have forced companies to shed staff or to sell some

property all this because banks have become less willing to provide them with credit over the last months.

Murillo et. al. (2008) conducts a survey of 1050 chief financial officers (CFOs) and finds that not only do companies cancel investment due to tight credit markets, the vast majority of financially constrained firms have sold assets in order to fund operations in 2008: exactly 70% of the constrained respondents in U.S. survey say that they are selling more assets now in 2008 than previously, compared to 37% of the unconstrained respondents, in order to obtain funds. They also inquire about how firms fund attractive investments when they are unable to borrow in financial markets. About half of U.S. firms say that they rely on internally generated cash flows to fund investment under these circumstances, and about four in ten say that they use cash reserves. Notably, 56% of constrained U.S. firms say that they cancel investment projects when they are unable to fund them with external funds, significantly greater than the 31% of constrained firms that say the same. Taking in consideration the predictions of Pecking Order hypothesis and the current situation the following hypothesis is formulated.

Hypothesis II: In the time of current crisis any deficit that companies have is financed less by debt issuance.

An another point of view concerning the choice of capital structure of firms is offered by the Static Trade-Off theory, which claims that a firm's optimal debt ratio is determined by a trade-off between the losses and gains of borrowing, holding the firm's assets and investment plans constant. Firm substitute's debt for equity or equity for debt until the value of the firm is maximized. The gain of debt is primarily the tax-shelter effect, which arises when paid interest on debt is deductible on the profit and loss account. The costs of debt are mainly direct and indirect bankruptcy costs.

According to the trade-off theory managers are constantly striving to achieve an optimal capital structure. This optimum is achieved by reaching a target debt level. If being distracted, managers would have to work gradually back to the target debt level. Having a stable point of optimal debt would therefore result in a mean reverting behavior (Shyam-Sunder and Myers, 1999).

DeJong et al. (2009), in their paper, study a sample of U.S. firms in the period 1985-2005. They find that the Pecking Order theory is a better descriptor of firms' issue decisions than the Static Trade-Off theory, particularly they find that only a small minority of the firms that have

above-target leverage in a given year issue equity instead of debt. Hence, most firms increase their leverage, even when they are already above their estimated target. In contrast, when they focus on repurchase decisions they find that the Static Trade-Off theory is a stronger predictor of firms' capital structure decisions. The Static Trade-Off theory predicts that firms in this situation repurchase equity to increase their leverage.

Cole Rebel (2008) has analyzed the capital-structure decisions of small, privately held U.S. firms. In general, these results are broadly supportive of the Pecking Order Theory and inconsistent with the Trade-Off Theory. From this is possible to deduce that before the crisis, capital structure of the firms was more consistent with the predictions of the Pecking Order theory.

Flannery/Rangan (2006) investigates if U.S. firms indeed have long-run target capital structures and if this is the case, how fast they adjust to this target. In the dynamic version of the classic trade-off theory, target debt level can be time-varying. The theory states that there will be adjustment toward the "optimal" target, if there are deviations from the optimal capital structure. The main purpose of capital structure study using dynamic partial adjustment models is then to approximate the speed of adjustment. They find out that about 34 % of the deviation from optimal leverage is eliminated in each period, taking about three years for the average firm to adjust to its target capital structure following shocks.

As it was mentioned, prior to the crisis most of the firms became overleveraged, and now, in the current crisis situation, all firms are trying to adjust to a safe debt level in order to survive in this turmoil. It's clear that the costs of debt (direct and indirect) have increased and the bankruptcy is a real threat for a big amount of highly leveraged companies. The new borrowing environment means the cost of capital for corporations remains higher than in the boom years before the crisis hit, even as official US interest rates have been slashed to near zero (Reuters, September 14, 2009). So companies are trying to off-set this cost by reducing the level of debt. Leverage increases the risk of default. When the crisis hit, leveraged households, financial, non-financial institutions and even countries were forced to learn core principle – risk requires compensation – in a painful fashion. Their efforts to reduce risk (for which they had been inadequately compensated) through deleveraging often proved infeasible. Some financial institutions failed.

So companies through their action are trying to attain an optimal capital structure. According to the trade-off theory, an optimal debt level which maximizes the value of the firm does exist, when attaining a trade off as balancing the benefits of debt against the cost of financial

distress. Of course, it is in each firm's interest to find an optimal balance between internal and external financing trade-off theory. When the resulting "optimal" or target leverage varies over time (thanks to time-varying determinants), this is labeled the dynamic trade-off theory. Firms should adjust their capital structure to some target level if shocks to actual leverage occur. From the above discussion is possible to deduce the following hypothesis:

Hypothesis III: Firms in the crisis are adjusting their capital structure to a target debt level in order to attain a tradeoff between the benefits and costs of debt.

In concordance with the Trade-Off theory more profitable firms should use more debt since they have the possibility to shield more profit in order to get tax benefits associated with the use of debt tax shields. However, this is not a common finding since both Fama and French (2002) and Frank and Goyal (2003) finds that there often is a negative relationship between leverage and profitability. The Pecking Order theory argues that more profitable firms have a reduced need for external financing. The profits will therefore be used to pay down debt and the firms will achieve a low debt ratio over time.

A few empirical studies have been performed to analyze the relationship between leverage and corporate performance. The major difference between them is found in the definition of corporate performance. One series of papers uses basic accounting measures of performance. Majumdar and Chhibber (1999) test the relationship between leverage and corporate performance on a sample of Indian companies. Adopting an accounting measure of profitability, return on net worth, in order to evaluate performance, they observe a significant negative link between leverage and corporate performance. Kinsman and Newman (1999) use various measures of performance on a sample of US firms, based on accounting or ownership information (firm value, cash-flow, liquidity, earnings, institutional ownership and managerial ownership). They perform regressions of leverage on this set of performance measures. Their conclusion is that the existence of robust relationships between leverage and some of the measures of performance such as a negative link with firm value and cash-flow. Bris et al. (2004), sort companies into two groups, depending on whether they benefited from or were harmed by crisis. While leverage increases and profitability declines for all companies, these effects are more pronounced for negative-exchange-rate-exposure companies.

There can also be mentioned several empirical works that focus on the determinants of leverage and test the profitability variable. It must be emphasized however, that profitability cannot be strictly considered as a performance variable to explain leverage, since profitability

is the source of internal financing. As a result, there exists a negative impact of profitability on leverage, as higher profitability means a reduced need for external financing such as financial debt. Here the conclusion is undoubtedly a negative relationship between profitability and leverage (Rajan and Zingales (1995), Johnson (1997), Michaelas et al. (1999)).

There is however a second series of works focusing on the relationship between leverage and corporate performance that develop more sophisticated measures of performance. Pushner (1995) aims to investigate the relationship between leverage and corporate performance in conjunction with the influence of equity ownership in Japan. Here, corporate performance is measured by total factor productivity: a production frontier is estimated, in which performance is equal to the residual of OLS estimate. He concludes that a negative relationship exists between leverage and corporate performance. Two studies test the role of financial pressure on corporate performance, which is a closely related issue. Both analyze data on the United Kingdom and again measure corporate performance as total factor productivity. Nickell et al. (1997) observe a positive link between financial pressure and productivity growth, while Nickell and Nicolitsas (1999) conclude to a weak positive effect of financial pressure on productivity growth.

To conclude this brief survey about former empirical literature, it appears that there is no consensus on the relationship between leverage and corporate performance.

According to the results of Gunay (2002), who made a study on Turkish companies during crisis (1999-2001), firms with a low level of debt nearly immunize themselves against economic crisis by having low leverages. Thus, the profitability and capital structure of low leverage firms will not be affected from the economic crisis as much as the high leverage firms, after the impact of economic crisis subsides.

It is obvious that the level of debt in the capital structure of companies decreased in the downturn but still remains unclear the effect of the crisis on the economic situation and profitability of real sector companies. In the light of current events the biggest emphasis is on the analysis of financial sector while the economy real sector is lacking attention.

The slowdown, although it started as a financial crisis, soon spread to the whole economy. The collapse of the housing bubble caused the value of investments to fall. The companies that had invested in subprime loans lost a total of about $512 billion. More than half of the money lost, $260 billion, was lost by American firms. For example the crisis affected severely the American automobile manufacturing industry lowering the profits of the companies.

In the current crisis according to a report by Citigroup's financial strategy group, companies that are more profitable and less leveraged are enjoying better valuations and prospects as stock markets rebound from the global financial crisis. Leveraging became very profitable for firms, until the bubble burst. Now burdened with debt, many of those firms are in danger of defaulting. According to a report released in March 21, 2009, there were 93 US companies at risk of defaulting on $53 billion in debts, marking a 50 percent jump since the credit crisis started. Generalizing these facts, we can say that the profitability of the real sector industries decreased and apparently the level of debt didn't play the last role in this fact. Correspondingly, the fourth hypothesis of this study will be formulated in the following way.

Hypothesis IV: The debt and profitability are expected to be inversely related in the time of current crisis.

Chapter 3

Methodology and Models

3.1 Companies and Data

The country studied in this paper is USA and was selected because it was most directly affected by the current financial crisis. The financial crisis that began in the United States in the sub-prime mortgage market in 2007 and that spread quickly to Europe has become a global crisis, affecting both financial systems across the globe and economic activity in all countries (Jack Boorman, 2009). The IMF estimates that the total losses around the world may reach more than USD 4 000 billion. The major part of the losses is expected to stem from US assets. The level of loss given default is expected to be twice as high in the USA as in Europe. The banking sector is expected to account for two-thirds of the global write downs and losses (Monetary Policy Report, February 2009). The fourth quarter of 2008 produced a 6.3 percent decline in USA's GDP–the biggest drop in 25 years. The U.S. economy has contracted 6.1 per cent in the first quarter of 2009 as the U.S. Commerce Department's latest report unveiled. The drop in GDP comes despite rising consumer spending. The falling GDP figures over the past consecutive three quarters of 2009, hasn't happened in 34 years, since third-quarter 1974 through first-quarter 1975 (Global Crisis News, April 29).

There are analyzed 60 USA companies from 6 industries: consumer goods industry, consumer services, basic materials industry, oil and gas, industrial and technology. These industries belong to the real sector of the economy. Data about these companies is collected for a period of three years: 2007, 2008, 2009 and is used to test the hypotheses of this study. The crisis, which has its roots in the closing years of the 20th century, really started to show its effects in the middle of 2007 and has exposed pervasive weaknesses in financial industry regulation and

the global financial system during 2008 and 2009 (Ben S. Bernanke, April 14, 2009). T-test, f-test, fixed effects test, regression analysis by using cross- section, time series and panel data is used to test the hypotheses of this study. As usual, firm-specific variables are observed as panel data, i.e. with a large number of observations in the cross-section (individuals) over short periods of time. If the panel dataset is not used then as usual there are some major drawbacks in the models. First, the (additional) information content of observing the same entity repeatedly is not totally exploited. Also additional problems associated with panel data may occur with incomplete data, sample selection and survivorship biases, and outliers in the data.

To be included in the sample firms must be listed NYSE Euronext, the holding company created by the combination of NYSE Group, Inc. and Euronext N.V., was launched on April 4, 2007. NYSE Euronext (NYSE/New York and Euronext/Paris: NYX) operates the world's largest and most liquid exchange group and offers the most diverse array of financial products and services. Each firm must have financial data reported in the Reuters database for the all analyzed years and also each firm must have complete financial information for the entire sample period.

3.2 Models and Variables

3.2.1 Leverage Testing

Capital structure is a term that refers to the combination of different types of securities (debt, stocks) which are issued by a company to finance its assets. When a company has no debt it said to be unlevered, while a firm with debt in its capital structure is said to be leveraged. Two major leverage terms can be distinguished: operational leverage and financial leverage. Operational leverage is related to a company's fixed operating cost and it increases the business (or the operating) risk. Financial leverage is related to fixed debt cost and increases the financial risk. Total leverage is then given by a firm's use of both fixed operating costs and debt costs, implying that a firm's total risk equals business risk plus financial risk[1]. In this study of capital structure and its determinants, by leverage, I mean financial leverage.

[1] For a textbook treatment of leverage and risk, see e.g. Brealy and Myers (2003).

There are many and different measures of capital structure. From them two major categories of leverage measures exist: those that are based on market value of equity, and those that are based on book value of equity. Book values are used primarily because using market values might yield doubtful results. For example, a decline in stock prices implies an increase in debt-to-value ratios with no increase in the amount of debt, if market values are used.

One of the most important problems is choosing an appropriate leverage measure as the dependent variable. In their paper Rajan and Zingales (1995), argue that the choice of this measure depends on the objective of the analysis. Though, they conclude that the best representation of past financing decisions is probably the ratio of total debt over capital (total debt plus equity).

Table 1 below lists the different measures of leverage and each measure's pros and cons, presented in Rajan and Zingales (1995).

For testing the first hypothesis, debt-to-value ratios are reported as a measure of leverage, for all the firms in sample. The debt-to-value ratios are analyzed for the whole period of 3 years (2007-2009). For each firm, data is gathered on its total debt-to-value ratio as well as on the ratio of short-term and long-term debt to capital from Reuters Datastream. In this part is analyzed the level of leverage for the US companies and its evolution across time for the period of interest. Also are analyzed the changes in short-term and long-term debt ratios to capital, where short-term is defined as a maturity of less than 1 year.

For this study, following leverage measures will be analyzed: the ratio of

• total liabilities over total assets,

• total debt over total assets,

• total debt over capital.

In this paper, total debt equals total liabilities less untaxed reserves.

Table 1. Different measures of leverage and corresponding pros and cons, according to Rajan and Zingales (1995).

Leverage measure	Pros and cons
Total liabilities / Total assets	+ The broadest definition of leverage; proxy for what is left for shareholders in case of liquidation. Not a good indication of whether the firm is at risk of default in the near future. - May overstate leverage since total liabilities includes items like accounts payable, untaxed reserves etc.

Total debt / total assets	+ Does not include liabilities like untaxed reserves or accounts payable (for transaction purposes); more appropriate measure of leverage than (1) above. - Affected by level of trade credit (i.e. unpaid bills; makes up bulk of accounts payable).
Total debt / net assets	+ Not influenced by trade credit. (Net assets = total assets − accounts payable − other liabilities). - Still affected by factors that have nothing to do with financing, e.g. assets held against pension liabilities.
Total debt / Capital	+ Probably the best representation of past financing decisions (capital = total debt + equity). -
EBIT / Interest expense	+ Measure of the risk that equity holders will not be able to make fixed payments and will have to give up control. Appropriate measure if investments equal in magnitude to depreciation needed to keep the firm a going concern. - Based in assumption that short-term liabilities like accounts payable and short-term debt will be rolled over. Very sensitive to income fluctuations.
EBITDA / Interest expense	+ Measure of the risk that equity holders will not be able to make fixed payments and will have to give up control. Appropriate if no such investments as in (5) are needed. - Same as for (5).

The ratio of total debt over net assets cannot be readily observed, due to limitations in the data set.

3.2.2 Pecking Order Model

As it was mentioned according to Shyam-Sunder and Myers (1999) the pecking order assumes that every capital outflow causes a financing deficit by the same amount of capital. As is known there are three sources of funding available to firms: retained earnings, debt, and equity. If you look from the point of view of an investor, equity is more risky than debt. This is why an outside investor will require a higher rate of return on equity than on debt. From the point of view of the firm, a better source of funds are retained earnings than is debt, and debt is a better source of financing than equity. This way, if a firm will be in need of funds, first of all the firm will fund the projects using retained earnings. If there are not enough retained earnings, then debt financing will be used. Thus, for a firm in normal operations, equity will not be used and the financing deficit will match the net debt issues. Equity will only be issued as a last resort due to significant costs of financial distress. By constructing a financing deficit variable from information on corporate cash flow one can test if the pecking order theory is

relevant. The deficit variable is constructed by the sum of dividends, net investments, change in working capital and internal cash flow.

$$DEF_{it} = DIV_{it} + I_{it} + \Delta W_{it} - C_{it} = \Delta D_{it} + \Delta E_{it}, \quad \text{if} \qquad \text{Equation 1}$$
$$DEF_{it} = DIV_{it} + I_{it} + \Delta W_{it} > C_{it}, \text{ otherwise } DEF_{it} = 0.$$

The variables included in the equation are presented in the following table

Table 2. Summary of variables for testing the pecking order theory.

Variable	Definition
Firm i, Year t	Refers to firm, i, and year, t
Net Financing Deficit, DEF_{it}	Surplus / deficit during year t
Cash Dividend Paid, DIV_{it}	Cash dividend paid at end of year t
Net Investments, I_{it}	Net capital expenditures of firm i at time t (i.e., I_{it}=changes in total assets from time t-1 to time t – changes in total liabilities from time t-1 to time t);
Change in Working Capital, ΔW_{it}	Change in working capital in year t (i.e., ΔW_{it}=change in operating working capital + change in cash and cash equivalents + change in current debt);
Net Internal Cash Flow, C_{it}	Cash flow after interest and taxes (i.e., C_{it} = income before extraordinary items +depreciation and amortization + extraordinary items and discontinued operations +deferred taxes + equity in net loss – earnings + other funds from operations + gain(loss) from sales of PPE and other investments);
Net debt, ΔD_{it}	Net debt issued in year t (i.e., ΔD_{it}=long-term debt issuance - long-term debt reduction);
Net Equity Issuance, ΔE_{it}	Net equity issued in year t (i.e., ΔE_{it} = sale of common stock minus stock repurchases)

When having defined the deficit variable, testing the pecking order should be fairly straight forward:

$$\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + \varepsilon_{it} \qquad \text{Equation 2}$$

ε_{it} - error term.

This is the general form of the model testing for POH and if net deficit is to be entirely financed with net debt issuance the following hypothesis according to the model must be true:

$$\beta_{PO} = 1. \qquad \text{Hypothesis 1}$$

Since the assumption is that the net deficit of firms will not be entirely financed by debt a rejection of the $\beta_{PO} = 1$ will satisfy the second hypothesis of this study.
As opposed by Shyam-Sunder and Myers (1999) there might be factors in equation that do not affect the net debt issuance on an aggregate level. The different components in DEF may have different impact on ΔD. For this to be tested it is needed to stress the variables on a separate basis and therefore also run the equation in its disaggregated form.

$$\Delta D_{it} = \alpha + \beta_{DIV} DIVit + \beta_I I_{it} + \beta_W \Delta W_{it} - \beta_C C_{it} + \varepsilon_{it} \qquad \text{Equation 3}$$

For the aggregation step to be justified the following pecking order theory hypothesis must therefore be true:

$$\beta_{DIV} = \beta_I = \beta_W = \beta_C = 1. \qquad \text{Hypothesis 2}$$

Again a rejection of the PO hypothesis stated above will sustain the fact that a firm will not be financed entirely by debt in current crisis.

3.2.3 Dynamic Partial-Adjustment Trade-off Model

According to the trade-off theory the companies are constantly striving to achieve an optimal capital structure. This optimum is achieved by reaching a target debt level. As a result of the cyclical nature of economy this level is influenced by disturbances which cause firms distraction from reaching this optimum. If being distracted, the firm would have to return back to the target debt level. Having a stable point of optimal debt would therefore result in a mean reverting behavior.
In the dynamic version of the classic trade-off theory, objective leverage can be time-varying. If the companies are deviating from the optimal capital structure, the theory states that there will be correction toward the "optimal" target. The most important objective of capital structure study using dynamic partial adjustment models is then to approximate the speed of adjustment. Flannery and Rangan (2006) investigate whether United States firms really have long-run target capital structures and if they do, then how quick they adjust to this target.

Flannery and Rangan (2006) pay attention to the model specification and econometric methods they use, emphasizing the need to take the panel nature of the data in consideration.
Target leverage of a particular firm i at a future time (t+1) is determined by a set of firm characteristics denoted X_{it}. These characteristics represent the trade-off between the costs and benefits of debt in various capital structures. From this we can deduce the aimed leverage given by:

$$MDR_{i,\,t+1} = \beta X_{it}, \qquad \textit{Equation 4}$$

Here $MDR_{i,\,t+1}$ denotes market debt ratio and β is a coefficient vector. In the case firms would have a target capital structure there would have been at least some elements of β different from zero. The Flannery/Rangan (2006) partial adjustment model is the following:

$$MDR_{i,\,t+1} = (\lambda\beta)\, X_{it} + (1-\lambda)\, MDR_{i,\,t} + \mu_i + \delta_{i,t+1}, \qquad \textit{Equation 5}$$

In this model λ is the adjustment speed coefficient, μ_i a time-invariant unobserved variable (firm fixed effect), and $\delta_{i,t+1}$ an error term. All firms are assumed to have the same speed of adjustment and catch the degree to which deviations from optimal level of leverage are eliminated in each period. If the current deviation from the target debt ratio marginally increases, the difference between the future and the current debt ratio increases by λ. When λ=0, this means that the speed of adjustment is zero, so, there is no adjustment at all. When λ = 1, the speed of adjustment is very high, this implies that the debt ratio is always at its target value.
Instrumental variable estimations controlling for time-invariant and firm-invariant unobserved variables (time and firm fixed effects) of the partial adjustment model are presented in table 3:

Table 3. Summary variables for testing the trade-off model.

Variable	Definition
Market leverage, MDR_{it}	Total Liabilities/(Total Liabilities+ Market Value of Equity;
Profitability, P_{it}	EBITDA / (Total Liabilities + Equity);
Size, S_{it}	Natural Logarithm of Sales;
Market-to-Book, MTB_{it}	(Total Liabilities + Market value Equity) / (Total liabilities + Equity);

Tangibility, T_{it}	Fixed Assets / (Total Liabilities + Equity);
Depreciation, Dp_{it}	Depreciation encountered by firm i, in year t;
Expected Inflation, EI_{it}	CPI forecasts by Economist Intelligence Unit;
R&D Expenditure, $R\&D_{it}$	Research and Development Expenditures reported by firm i, in year t;
No R&D Expenditure Reported [Dummy],$R\&Dd_{it}$	1-No R&D Expenditures Reported; 0-R&D Expenditures Reported;
Firm is rated [Dummy], Rd_{it}	1-The Firm is Rated, 0-The Firm is not Rated;

3.2.4 Dynamic Partial-Adjustment Trade-off Model with Macroeconomic Determinants.

The dynamic partial-adjustment capital structure model is tested in this paper in order to find out which will be the financing decisions of U.S. companies in the times of current crisis. How the firms will choose their capital structure in the conditions of shock to all the aggregate macroeconomic variables.

Thus again, following Flannery and Rangan (2006), I estimate the impact of macroeconomic situation on the capital structure adjustment speed. Particularly, I model the target debt level of firm i in period t+1 ($MDR_{i,\ t+1}$) as a linear function of a set of lagged macroeconomic variables ($Macro_t$) and firm characteristic variables ($X_{i,t}$), which are the same as in Equation (5). So rearranging the model yields the following:

$$MDR_{i,\ t+1} = (1-\lambda)\ MDR_{i,\ t} + (\lambda\beta)\ X_{it} + (\gamma\eta)\ Macro_t + \mu_i + \delta_{i,t+1}, \qquad \textit{Equation 6}$$

The dummy variables for year will not be incorporated in the following panel regression since these may absorb the time-varying effect of macroeconomic conditions on capital structure.

The macroeconomic conditions are defined by a set of macroeconomic factors. In order to test the influence of macroeconomic conditions on the speed of capital structure adjustment is important to analyze these factors. In concordance with Korajczyk and Levy (2003) and,

Cook and Tang (2008) these factors include term spread, default spread, GDP growth rate, and the price-output ratio.

The term spread is measured as the difference between long-term and short-term rate of interest. In our case this factor is measured as the difference between the U.S. twenty-year government securities yield and three-month Treasury-bill yield[2]. High term spread is viewed as a strong interpreter for a good economy (Stock and Watson, 1989; Estrella and Mishkin, 1998). Therefore, is expected a faster adjustment speed in good macroeconomic conditions as predicted by a high term spread.

Default spread is defined as the difference between the average yield of bonds rated Baa and the average yield of bonds rated Aaa, each rated by Moody's. Following Korajczyk and Levy (2003) and Fama and French (1989), the default spread, that is, an average yield on Baa less Aaa Moody's rated corporate bonds with maturity of approximately 20 to 25 years, as a proxy for time variation in expected bankruptcy costs.

Tracking long-term business cycle conditions is observed that this indicator is higher for the period of recessions and lower during expansions (Fama and French, 1989). Consequently, is expected that companies will adjust capital structure faster when default spreads are lower.

In economics, a recession is a business cycle contraction, a general slowdown in economic activity over a period of time (Merriam-Webster Online Dictionary). Production as measured by Gross Domestic Product (GDP) falls for two or more successive quarters of a year in recession. I use the real GDP growth rate as a direct indicator of macroeconomic situation[3]. In good macroeconomic conditions the real GDP growth rate is higher and consequently, a faster adjustment speed is expected.

In the analysis I will also employ an indicator of future stock market performance which is price-output ratio. The price-output ratio is calculated as the S&P500 stock price index in January in a given year scaled by GDP from the previous year.[4] It has been observed that this price-output ratio tracks an important part of variation in both expected returns and excess returns on the aggregate stock market. The mean reversion in the price-output ratio implies that expected returns are high if current stock prices are low relative to current GDP. Therefore, everything else held fixed, I anticipate the adjustment speed of capital structure to be higher when the price-output ratio is lower.

[2] The data can be found at the Federal Reserve Statistical Release web-page http://www.federalreserve.gov/releases/h15/data.htm.

[3] Data is retrieved from U.S. Department of Commerce, http://www.bea.gov/.

[4] http://www.econ.yale.edu/~shiller/data.htm.

3.2.5 Conventional Model

In the most empirical studies on capital structure determinants there is a list of variables that most probable affect capital structure choices. These variables suggested by Harris/Raviv (1991) in their theory review are: fixed assets, non-debt tax shields, investment opportunities, firm size, earnings volatility, default risk, profitability, advertising expenditures, R&D expenditures, and product uniqueness. Harris/Raviv (1991, p. 334) even suggest that available studies "generally agree" on these determinants, although already the classic paper by Titman/Wessels (1988) finds no significant impact of non-debt tax-shields, volatility, collateral value, or future growth on debt ratios.

This pattern of ambiguous and in part contradictory evidence can be traced through the empirical literature ever since Modigliani/Miller (1958). Still, the recent evidence has at least reached consensus on some variables and financing patterns that appear sufficiently robust empirically.

Frank and Goyal (2003) presents a conventional leverage regression model consisting of four explanatory factors; growth, profitability, size, and tangibility. The reason for including these factors is that they have historical significant impact on leverage and have therefore survived many tests. Interpreting the trade-off and pecking order theory these variables will have specific impact on debt issuance.

In their influential empirical study, Rajan/Zingales (1995) study the determinants of capital structure choices in main developed countries. In general, the authors find corporate leverage and its determinants in the G-7 countries to be fairly alike. Their proof serves as a starting point for variable choice in empirical studies since, comprising the factors growth, profitability, tangibility and size.

As suggested by Frank/Goyal (2007) using only the mentioned above factors and omitting expected inflation and the median industry debt ratio leads to misspecifications, reporting other factors statistically insignificant or changing their signs. They make a study taking the data on U.S firms for the period 1950-2003 from COMPUSTAT, the authors find several cross-sectional factors of leverage that are "reliably important". They make a list which includes 25 variables from earlier literature and find that six core variables are able to robustly explain 27 % of cross-sectional variation in leverage. Only 2 % of the variation is explained by remaining 19 determinants.

The conventional leverage regression is intended to explain the level of leverage, while the pecking order regression is intended to explain the change rather than the level (Frank, Goyal (2002)), the regression equation then takes the following form:

$$MDR_{it} = \alpha + \beta\Delta T_{it} + \beta\Delta MTB_{it} + \beta\Delta S_{it} + \beta P_{it} + \beta\Delta IMD_{it} + \beta DEF_{it} + \beta\Delta EI_{it} + \varepsilon_{it}$$

Equation 6

The conventional regression is run in first differences with the financing deficit as an added factor. Δ denotes the first differences between years.

The description of variables used in conventional model regression is presented in the table 4 below.

Table 4. Summary variables for testing the conventional model.

Variable	Definition
Market leverage, MDRit	Total Liabilities/(Total Liabilities+ Market Value of Equity;
Profitability, Pit	EBITDA / (Total Liabilities + Equity);
Size, Sit	Natural Logarithm of Sales;
Market-to-Book, MTBit	(Total Liabilities + Market value Equity) / (Total liabilities + Equity);
Tangibility, Tit	Fixed Assets / (Total Liabilities + Equity);
Industry Median Debt, IMDit	Median of Market Leverage by NACE code and by year. Industry is defined as the first digit NACE code level.
Expected Inflation, EIit	CPI forecasts by Economist Intelligence Unit:
Net Financing Deficit, DEF_{it}	Surplus / deficit during year t

In what follows I will summarize these core determinants of capital structure and their predicted effect on leverage by classic capital structure theories.

Tangibility

From the point of view of testing the pecking order, the most important of the conventional

variables is tangibility which is measured as the ratio of fixed assets to total assets. In line with Harris and Raviv (1991), under the predictions of pecking order theory, someone can expect that firms with little tangible assets would have bigger asymmetric information problems. In this way, firms with few tangible assets will tend to collect more debt over time and become more highly levered. Hence, Harris and Raviv argue that the pecking order predicts that $\beta_T<0$.

Findings by Rajan and Zingales (1995) and Gaud et al (2005) are consistent with the trade-off theory saying that tangible assets are appropriate for the reason of raising debt since it act as good guarantee. It also seems to diminish the cost of financial distress. Closing this, firms with large ratios of tangible assets would be expected to raise more debt. On the other hand, a positive relationship between available tangible assets and leverage is consistent with the pecking order theory as well, if collateral reduces the relevance of asymmetric information, thereby making the preference order less strict.

Growth (Market-to-Book)

As usual firms with high market-to-book ratios are often thought to have more future growth opportunities. There also may be a concern that debt could limit a firm's ability to seize such opportunities when they appear Myers (1977). Goyal, Lehn, and Racic (2002) find that when growth opportunities of defense firms decline, these firms increase their use of debt financing. Barclay, Morellec, and Smith (2001) present a model showing that the debt capacity of growth options can be negative. The common prediction is that $\beta_{MTB}<0$ and this is consistent with the trade-off theory. This also might be because the availability of growth opportunities might increase expected costs of financial distress, resulting in lower leverage.

The pecking order theory stretches that small firms faces larger information asymmetries and therefore raise more debt. In order to minimize such asymmetries, firms with high growth will seek to issue debt. Since high growth firms traditionally have higher market-to-book ratios this measure will be used as a proxy (Frank and Goyal, 2003). Also current and future growth must arise from (real) investments, which should be financed with more debt according to the pecking order theory. Thus, the negative relation between leverage and growth is not consistent with the pecking order theory.

Size (Sales)

The trade-off theory suggest that there is a negative relationship between size and probability of default and concludes that larger firms should therefore be more leveraged. This is being consistent with the findings of Rajan and Zingales (1995) and Frank and Goyal (2003). Larger or more mature firms are likely to have lower default risk, and are less opaque than smaller firms due to their established track record of success and the attention received from analysts and rating agencies (thus reducing informational asymmetries). These arguments imply a potential for higher leverage.

According to the pecking order theory, the prediction on the size-leverage relationship is not clear due to the ambiguous impact of a reduced degree of asymmetric information on the relative agency costs of cash versus debt versus equity (Ralf Elsas and David Florysiak, 2008).

Rajan and Zingales (1995) find that pecking order theory predicts larger firms to raise more debt since they are considered more diversified and therefore less risky. Consequently more debt is found in capital structures for large firms due to lower information costs and good reputation in debt markets.

Profitability

According to the trade-off theory more profitable firms should use more debt because of the tax shield. This happens since they have the possibility to shield more profit in order to get tax benefits associated with the use of debt tax shields. Also if higher profitability decreased the expected costs of financial distress (assuming some stationarity of profitability), one would expect to find profitability to increase leverage under the trade-off theory.

But this is not a common finding since both Fama and French (2002) and Frank and Goyal (2003) finds that there often is a negative relationship between leverage and profitability. Kayhan/Titman (2007) also finds this relation in their analysis of changes in debt ratios, but the effect is relatively weak. In dynamic trade-off studies, profitability is also obviously negatively linked to leverage. It is generally observed that the financing behavior of firms is likely to change over time. For example, Frank/Goyal (2007) finds that profitability has lost some of its explanatory power for U.S. firms' capital structures over the last decades.

A conclusion from what was said above and which is consistent with the pecking order theory is the fact that more profitable firms have a reduced need for external financing. The profits will therefore be used to pay down debt and the firms will achieve a low debt ratio over time. Also, since higher profitability will translate into more free cash flow, debt should be more valuable due to its disciplining effect on managers. Thus, the finding of a negative relationship is more consistent with the pecking order theory, because higher cash flows with everything else held constant reduce the necessity to issue debt.

Industry Median Debt Ratios

From the previous studies the industry median debt variable has been found to have high explanatory power and is most often positively correlated with leverage. This seems obvious in analysis where we have just one variable, but in a multivariate context the median leverage should not any longer affect leverage, this is because one controls for the determinants of capital structure at the same time. To clarify the explanatory power, Frank/Goyal (2007) state that managers use industry median leverage as a point of reference within the industry or some kind of target capital structure to which they adjust (e.g. Hovakimian et al. (2001) find that firms adjust to the industry median leverage). On the other hand, the connection might be explained by industry median leverage accounting for absent factors common to the industry, such as product market interactions or the nature of competition.
In their study, MacKay/Phillips (2005) also imply that firms' operational leverage relative to the industry median and the industries' degree of competition are important determinants of capital structures.

Expected Inflation

In the cross-sectional studies there is evidence that the connection between expected inflation and the level of debt is positive. Expected inflation is probably the least reliable factor among the six main factors suggested by Frank/Goyal (2007) due to estimation relying upon the trouble to observe expectations in general and the low occurrence of observations for macroeconomic data.

If interpreting the trade-off- and pecking order theory the mentioned above variables will have

specific impact on net debt issuance which is summarized in table 5.

Table 5. Summary of Expected Signs on Coefficients

Factor	Trade-off theory	Pecking-order theory
Tangibility	+	- (+)
Growth	-	+
Size	+	+
Industry Median Debt	+	-
Expected Inflation	+	-
Profitability	+	-

Chapter 4

Empirical Results

4.1 Leverage testing

Table 6, bellow, presents the mean and median figures of the leverage measures that were discussed before. As is possible to observe from the data, USA companies are not so high leveraged and more off, the ratios are decreasing for the examined period of time.

Table 6. Mean and median values of different leverage measures for real sector American companies 2007-2009.

Year		2007	2008	2009	*Average*
Total liabilities/ Total assets	Mean (%)	57,2	57,3	57,7	*57,4*
	Median (%)	55,5	59,0	57,3	*57,3*
Total debt/ Total assets	Mean (%)	42,4	27,5	21,9	*30,6*
	Median (%)	21,5	23,4	18,9	*21,3*
Total debt/ Capital	Mean (%)	35,5	38,3	37,8	*37,2*
	Median (%)	33,6	36,9	32,4	*34,3*

Note: Total debt= short-term debt + long-term debt. Capital= total debt + book value of equity.

The ratio of total liabilities over total assets has an average mean of 57,4 % and a median value of 57,3%, slowly increasing from 57,2% in 2007 to 57,7% in 2009. As we can see liabilities represent approximately half of the firm assets and the other half is equity. This is a

good indicator in the current situation as it assures a more stable capital structure and not such a big reliance on liability. However, this indicator might overstate leverage since it includes items like accounts payable, untaxed reserves etc. By excluding all this from total liabilities we get to the second leverage measure (total debt/total assets). As expected, this figure shows lower values of leverage than the previous one. From the table we can see that means value is 30, 6% and the median is 21, 3%. This ratio is decreasing from 42, 4% in 2007 to 21, 9% in 2009 which is a result of the current liquidity crisis followed by a tightening of the credits conditions to the business. The third measure (total debt/capital), gives an insight of how the companies are financing their operations and their financial strength. As we have seen from before USA companies are not so much reliant on debt. The mean and median values are 37, 2% and 34, 3% respectively. This ratio increased by 2, 8% from 2007 to 2008 and then decreased by 0, 5% from 2008 to 2009. The median decreased over the analyzed period from 33, 6 to 32, 4%, despite an increase in 2008.

The figures are in line with the predictions of this study concerning the evolution of debt in the capital structure of the American companies during the crisis period.

4.1.1 Decomposition of total debt into short-term and long-term debt ratios.

Since we are interested in the leverage level of the USA companies, it makes sense to analyze the sources of debt in more detail. For this purpose the total debt is separated in short-time debt and long-time debt components.

Short-time debt consists of any debt incurred by a company that is due within one year. The debt in this account is usually made up of short-term bank loans taken out by a company. At the same time, short term debt financing provides the business with liquidity to conduct its day-to-day operations and to maintain working capital needs. However, it presents some disadvantages to the business as well. Between them is possible to mention the fact that short-term debt only meets working capital or immediate business needs. It is not useful for servicing any long term plans with larger capital requirements, higher risk, and longer payback horizons. Also short term debt financing has to be monitored closely to avoid bad relationships with suppliers and bankers.

In contrast to short-term borrowings, long-term debt is used to finance business investments that have longer payback periods (more than one year).

The cost of long-term debt is generally much more than that of short-term borrowing. The

long-term debt agreement specifies the interest rate, the timing of interest payments, and the amount of monthly payments. A company with too much long term debt will find itself overwhelmed with interest payments and at risk of having too little working capital, potentially leading to bankruptcy. A company that is reducing its long term debt displays signs of prosperity as its reducing its payments associated with the debt. A company that is increasing its long term debt is deteriorating as its increasing its interest payments and eventually risks becoming insolvent and going bankrupt.

In attempt to analyze determinants of corporate debt with respect to both short-term and long-term debt ratios, I create two leverage measures (short-term debt/capital and long-term debt/capital). The resulting leverage figures are presented in table 7 below.

Table 7. Mean and median values for long-term debt, short-term debt and total debt ratios for 2007-2009.

Year		2007	2008	2009	*Average*
Short-term debt/ Capital	Mean (%)	5,4	7,5	5,9	*6,3*
	Median (%)	1,4	2	1,7	*1,7*
Long-term debt/ Capital	Mean (%)	30,2	30,8	32,7	*31,2*
	Median (%)	27,2	30,1	27,8	*28,4*
Total debt/ Capital	Mean (%)	35,5	38,3	37,8	*37,2*
	Median (%)	33,6	36,9	32,4	*34,3*

As is possible to observe from the figures the ratio of short-term debt/capital represents approximately 1/5 of the total debt over capital. This is a very low figure but, represents a good indicator in the times of current crisis. During this crisis, access to funding is a problem because banks are in desperate need of capital and can't take risks that in ordinary times would be prudent. As a result, high levered companies do not have access to funds and can't fulfill their short-term obligations. Apparently, this is not such a big problem for the real-sector American companies which are relying more on equity financing.

We can see that short-term debt/capital has increased with 2, 9% from 2007 to 2008. This happened at the early stages of the crisis when firm preferred short-term debt to finance their operations and banks were not so adverse on lending (The Wall Street Journal, October 30,

2009**)**. From 2008 to 2009 the ratio of short-term debt decreased from 7, 55 to 5, 9% as a result of tightened credit conditions and deleveraging. We can see that the average median figure for the short-term debt ratio (1, 7%) is much more lower than the average one (6,3%) for the analyzed period. This tells us that the mean is overstated being influenced by a couple of outliers.

Long-term debt, which represents the biggest part of company's debt, was more slowly increasing during this period in comparison with previous periods of time (30, 2% in 2007 to 32, 7% in 2009). This is due to the need for equity injections, restrictions on liabilities and inaccessible long-term debt markets (Reuters, November 10, 2008).

Now that the portion of long-term debt and short-term debt in total debt has been analyzed, it might be interesting to see how the ratio of short-term debt, long-term debt and total debt over capital vary across industries. The dataset contains information about American firms from six industries: basic materials, consumer goods, industrials, and technology, oil and gas and customer services. The resulting figures for short-term and total debt ratios are presented in table 8 bellow. As is possible to observe from the table the most leveraged are companies are from consumer goods and less levered from oil and gas industry with 16, 6% and respectively 1, 9% average of short-term debt to capital.

Table 8. Short-term debt and total debt ratios for industries. For convenience the figures for total debt to capital are shown here too.

Industry		Short-term debt/Capital			*Average*	Total Debt/Capital			*Average*
		2007	2008	2009		2007	2008	2009	
Basic Materials	Mean (%)	4,8	7,8	4,3	*5,6*	39,2	42,7	40,3	*40,7*
	Median (%)	3,7	4,6	1,7	*3,3*	39,2	44,5	40,5	*41,4*
Consumer Goods	Mean (%)	13,5	19,1	17,3	*16,6*	46,6	49,9	47	*47,8*
	Median (%)	5,7	13,6	9,7	*9,7*	42,2	44,4	37,4	*41,3*
Industrials	Mean (%)	2,4	6,0	4,1	*4,2*	32,6	29,0	22,5	*28,0*
	Median (%)	0,5	2,4	1,5	*1,5*	28,8	29,3	22,8	*26,9*
Technology	Mean (%)	4,5	7,0	3,9	*5,1*	27,7	35,3	46,2	*36,4*
	Median (%)	0,8	0,7	1,0	*0,8*	30,2	30,1	24,2	*28,2*
Oil and Gas	Mean (%)	2,5	1,8	1,4	*1,9*	23,7	24,7	23,5	*24,0*
	Median (%)	1,0	0,4	0,2	*0,5*	24,2	20,9	19,8	*21,6*
Customer Services	Mean (%)	4,6	3,2	4,5	*4,1*	43,5	48,1	47,1	*46,2*
	Median (%)	3,2	2,0	3,4	*2,9*	37,3	43,7	37,4	*39,5*

We can see that although the level of short-term debt/capital slowly increased for most of the industries from 2007 to 2008, in 2009 this indicator decreased for all industries except customer services industry. It seems that the ratio of short-term debt in customer services sector was more affected by the crisis at the very beginning (1, 2% decrease) and by 2009 the situation improved (1, 4% increase). The median values are generally lower than the mean values, fact that tells us about the presence of outliers.

As was mentioned before, long-term debt constitutes the most important part of debt financing of USA companies. Contrary to the findings above, table 9 below reveals that most highly leveraged with long-term debt are companies from customer services industry (42,4%).

Table 9. Long-term debt and total debt ratios for industries. For convenience the figures for total debt to capital are shown here too.

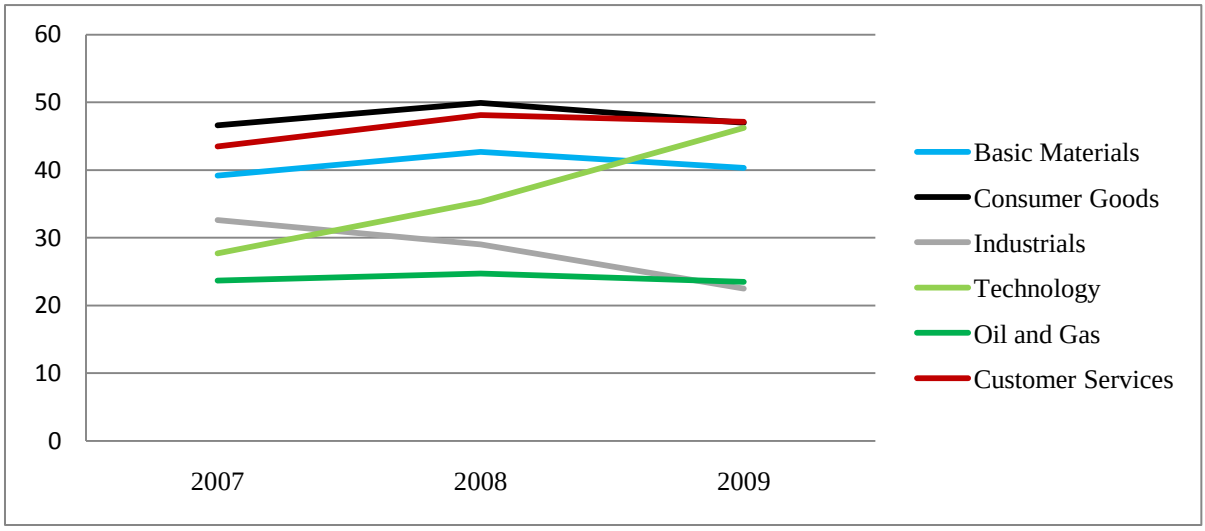
Industry		Long-term debt/Capital			*Average*	Total Debt/Capital			*Average*
		2007	2008	2009		2007	2008	2009	
Basic Materials	Mean (%)	34,3	34,9	41,3	*36,8*	39,2	42,7	40,3	*40,7*
	Median (%)	31,9	38,6	41,5	*37,3*	39,2	44,5	40,5	*41,4*
Consumer Goods	Mean (%)	33,1	30,7	29,6	*31,1*	46,6	49,9	47,0	*47,8*
	Median (%)	26,7	32,9	28,0	*29,2*	42,2	44,4	37,4	*41,3*
Industrials	Mean (%)	30,3	23,0	18,5	*23,9*	32,6	29,0	22,5	*28,0*
	Median (%)	28,2	24	16,1	*22,8*	28,8	29,3	22,8	*27,0*
Technology	Mean (%)	23,2	28,3	42,3	*31,3*	27,7	35,3	46,2	*36,4*
	Median (%)	11,9	16,4	13,8	*14,0*	30,2	30,1	24,2	*28,2*
Oil and Gas	Mean (%)	21,2	23,0	22,1	*22,1*	23,7	24,7	23,5	*24,0*
	Median (%)	21,1	17,0	18,2	*18,8*	24,2	20,9	19,8	*21,6*
Customer Services	Mean (%)	38,9	44,9	42,7	*42,2*	43,5	48,1	47,1	*46,2*
	Median (%)	29,6	40,6	36,1	*35,4*	37,3	43,7	37,4	*39,5*

The less leveraged as in the case of short-term debt is oil and gas industry with 22, 1% of long-term debt to capital ratio. As in the previous case the long-term debt ratio to capital increases for most of the industries from 2007 to 2008. In 2009 there is observed a decrease in this indicator for all industries except basic materials and technology. Moreover, for technology industry this increase is around 11%. The results show that the ability of companies from this sector to finance their operations by long-term debt financing was not

affected at all by the crisis. The ratio of long-term debt to capital was steadily increasing for the analyzed period of time from 23, 2% in 2007 to 42, 3% in 2009. We can see that the median figures for this sector follow a different pattern. From this we can conclude that the level of long-term debt/capital in most of the firms in this sector declined but as a result of few outliers the mean figures are overstated.

In what follows I would like to pay attention to total debt/capital ratio which is presented both in table 7 and 8. Total debt is composed from short-term debt and long-term debt which were discussed earlier. In order to analyze this indicator an additional measure will be used which is Dow Jones Industrial Average Index (DJIA). This is a stock market index that shows how 30 large, publicly-owned companies based in the United States have traded during a standard trading session in the stock market (Sullivan, Arthur; Steven M. Sheffrin, 2003).

Figure4. Total debt/capital by industry for the period 2007-2009.



The value of the Dow is not the actual average of the prices of its component stocks, but rather the sum of the component prices divided by a divisor, which changes whenever one of the component stocks has a stock split or stock dividend, so as to generate a consistent value for the index. In Annex 1 we can see the DJIA of each industry for the period 2007-2009. Having these figures is possible to observe the patterns of evolution between market stock prices and the level of total debt to capital for each industry.

The highest quotations of DJIA are for oil and gas and technology industry. As is possible to observe from the previous tables oil and gas industry has the lowest level of debt/capital. Technology sector has on average a relative low level of debt to capital in but this indicator is stabile increasing from 2007. Although, during the analyzed period, the level of debt to capital

stays stable for oil and gas industry and increases for technology industry in the second half of 2008 DJIA dramatically fell more than twice in value. The situation remained the same until the end of first quarter of 2009, after which DJIA started to increase, especially for the technology sector. The situation is similar for all the industries, even for the industrials industry, whose level of debt decreased during the analyzed period of time.

From this we can conclude that DJIA index is generally higher for the least leveraged companies and its values are currently increasing independent of the evolution of debt over capital for each industry.

After analyzing the level of leverage of American companies in the current crisis I can say that the results correspond to the predictions of first hypothesis of this study. I would like to start with the fact that the USA companies were not highly leveraged. The debt represents less than 50 % of the total assets in 2007 and this ratio decreases by half until 2009. This fact could be explained by the tightened credit conditions of the crisis. Although some measure of leverage slightly increased in 2008, in 2009 they all went down. Some of these measures were scaled by assets and is important to mention that in 2009 the level of assets also decreased (Annex 2). This happen as a result of the deleveraging process that became very popular and many companies were and are using it in order to obtain resources to finance their activities. Those measures of leverage that that were scaled by capital also went down although equity was stable increasing during the crisis period.

If we are trying to analyze the level of debt as a measure composed from short-term debt and long-term debt then must be mentioned the fact that the level of short-term debt represents only 15 %- 16 % of total debt, the rest is long-term debt. Ratio of short-term debt in total capital slightly increased in 2008 and then decreased in 2009. At the same time the ratio of long-term debt registered a very slow but stable increase during 2007-2009. We can conclude from this that in the crisis it was mainly reduced the availability of short-term financing, while long-term financing was still possible. But of course, not at the levels that were before.

The level of short-term debt was also analyzed for companies belonging to different industries. The most leveraged are the companies from consumer goods industry, less leveraged are companies from oil and gas industry. Long-term debt was highest for companies belonging to customer services industry and lowest for the companies of oil and gas industry. Also was interesting to observe if there is some connection between level of debt for different industries and quotations on the financial markets. The result is that DJIA index is generally higher for the least leveraged companies and its values are currently increasing independent of

the evolution of debt over capital for each industry.

4.2 Testing the Pecking Order Hypothesis.

The sample for testing the pecking order hypothesis comprises a number of 180 observations. There are 60 USA companies from 6 industries analyzed for a period of three years (2007, 2008, and 2009). Since some of the variables used for testing the hypothesis of this study represent differences between years, some data from 2006 will also be used. This way the study will comprise a bigger period of time and some information from the period when the companies were in a relatively stable position. We have a three time period interval 2007-2006, 2008-2007, and 2009-2008. The descriptive statistics of the variables used for testing this hypothesis can be seen in the Annex 3, at the back of this paper.

One of the most important variables of this hypothesis is the deficit variable. In the table 10 bellow we can see descriptive statistics of this variable for the analyzed period of time (2007-2009). In the crisis situation only 5 (8, 33%) firms out of 60, that are analyzed in this study, didn't had a deficit, all the others encountered problems with financing during 2007-2009.

Table 10. Descriptive statistic for the deficit variable. Years 2007, 2008, and 2009 (mil. dollars).

Year	Mean	Std. dev.	Minimum	Maximum
2007	501,61	1192,90	0,00	8110,70
2008	790,44	2638,20	0,00	19710,00
2009	362,07	816,98	0,00	4299,00

In 2008 the companies encountered the highest level of deficit in comparison with 2007 and 2009. On average the companies had a deficit of 790, 44 millions of dollars in 2008, with a maximum of 19 710 millions of dollars. This is a more than twice increase in comparison with 2007. The deficit that American companies had in 2008 decreased significantly in 2009. The funds deficit decreased from 790, 44 mil. dollars to 362, 07 mil. dollars in 2009, with a standard deviation of only 816, 98 and a maximum of 4 299 mil. dollars. This is mostly a result of the companies policy change. Their management has been orientated to the reduction of the deficit through sale of assets, backing from new projects and investments, cutting off the expenses and in some cases reduction of the production. The end of 2009 brought a stabilization of the financial markets but this didn't have a positive effect on the availability of

credits as we saw from the previous section.

Following the methodology of Frank and Goyal (2003) I have tested the regression against the different dependent variables such as net debt issuance, gross debt issuance and other debt level variables. For this I used panel data. In order to correct for possible endogenity dummy variables for the year are also included, but they are not significant and don't affect the results of this study. The other debt level variables used are the following:

LTDR – Long-term active debt divided by the sum of total debt and book value of equity capital.

MLTDR - Long-term active debt divided by the sum of total debt and market value of equity capital.

LTDRA –Long-term liabilities divided by the book value of total assets.

TDRA - Total liabilities divided by the book value of total assets.

From the table 11 we can see that in the regression PO1 the financing deficit variable is highly significant and an increase of one percentage point in financial deficit will lead to an increase of 0,285 percentage point of net debt issued. This does not seem to support the pecking order theory as the financial deficit will not be financed so much by debt issue. Also the beta in regression PO1 of 0, 2848 forces us to statistically reject the null hypothesis that $\beta_{PO}=1$. R^2 in the case of panel data is not reliable and might give us distorted result.

As concluded from regression PO2 the use of an alternative dependent variable such as gross debt issued do not seem to offer any wider explanatory power. This is consistent with Bond and Scott (2006).

Table 11. Pecking Order Tests - $\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + \varepsilon_{it.}$

	Net debt issue	Gross debt issue	LTDR	MLTDR	TDRA	LTDRA
	PO1	PO2	PO3	PO4	PO5	PO6
Constant, α	-21,0003	1135,31***	0,3326***	0,2421***	0,5597***	0,3268***
	(56,9306)	(195,969)	(0,0332)	(0,0275)	(0,0284)	(0,0244)
Financing deficit, β_{PO}	0,2848***	0,5932***	-1,60E-05	-1,03E-05	-1,59E-05*	-5,67E-06
	(0,0189)	(0,0652)	(1,10E-05)	(9,15E-06)	(9,46E-06)	(8,14E-06)
n	180	180	180	180	180	180
R^2	0,5695	0,3242	0,0137	0,0125	0,0164	0,0042

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. Standard errors are given in parenthesis. Dependent variables are shown in the X-axis and the independent variables are shown in the Y-axis of the table.

A conventional method being used by Frank and Goyal (2003) and Shyam-Sunder and Myers (1999) are to scale the variables with net assets. By doing this controlling for firm size can be done. In regression PO5 and PO6 we have therefore scaled the long-term liabilities and total liabilities with net assets. Scaling with net assets does not seem to offer a better explanatory power. Long-term active debt divided by the sum of total debt and market value of equity capital as the dependent variable also does not offer a wide explanatory power.

In order to better understand the evolution of the level of debt and deficit in the current crisis I will test the hypothesis of the pecking order for each year separately, by using cross-section data. From the previous table we have seen that the most significant measures of debt are net debt issue and gross debt issue. It is important to be aware of the risk that the scaling variables might be correlated with some of the regressed variables. If that is true we might manipulate the coefficients. Therefore I have chosen not to take the risk of affecting the coefficients and further testing will mainly be un-scaled.

The results are presented in the table 12 bellow.

Table 12. Pecking Order Tests - $\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + \varepsilon_{it,}$ by using cross-section data for each year separately.

	Net debt issue			Gross debt		
	2007	*2008*	*2009*	*2007*	*2008*	*2009*
Constant, α	-81,1678	49,7483	-56,2	673,717***	865,646***	871,545***
	(77,2861)	(54,7814)	(45,2282)	(152,201)	(183,819)	(262,16)
Financing deficit, β_{PO}	0,3221***	0,2679***	0,3821***	0,6634***	0,5090***	1,3217***
	(0,0601)	(0,02)	(0,051)	(0,1185)	(0,0673)	(0,2954)
n	180	180	180	180	180	180
R^2	0,3309	0,7549	0,4921	0,351	0,4968	0,2565

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. Standard errors are given in parenthesis. Dependent variables are shown in the X-axis and the independent variables are shown in the Y-axis of the table.

In the case when the dependent variable is the net debt issue we can see that the financing deficit is significant for all the years at 99% confidence level. We can see that in 2007, one million dollars increase in the level of financing deficit would lead to an increase in the net debt issue of 0, 3221 million dollars. This number went down to 0, 2679 million dollars in

2008 as a result of the tightening of the credit conditions. The companies were financing its deficit from other sources than long-term debt. In 2009, an increase of 1 mil. dollars in the level of financing deficit would lead to an increase in the level of net debt issue of 0, 3821 mil. dollars. This result is quite interesting but is in line with the findings of this study from before. The dependent variable of this regression is the change in the issue of long-term debt, and as is possible to observe from table 7, that the long-term debt to capital ratio registered a very slight but stable increase in the years 2007-2009. The crisis generally reduced the availability of credits, but more affected was short-term lending. Long-term lending registered, although more slowly, a stable increase.

We can see that the financial deficit managed to explain about 75 % of the variation in the net issue of long-term debt in 2008. This number was smaller in 2007 and 2009 which shows us that there is still a lot of unexplained variation in the net issue of debt. Also for 2007, 2008, and 2009 we statistically reject the null hypothesis $\beta_{PO}=1$.

In the case when the dependent variable is the gross issue of debt we can see that for all the years the deficit variable and constant are highly significant at 99% of confidence. In 2009, an increase in the financing deficit of a company of 1 mil. dollars would lead to an increase in the issue of long-term debt of 1, 32 mil. dollars. Also very interesting is the fact that in this case we can't reject the null hypothesis that the financing deficit was financed entirely by debt issuance. From the previous tables we can see that the level of deficit that the firms had in 2009 decreased, and the level of long-term debt increased. Also the companies were not able to finance their cash needs from short-term debt issue. This could explain the result that was obtained. If we look at unadjusted R^2 it is possible to observe that this regression has a lower explanatory power than the case when explained variable is net debt issue. We can conclude that there is still a lot of variation in the level of debt that can't be explained and there are a lot of variables that could also explain the changes in debt level and influence the results of our study.

We have in the previous theoretical section made assumptions about net deficit being a component of a number of cash flow based components. In table 13 one can see whether this aggregated variable is justified empirically. Consistent with table 13 we can see that the use of alternative dependent variables, particularly gross debt issue, does not offer a wider explanatory power.

In regression PO7 the null hypothesis of $\beta_{DIV}=\beta_I=\beta_W=\beta_C=1$ is being statistically rejected. This has been tested with an F-test on a five percent level. In the case of PO7 the aggregation step

does not seem to be supportive. Increase in dividend and working capital influence the increase in net debt only by a small amount. The increase in dividends also does not cause a significant increase in net level of debt. Also should be mentioned that a lot of American companies do not pay any dividend to its shareholders.

The net internal cash flow coefficient has the expected sign whereas an increase in internal cash flows of 1 mil. dollars would result in a net debt reduction of 0, 0627 mil. dollars. In the trade-off theory there is also a prediction of a positive relationship between investments and debt. Therefore these conclusions are not unique for the pecking order theory which is also noticed by Frank and Goyal (2003).

Table 13. The Justification of the Aggregation Step - $\Delta D_{it} = \alpha + \beta_{DIV}DIV_{it} + \beta_I I_{it} + \beta_W \Delta W_{it} - \beta_C C_{it} + \varepsilon_{it.}$

	Net debt issue	Gross debt issue	LTDR	MLTDR	TDRA	LTDRA
	PO7	PO8	PO9	PO10	PO11	PO12
const	-39,1824	886,779***	0,3384***	0,2497***	0,5667***	0,3310***
	(66,4993)	(164,434)	(0,0337)	(0,0277)	(0,02876)	(0,0248)
DIV	0,0391	3,4248***	-0,0001	-0,0002*	-0,0001	-7,71E-05
	(0,2079)	(0,5142)	(0,0001)	(8,66E-05)	8,95E-05	7,75E-05
ΔW	0,1665***	0,3884***	-8,46E-06	3,38E-05	-2,12E-05	-2,54E-05
	(0,059)	(0,1461)	(2,9938-E05)	2,46E-05	2,54E-05	2,20E-05
I	0,1362***	0,0189	-1,90E-05	-9,18E-06	-1,86E-05	-1,17E-05
	0,0311	0,0678	1,5747-E05	1,29E-05	1,34E-05	1,16E-05
C	-0,0627***	-0,0264	-3,90E-06	-6,31E-06	-5,38E-06	-4,83E-06
	0,0167	0,0412	8,45E-06	6,94E-06	7,18E-06	6,22E-06
n	180	180	180	180	180	180
R^2	0,4411	0,5473	0,0351	0,0476	0,0506	0,0269

*** significant at 1% level, ** significant at 5% level, * significant at 10% level. Standard errors are given in parenthesis. Dependent variables are shown in the X-axis and the independent variables are shown in the Y-axis of the table.

In the equation PO8 the dependent variable is the gross issue of debt. Having this variable as dependent does not seem to add to the regression any additional explanatory power. The most significant change is in the fact that dividend variable is significant and an increase of 1 mil. dollars in the level of dividends would lead to an increase in the level of gross debt of 0, 388 mil. dollars. In regression PO8 the null hypothesis of $\beta_{DIV}=\beta_I=\beta_W=\beta_C=1$ is being also

statistically rejected.

In what follows I will also test the pecking order hypothesis in its aggregate form for each year separately by using the cross-section data. The analyzed dependent variables, as in the previous case will be net debt issue and gross debt issue.

As we can see from table 14, the aggregate step seems to offer an additional explanatory power in the case when the dependant variable is the gross debt issue. The variables of the regression explain 43% in 2007 and 76% in 2008 of the variation in the issue of gross debt. This is a quite high number. Also in 2008 almost all the variables are significant at 90% and 99% of confidence except the net investment variable. In 2009 we can see that the explanatory power of the regression has decreased, dividend and changes in working capital variable are not significant anymore. But, even when we analyze the data for each year separately we cannot accept the null hypothesis of pecking order theory.

Table 14. The Justification of the Aggregation Step - $\Delta D_{it} = \alpha + \beta_{DIV}DIV_{it} + \beta_I I_{it} + \beta_W \Delta W_{it} - \beta_C C_{it} + \varepsilon_{it}$ by using cross-section data for each year separately.

	Net debt issue			Gross debt		
	2007	2008	2009	2007	2008	2009
const	-18,9838	43,3772	-15,6715	658,225***	570,117***	634,919***
	72,3516	69,3296	53,6591	144,9	135,903	193,266
DIV	-0,2489	0,5026	-0,7316	2,1698***	5,5256***	0,8944
	0,3352	0,389	0,473	0,6713	0,7625	1,7038
ΔW	-0,0171	0,2119**	0,2603**	-0,2115	0,3510*	0,0927
	0,147	0,0964	0,1204	0,2945	0,1889	0,4335
I	-0,1164	0,2199**	0,2028**	0,1662	0,2312	1,0529***
	0,0818	0,0889	0,0968	0,1638	0,1793	0,3485
C	-0,1567***	-0,0188	-0,0978***	0,0095	0,1713*	-0,3506***
	0,034	0,0469	0,0357	0,0682	0,0919	0,1286
n	180	180	180	180	180	180
R^2	0,4371	0,6623	0,3381	0,4353	0,7634	0,6259

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. Standard errors are given in parenthesis. Dependent variables are shown in the X-axis and the independent variables are shown in the Y-axis of the table.

After testing for the pecking order theory I can formulate a series of conclusions regarding the obtained results. First should be mentioned that almost all USA companies encountered problems with financing of their activity (83, 3% out of 100% had a financing deficit). The maximum deficit level was attained in 2008. For testing the pecking order hypothesis is used panel and cross-section data. Common problems found in panel data are detected in this sample; the ordinary least square (OLS) assumption of independent errors is unlikely to be satisfied. The most serious problem of OLS estimation comes from the dependence of the residuals. Residuals show the presence of autocorrelation and homoskedasticity. The problem of dependent errors seems to be more important with this data set than that of outliers. In order to somehow correct for the problems found in the data I use year as dummy variables but this variables are not significant and do not influence the results of the study.

When using panel data the results do not seem to support the pecking order theory. Also the use of alternative dependent variables does not seem to add any explanatory power. Performing the pecking order regression for each year separately, by using cross-section data, does not provide also any support for the POH. But from the table 12, we can see that in 2008, 75% of the variation in the net issue of long term debt is explained by the financing deficit. So the main reason for issue of the debt in the worst year of crisis was the financing deficit. In 2007 and 2009 this number is much lower so there are other reasons explaining the change in long-term debt issue. The case when the dependent variable is the gross debt issue supports the POH for the year 2009. From the previous analysis we can see that the level of deficit in 2009 decreased, and the level of long-term debt increased. Also the companies were not able to finance their cash needs from short-term debt issue. This could explain the result that was obtained.

The tested net deficit variable is a component of a number of cash flow based components. In order to see if the aggregated step is justified I tested it for pecking order hypothesis. We can see that the aggregation step does not seem to be supportive for the tested hypothesis and the use of other dependent variables also. As in the previous case when we use cross-section data for each year separately the gross issue of debt is explained better by the aggregated variables than net issue of debt.

4.3 Testing the Trade-off Hypothesis

In the trade-off theory it is assumed that the firm will adjust to a target debt level in order to

achieve an optimal capital structure. The main objective of the partial adjustment model used here is to see if there is an adjustment towards an optimal level, and if so what is the speed of this adjustment.

The model and the variables for testing this hypothesis were discussed in the chapter before. Also the descriptive statistics for the variables are presented in the Annex 4, at the end of this paper.

Table 15 shows results of instrumental variable estimations controlling for time-invariant and firm-invariant unobserved variables (time and firm fixed effects) of the partial adjustment model. It summarizes also the core regression results of Flannery/Rangan (2006) shown in their Table 2, model 7, and compares them to a similar regression for the firm sample presented in this paper.

Similar to Flannery/Rangan (2006), I include a dummy indicating if U.S. firms from the period 2007-2009 did not report research & development expenditures (R&D), and set in this case the variable to zero. This serves to avoid biases from the fact that reporting R&D expenditures is voluntary under the U.S. accounting standards. Model also includes a rating dummy since the rating agencies played an important role at the various stages of the subprime crisis and influenced the availability of credits to the companies.

In the model the dependent variable is market leverage. All regressor variables are lagged one year. Year dummies have been included. Depreciation and R&D expenditure are divided by total assets.

In this model I am trying to explain firm's level of leverage in the analyzed period and according to the specified above model it depends on the firm's situation from the previous years. Particularly is dependent on the level of leverage it has already had and on a set of other variables describing the firm's characteristics. As we can see from the table 15 not all these variables are significant in the sample of United States firms (2007-2009), so not all of them account for the change in the level of debt. This might be due to a small number of observations in the sample and a limited time period. Smaller sample size and a greater number of independent variables decrease the likelihood of finding statistically significant results.

Still, from our results we can see that the constant is significant at 95% confidence and also the lagged market leverage is significant at 95% of confidence. What is interesting is the negative correlation between the lagged market leverage and the dependent variable market

leverage. The negative sign on lagged leverage suggests that mean reversion is at work as predicted by the tradeoff theory.

Table 15. Flannery/Rangan (2006) regression results and instrumental variables with fixed effects regression for United States firms, 2007-2009.

Regressors	Instrumental Variable Regression, Fixed Effects (U.S. firms 2007-2009)	Flannery and Rangan (2006), Instrumental Variable Regression, Fixed Effects (U.S. firms)
Constant	2,470 (0,931)**	-
Lagged Market Leverage	-0,329 (0,156)**	0,656 (0.000)***
Profitability	-0,275 (201)	-0,030 (0.000) ***
Size	-0,265 (0,119)	0,025 (0.000) ***
Market-to -Book	0,002 (0,021) **	0,000 (0.418) ***
Tangibility	0,129 (0,223)	0,053 (0.000) ***
Industry Median Debt	-	0,034 (0.000) ***
Depreciation	-1,438 (1,541)	-0,226 (0.000) ***
Expected Inflation	7,775 (2,069)***	-
R&D Expenditure	1,821 (1,384)	-0,025 (0.000) ***
No R&D Expenditure Reported [Dummy]	-	0,000 (0.010) ***
Firm is Rated [Dummy]	-	0,003 (0.087)*
n	120	111 106
R-squared	0,96	0,466

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. Standard errors are given in parenthesis.

One percentage point increase in the market leverage in the previous year leads to a decrease in the same value in the current year of 0,329 percentage point. This shows us that the companies are decreasing their level of debt quite fast in the analyzed crisis period. The sign is opposite for this variable in the Flannery and Rangan model including the U.S. companies for the period 1987-2006, that is the period before crisis.

We can see that in the case of profitability, although in the 2007-2009 sample is not

significant, it has the same sign as in the Flannery and Rangan model. Higher profitability lowers the level of market debt in companies. The results are different for size variable, seems that it has an opposite effect on the level of market debt in companies in the crisis period than in the period before (but again, the variable is not significant).

Market-to-book variable is significant at 95% of confidence and positively influences the level of debt in the next period. One percentage point increase in the market-to-book variable will lead to an increase in the level of debt of 0,002 percentage point. This variable is not influencing the level of debt in the Flannery and Rangan model. Industry median debt is not reported in the current sample although in the U.S. firms (1987-2006) sample is highly significant.

Expected inflation is significant at 99% of confidence and it manages to predict pretty well the level of leverage of the companies. A one percentage point increase in the expected inflation will lead to an increase in the market leverage of 7, 77 percentage points in the next period. This measure is not reported in the Flannery/Rangan sample. R&D expenditure is not significant in the crisis sample, although it is significant in the pre-crisis sample.

As we can see from the table 15, column 3 the no R&D expenditures reported dummy and rated dummy are highly significant. In the crisis sample these variables are omitted due to exact collinearity. I include in the model also year dummies as I expect that different economic conditions in the analyzed years might lead to different leverage behavior. These dummies should show how much more or less leverage a firm took previous to a specific year. But as it turns out in our model the year dummies are not significant and do not change the results of the regression.

Unadjusted R squared is also reported with a high value of 0, 96 in the current sample and only 0, 46 in the Flannery/Rangan sample. But measures of goodness of fit aren't useful at all for evaluating a model in panel data with fixed effects; tossing in lots of fixed effects is inflating R-squared.

In terms of the Flannery/Rangan (2006) results in column 3, most of the firm characteristics $\mathbf{X}_{it}$ that determine the target capital structure are highly significant after controlling for the lagged market debt ratio, which supports the existence of target leverage. According to the estimated coefficient on MDR_{it}, the speed of adjustment is λ=1-0,656 = 0,344, thus significantly different from zero in a statistical and economic sense. Hence, about 34 % of the deviation from optimal leverage is eliminated in each period, taking about three years for the average firm to adjust to its target capital structure following shocks.

The corresponding estimation results for United States firms in the crisis period , (column 2) show that the adjustment speed is much faster, 132,9% (λ =1- (-0,329) = 1,329). In the theoretical part I talked about the fact that if λ=1 then the speed of adjustment is infinitely high and the debt ratio is always at its targeted value. So the firms in our sample are adjusting, but it seems that the firms are not adjusting to their targeted debt level but are reducing their level of debt way below the optimal level, by this trying to have as less as possible leverage in their capital structure. In this way the companies will not benefit anymore from the tax shield that arises from the fact of having debt. At the same time I cannot say that this is wrong as in the current situation the cost of bankruptcy also increased a lot and this might off-set the benefits obtained from having leverage.

Similar to Flannery/Rangan (2006), I use firm fixed effects model which explain a large proportion of the cross-sectional variation of the market debt ratio of U.S. firms (2007-2009). Ignoring firm-individual effects would lead to much lower adjustment speed estimates and a miss-specified model, emphasizing the need to take the panel nature of the data into account.

In addition to this type of dynamic adjustment behavior analysis as shown by the Flannery/Rangan (2006) study, some studies unite a theoretical and empirical analysis. The theoretical models are constructed in such a manner that they take in consideration as many stylized facts as possible, but also produce new hypotheses. The firm behavior which is theoretically derived is then replicated, generating data with known properties of the firms' capital structure determinants. After that the data is then used to test the characteristics of standard econometric estimators.

There is a current model of this type of analysis. In their paper Titman and Tsyplakov (2007) show a dynamic trade-off model which includes firm investments determined by product market changes, burden costs of having financial distress, and debt-holder/equity-holder agency problems. They reproduce model-generated panel data for leverage ratios, cash flows and investment choices and perform partial adjustment regressions as in Flannery and Rangan (2006) and others. In this case, the speed of adjustment is around 7, 1% under realistic parameter settings. This result is close to the estimates from the real world measured by Fama/French (2002) and Kayhan and Titman (2007), but slower than the estimate by Flannery/Rangan (2006). Besides, Titman/Tsyplakov (2007) demonstrates that there is a strong connection between the equity returns of firms and their debt ratios.

As it was mentioned before the main scope of this model is to see if firm will adjust to a target debt level in order to achieve an optimal capital structure and also, if this adjustment is

present, what is the speed of it. The significant variables of this regression are lagged market leverage, market-to-book leverage and expected inflation, so as we can see some of the firm characteristics that determine the target capital structure are significant after controlling for the lagged market debt ratio, which supports the existence of target leverage. The negative sign on lagged leverage suggests that mean reversion is at work as predicted by the tradeoff theory. Market-to-book variable and expected inflation positively influences the level of debt in the next period.

In this model the speed of adjustment is very high. The companies are reducing their level of debt way below the optimal level, by this trying to have as less as possible leverage in their capital structure. But again as it was said cost of bankruptcy also increased a lot and we cannot say for sure what the optimal level of debt is.

4.3.1 Testing the dynamic partial-adjustment model with inclusion of macroeconomic factors

In this section I estimate the capital structure adjustment speed based on the integrated dynamic partial adjustment model with the inclusion of macroeconomic variables. The results are illustrated in table 16. Macroeconomic factors are term spread, default spread, GDP growth rate and price-output ratio. In this model I am trying to see whether adding a macroeconomic variable to the model will increase the robustness of the results and will offer a better explanation of the adjustment speed of capital structure in the times of recession. The expected inflation is excluded from the regression since it wipes out the effects of macroeconomic variables.

From the table we can observe that a significant change of the results did not occur. From the firm characteristics $\mathbf{X}_{it}$, that determine the target capital structure are significant the previous year market debt ratio and size of the firm variables. Together with the macroeconomic determinants (which are highly significant) these variables determine the level of debt in a given year. Notable is the fact that with the inclusion of macroeconomic variables the size of the firms became a significant determinant of the level of debt. The term spread, which is defined as the difference between the long-term and short-term interest rate, is positively correlated with the level of debt in the next year. An increase in the level of term spread could be due to a decrease in the short-term interest rate or an increase in the long-term rates. But since the level of funds available to the firms increases as the term spread increases it would

be logical to suppose that this happens because a decrease in the short-term interest rates. So an increase in the short-term interest would lead to a decrease in the level of debt available to the firms, fact that is in concordance with the actual economic conditions. The inclusion of other macroeconomic determinants does not change the results of the model.

Table 16. The dependent variable is Market Leverage. All the regressors are lagged one year. Each regression includes a macroeconomic indicator. The second column is regressed by adding term spread variable as a macroeconomic indicator, third column by adding default spread variable, forth column by using the GDP growth rate and fifth column uses the price-output ratio as a macroeconomic factor.

Regressors	Fixed effects regression with macroeconomic factors			
	Term spread	Default spread	GDP growth rate	Price-output ratio
Constant	2,674 (0,968)***	2,611(0,957)***	2,85 (0,003)***	15,625(4,191)***
Lagged Market Leverage	-0,329 (0,156)**	-0,329 (0,156)**	-0,329 (0,155)**	-0,329(0,156)**
Profitability	-0,275 (0,201)	-0,274(0,200)	-0,274 (0,201)	-0,274(0,200)
Size	-0,265(0,118)**	-0,265(0,118)**	-0,265(0,118)**	-0,265(0,118)**
Market-to -Book	0,002 (0,021)	0,001(0,021)	-0,002(0,021)	0,002(0,021)
Tangibility	0,129 (0,223)	0,128(0,222)	0,128(0,222)	0,128(0,223)
Depreciation	-1,438 (1,541)	-1,438(1,540)	-1,438(1,540)	-1,438(1,541)
R&D Expenditure	1,821(1,384)	1,821(1,384)	1,821(1,384)	1,821(1,384)
Macroeconomic factor	3,186(0,848)***	8,736(2,325)***	-3,112(0,828)***	-1,22E+011 (3,25E+010)***
n	120	120	120	120
R-squared	0,96	0,96	0,96	0,96

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. Standard errors are given in parenthesis.

From the table 16 we can see that the GDP growth rate and price-output ratio from the previous year are negatively correlated with the market leverage. So a higher growth ratio of the economy and a higher ratio of stock price over GDP lead to a decrease in the credit funds available to the real sector companies.

The adjustment speed of the capital structure is the same as in the previous model (table 15),

this way the inclusion of macroeconomic variables does not change the adjustment path or speed of capital structure. One of the reasons might be that the impact of macroeconomic factors on the company's capital structure is too small and is wiped out in the analysis due to the use of many regressors.

4.4 Testing the conventional model

As it was mentioned before the conventional leverage regression is more orientated to explain the level of leverage while the change in this variable is better explained by the pecking-order model. One of the assumptions of this type of regression is that shocks are uncorrelated across years and this assumption is unlikely to be literally correct. Having the condition stated above allows us to run the conventional specifications in first differences. When we run a regression in first differences then we can expect to lose some accuracy and a lower R^2 to be obtained. A problem in using first differences is that it may bias the variable coefficients towards zero. But as it will be seen from further analysis this bias is not large enough to alter the conclusions of the regression.

The most important in testing this model are the following four factors: tangibility of assets, market-to-book ratio, log sales and profitability, I also add the expected inflation variable. The measure of industry median debt will not be included in the regression because of lack of data. The following test basically has the scope to see how the financing deficit works when added to a conventional leverage regression.

The results of the OLS regression are presented in the table 17. The dummies for the year are also included but are jointly insignificant in all regressions. Hence, time-variant factors that are common to all firms (like the interest rate level and other macro variables) do not affect capital structure choices in United States.

Table 17. The dependent variable is market leverage. All regressed variables are lagged one year in the third column. In several specifications, the basic regression is augmented with the financing deficit. Year dummies have been included. It is an OLS regression with standard errors in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Regressors	OLS Regression		
	(1)	(2)	(3)
Constant	0,778 (0,094)***	0,732 (0,099)***	0,479 (0,165)***

Profitability	-0,085 (0,067)	-0,078 (0,067)	-0,206 (0,013)**
Size	-0,006 (0,010)	-0,002 (0,012)	0,021 (0,013)
Market-to -Book	-0,158 (0,015)***	-0,158 (0,015)***	-0,119 (0,017)***
Tangibility	-0,052 (0,061)	-0,036 (0,062)	0,091 (0,077)
Expected Inflation	0,075 (0,695)	0,184 (0,697)	0,055 (3,249)
Deficit		-1,11E-05 (7,76E-06)	-1,89E-05 (8,46E-06)**
n	180	180	120
R-squared	0,456	0,462	0,460
F-test	24,17 (0,000)***	21,13 (0,000)***	16,079 (0,000)***
F-test fixed effects			

In the table 18 below are presented the signs of the variables obtained by Frank and Goyal (2007) and Rajan and Zingales (1995) for the US firms in the periods of time before crisis. In the table market-to-book ratio and profitability are negatively correlated with the market leverage and size and tangibility have positive signs.

As we can see from the table 17 (column 1) the estimated coefficients on the market-to-book assets ratio, tangibility, firm size, and profitability do not have the usual predicted signs. The coefficient signs are negative on the market-to-book ratio, on tangibility, on log of sales, and negative on profitability. The only variable that has a positive correlation with the market leverage is expected inflation.

Table 18. Sign RZ/FG is the sign of the coefficient estimate found in Rajan/Zingales (1995) and Frank/Goyal (2007) for the United States.

	Sign RZ	Sign FG
Profitability	[-]	[-]
Size	[+]	[+]
Market-to -Book	[-]	[-]
Tangibility	[+]	[+]
Industry Median Debt		[+]
Expected Inflation		[+]

A rise in any of these variables will lead to a decrease in market-debt ratio. This proves once

more that in the period of time 2007-2009 U.S. companies are actively reducing their level of debt despite any increase in those indicators of firm performance that usually stimulate the debt. In the first column only the market-to-book variable is significant in determining the level of market debt but at the same time the model explains 45, 6% of the variation in the market leverage which is a quite high value.

In the second column of the OLS regression the financing deficit variable is added as an explanatory variable. If the pecking order were the key driver, it should have wiped out the effects of the conventional variables. It did not do so. Adding the deficit variable to the regression did not have much effect on the magnitudes and significance of the coefficients on the conventional variable. Also, in this regression the financing deficit is not empirically relevant.

In column (3), the leverage regression is re-estimated by lagging the regressor variables one-year. This fact changes the results of the regression a lot. The coefficients of the variables now have the expected signs corresponding to Rajan/ Zingales (1995) and Frank/Goyal (2007) results. The coefficient signs are negative on the market-to-book ratio, positive on tangibility, positive on log of sales, and negative on profitability. Also the sign is positive on expected inflation variable. The significance of the regression variables also changes. Market-to-book variable is highly significant as usual and in addition to this the profitability and financing deficit variable are significant at 95% of confidence. An increase in profitability of the firm would lead to a decrease in market leverage. Also the deficit variable and the market-to-debt ratio are negatively correlated. This fact demonstrates that in the current situation if the companies have a deficit of funds they will not cover this deficit by debt. As in the previous case the deficit variable did not wiped out the effects of other conventional variables. Nevertheless, the financing deficit is empirically relevant although the value of the coefficient is very small.

If we look back at the table 5, there are presented the signs of the coefficients of the variables which support the pecking-order theory and the trade-off theory. The sign of the profitability coefficient supports the pecking–order theory, but at the same time the sign of the market-to-book ratio and tangibility supports the trade-off theory. Also there are some discussions that the positive sign on the coefficient of tangibility variable might support as well the pecking-order theory. The coefficient of log of sales has a positive sign and this is consistent with the both competing theories.

It is interesting to observe R^2 along the whole three regressions. Adding the financing deficit and adding lagged variables adds amazingly little to the results of the fitted equations once the conventional factors are taken into account. This is in line with Fama and French (2002) who dispute that mean reversion in corporate leverage is surprisingly weak.

Until now pooled OLS was used to test the conventional model, however, Huang/Ritter (2007) find that applying pooled OLS leads to upward biased coefficient estimates and applying fixed effects estimation leads to a downward bias of the estimate. Furthermore, the bias with fixed effects estimation increases the smaller the time dimension of the data.

Anyhow, the most efficient way to deal with endogenity and heterogeneity is to use fixed effects regression. ,, A simple fixed effects panel estimator would be robust, because the dummy variables included to control for the individual effect automatically control for any time-invariant variable. This constitutes a compelling reason to employ panel estimators wherever possible. It also makes a strong argument to use fixed effects (or estimators based on first-differencing) rather than random effects estimators, because random effects require that the regression's other explanatory variables are uncorrelated with the individual effects "(Greene 2003, chap. 13). This fixed effects estimator is consistent in the standard panel framework, for the reason that it takes out the common, time invariant and firm-specific element in the regression's error term.

Table 19 summarizes the results of fixed effects regressions of the conventional model. Dummy for the year are also included in the fixed effects regression and they are significant.

So in the table 19 are presented the fixed effects regressions (first, second and third column) for non-financial United States firms in the period from 2007 to 2009. In all regressions, the market-value-based debt ratio is regressed on a set of explanatory variables that have been used by Rajan/Zingales (1995). As it was mentioned before, in all regressions dummy variables for the year of the observation are included (in order to avoid collinearity I am omitting one year). The fixed-effects estimator includes a set of indicator variables (dummies) for all companies instead of the common intercept term.

As we can see from the column 1 the coefficients of the variables do not have the usual expected signs as predicted by Rajan and Zingales (1995) and Frank and Goyal (2007). The coefficient signs are negative on log of sales, market-to-book and tangibility variables. It is positive on the profitability and expected inflation variable. Not all the coefficients of the regression are significant. In the first column only market-to-book and size variables are significant at 99% of confidence and affect the level of market leverage of the firms.

In the second column of the table 19 is added an addition variable in order to estimate the market debt of the companies. This variable is the financing deficit and as we observe the inclusion of this variable does not influence the results of the regression by too much. If the pecking order theory would have been the main determinant that influence the way a company finances its operation then the deficit variable had to wipe out the effects of the conventional variables. But it did not do so and the deficit variable is not even significant. These results do not support the pecking-order theory concerning the structure of firm financing in the analyzed period of time. The coefficients of variables, as in the regression before, do not have the usual expected signs. Market-to-book variable, log of sales, tangibility and expected inflation are negatively correlated with the market leverage. A positive relationship is presented only in the case of profitability and deficit variable. The most important variables in terms of the magnitude are size and market-to-book ratio.

Table 19. The dependent variable is market leverage. All regressor variables are lagged one year in the third column. In several specifications, the basic regression is augmented with the financing deficit. Year dummies have been included. It is a fixed effects regression with standard errors in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Regressors	Fixed Effects Regression		
	(1)	(2)	(3)
Constant	2,455 (0,536)***	2,6 (0,549)***	2,618 (0,921)***
Profitability	0,066 (0,136)	0,1 (0,139)	-0,239 (0,185)
Size	-0,219 (0,065)***	-0,238 (0,068)***	-0,311 (0,121)**
Market-to -Book	-0,09(0,016)***	-0,09 (0,016)***	0,025 (0,017)
Tangibility	-0,172 (0,145)	-0,165 (0,145)	0,168 (0,231)
Expected Inflation	0,019(0,387)	-0,025 (0,389)	7,689 (2,132)***
Deficit		6,13E-06 (5,34E-06)	5,32E-06 (4,89E-06)
n	180	180	120
R-squared	0,905	0,906	0,956
F-test	16,67 (0,000)***	16,48 (0,000)***	18,139 (0,000)***
F-test fixed effects	9,11 (0,000)***	9,03 (0,000)***	10,719 (0,000)***

According to the pecking-order theory the market-to-book variable and size variable should be positively correlated with the dependent variable and the profitability variable should be negatively correlated with the dependent one. As we can see the results are totally opposite which is another proof of the inconsistency of pecking-order theory.

In the third column all the explanatory variables are lagged one year. If we compare the fixed effect regression with and without the financing deficit the results of the regression do not change almost at all. The deficit variable is not significant and the model does not support the pecking order theory although the profitability has the normal sign predicted by the pecking order theory (but then again the variable is not significant). The expected inflation variable is highly significant and has a positive sign as predicted by the trade-off theory.

The presence of significant year dummy variables in both regressions implies that time-variant factors that are common to all firms (for example interest rate level and other macroeconomic indicators) systematically affect capital structure choices in United States companies.

When using the fixed effects regression we can test for the fixed effects. The null hypothesis is that all of the units share the same intercept. The alternative is that they vary across units, so the way to test this is by running both models and then comparing their sum of squares in a joint F-test. In all three models from the table 18 we reject the null hypothesis. This indicates that firm-specific but time invariant variables (for example the industry affiliation) to be systematic determinants of capital structure choices for United States exchange listed companies.

In the fixed effects regression is presented also R-squared. But measures of goodness of fit aren't useful at all for evaluating a model in panel data with fixed effects; tossing in lots of fixed effects is inflating R-squared. Also adding the financing deficit adds very little to the results of the fitted equations once account is taken of the conventional factors.

As a general conclusion of the conventional model I can say that when analyzing capital structure issues is better using data that consist of a panel of firms repeatedly observed over time. Controlling for unobservable time-invariant firm-specific effects is a minimum necessity to the applied econometric method. Consequently, the fixed effects regression shown in table 19, third column, constitutes the baseline model of the conventional regression, which can then be compared to the results of other methods that analyze capital structure.

As it was mentioned before conventional model is orientated to explain the level of leverage and from the regression we can see that the most significant determinants in magnitude of the

market leverage are expected inflation and the size of the companies. An increase in the size of the companies will lead to a decrease in the market-debt ratio and an increase in the expected inflation would raise the level of debt of companies. Also the addition of deficit variable does not change the results of the regression and this fact does not support the pecking-order theory. The signs of the coefficients are not the same as were obtained by Rajan and Zingales and Frank/Goyal which are using the same regression for United States companies but only in the periods of time before the crisis. Also the significant coefficients signs support more the trade-off theory rather than pecking-order theory according to the general framework from this field.

An important conclusion is that time-variant factors common to all firms affect capital structure choices (ex. macroeconomic situation) and firm-specific but time invariant variables (for example the industry affiliation) are determinants of capital structure choices for United States companies.

Chapter 5

Conclusion

The crisis of 2007 and 2008 is one of the most severe in financial history. It was triggered by a liquidity crisis in the United States banking system and it has resulted in the collapse of large financial institutions, the bailout of banks by national governments and downturns in stock markets around the world. Although the effects on the financial markets and institutions are of great interest, this paper has focused its attention on the effects the current crisis towards real sector companies from U.S.A.

According to the hypotheses formulated at the beginning of the paper I start the analysis of firm's capital structure by investigating the level of debt and its evolution during the analyzed period of time. After analyzing the capital structure I get to the conclusion that first, the USA companies are not highly leveraged, and second, the debt that represented less than 50 % of the total assets in 2007 decreases by half until 2009. Although some measure of leverage slightly increased in 2008, in 2009 they all went down. By making a decomposition of total debt into long-term debt and short-term debt is possible to observe that during the crisis was mainly reduced the availability of short-term financing, while long-term financing registered only a very slight increase. These results are consistent with the predictions of the first hypothesis of the study.

Having this in mind, I use then the pecking order theory and trade-off theory, with the help of which I test if traditional capital structure theories are able to empirically explain the composition of corporate capital structure. The test is based on the idea that if firms follow the

pecking order, then in a regression of net debt issues on the financing deficit, a slope coefficient of one is observed.When using panel data the results do not seem to support the pecking order theory. Performing the pecking order regression for each year separately, by using cross-section data, does not provide also any support for the POH. But from the table 11, we can see that in 2008, 75% of the variation in the net issue of long term debt is explained by the financing deficit. So the main reason for issue of the debt in the worst year of crisis was the financing deficit. Although we get this result, we do not find that the financing deficit is actually financed by debt, moreover, from the previous tests we saw that the level of debt decreased. Also in the annex 2 is shown that the level of equity increased in this period, this could mean that the financing deficit in this period is financed less by debt and more by equity.

In testing the trade-off theory, the selection of studies is based on Myers' (1984) insight, that the key question to differentiate between competing capital structure theories is whether firms adjust to some target following shocks to their capital structure. This is due to the fact, that trade-off theories suggest that firms try to maintain some "optimal" debt ratio. The most important objective of capital structure study using dynamic partial adjustment models is to approximate the speed of adjustment. I complement the empirical models of studies on firms' adjustment behaviour to capital structure shocks by adding additional factors that may influence capital structure decisions, but have gained only recently attention in the literature. For instance, Kisgen (2006) considers for the first time the role of ratings from external rating agencies (like S&P or Moody's) in the capital structure context. This seems an important contribution due to the eminent role that rating agencies play in capital markets nowadays. Also I consider the effect of expected inflation on the speed of adjustment of capital structure.

As it was mentioned before the main scope of this model is to see if firm will adjust to a target debt level in order to achieve an optimal capital structure and also, if this adjustment is present, what is the speed of it. I find out that mean reversion is at work as predicted by the trade-off theory and that the speed of adjustment is very high. The companies are reducing their level of debt way below the optimal level, by this trying to have as less as possible leverage in their capital structure.

In order to estimate the impact of macroeconomic conditions of the economy on the adjustment speed of the capital structure I add to the Flannery and Rangan partial-adjustment model a set of macroeconomic variables. The results show that the inclusion of these variables does not change the adjustment path or speed of capital structure.

So it is clear that in the times of current crisis the companies are adjusting their capital structure fast in order to make a trade-off between the benefits of debt (tax shield, financial discipline) and the costs of debt (increased bankruptcy costs, agency costs).

In order to increase the robustness of this paper finding, a conventional model is used to explain levels of debt. This is done by testing what sign the coefficients have and compare this to previous findings and the predicted outcome. The deficit variable is also added to the regression in order to test the pecking order theory even further. The financing deficit ought to wipe out the effects of other variables according to the pecking order theory. If the financing deficit is simply one factor among many that firms trade-off, then what is left is a generalized version of the trade-off theory. The current study finds that the financing deficit does not wipe out the effects of conventional variables.

As it was mentioned before conventional model is orientated to explain the level of leverage and from the regression we can see that the most significant determinants in magnitude of the market leverage are expected inflation and the size of the companies. The signs of the coefficients are not the same as were obtained by Rajan and Zingales and Frank/Goyal which are using the same regression for United States companies but only in the periods of time before the crisis. Also the significant coefficients signs support more the trade-off theory rather than pecking-order theory according to the general framework from this field.

An important conclusion is that time-variant factors common to all firms affect capital structure choices (ex. macroeconomic situation) and firm-specific but time invariant variables (for example the industry affiliation) are determinants of capital structure choices for United States companies.

I use the conventional model in order to test the forth hypothesis of this study which says that profitability and debt should be inversely correlated in the time of crisis. From the findings we can see that indeed these two factors are negatively correlated but, the profitability variable is not significant in the tested regression and by this does not affect the level of debt in the tested model.

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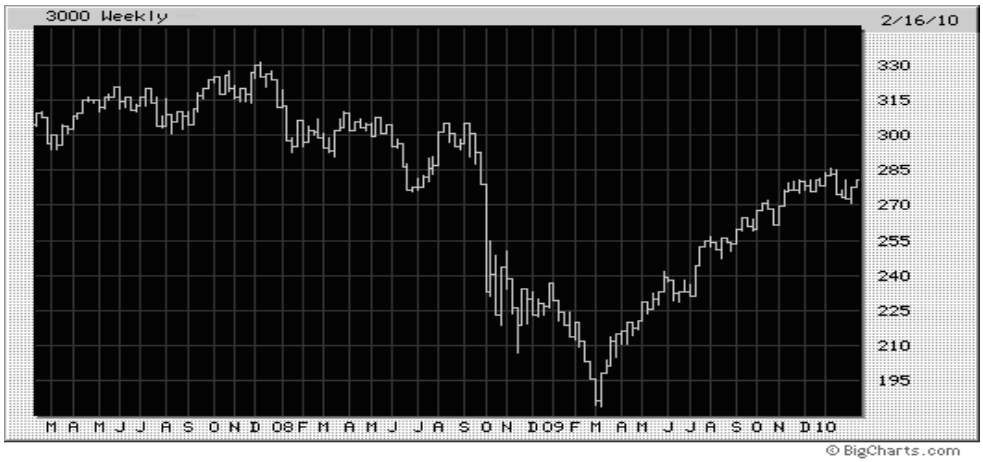
http://www.econ.yale.edu/~shiller/data.htm

Appendix A

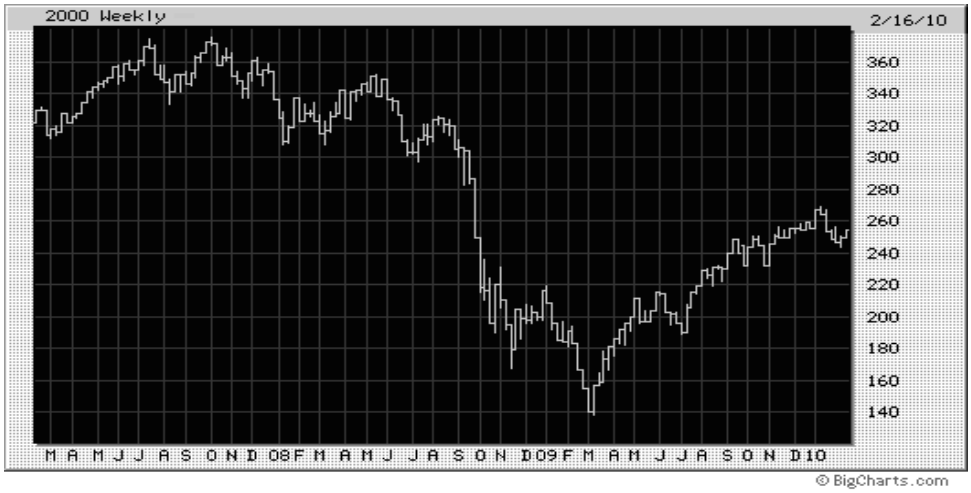
Annex 1. Dow Jones Industrial Average Index (DJIA) for 2007-2008 for industries.

Basic Materials

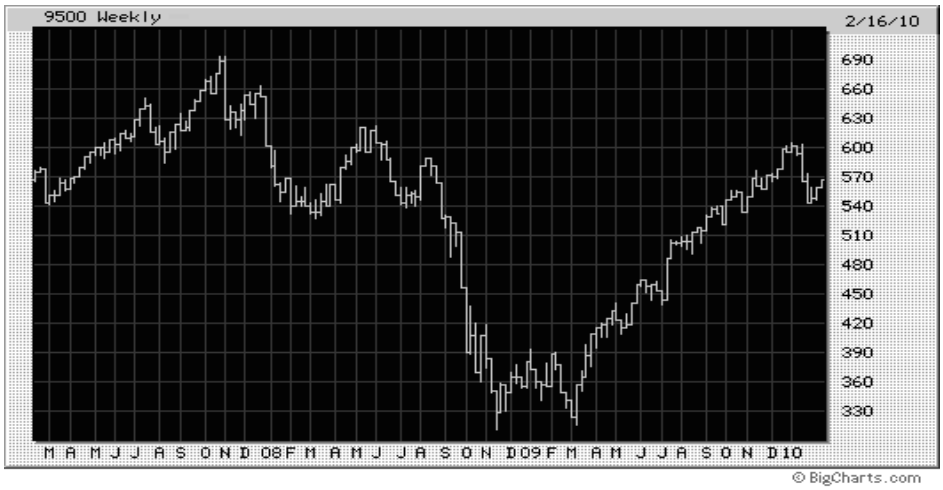
Consumer Goods



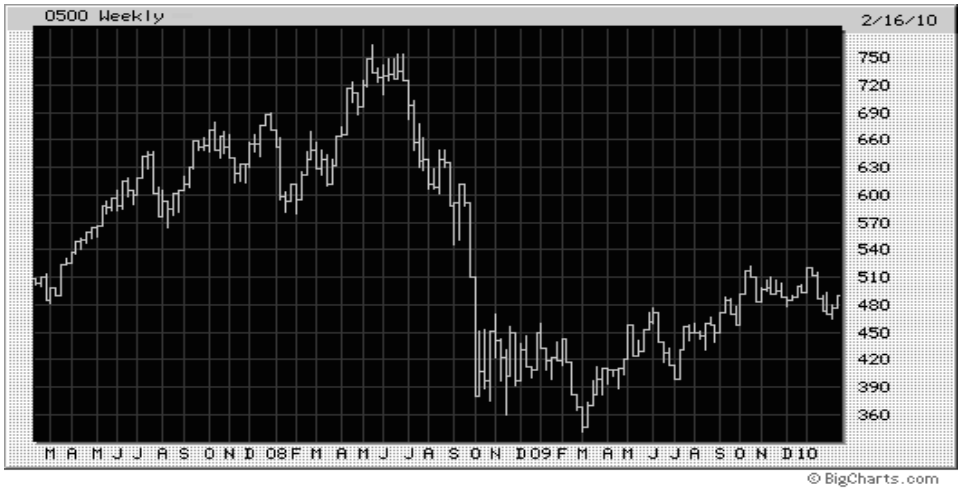
Industrials



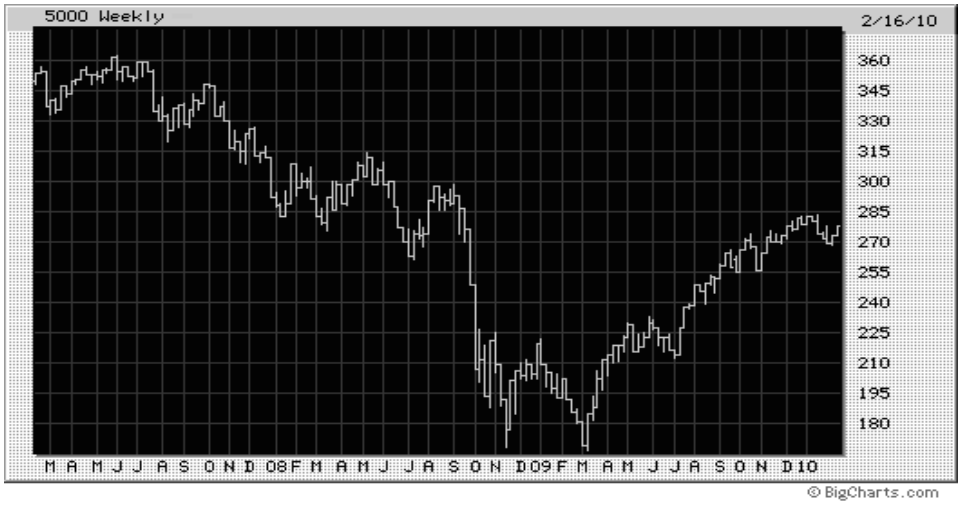
Technology



Oil and Gas



Customer Services



Source: The Wall Street Journal. Digital Network.

Annex 2. Descriptive statistics for total assets and equity in the period 2007-2009.

Assets

	2007	2008	2009
Mean (%)	6601,8	7942,1	7851,0
Median (%)	2642	2974,5	2890,4

Equity

	2007	2008	2009
Mean (%)	3283,7	3716,9	3846,0
Median (%)	1109,9	1283,5	1350,6

Annex 3. Descriptive statistics for testing the pecking order hypothesis.

Variables	Mean	Std. dev.	Minimum	Maximum
ΔD	141,35	661,59	-3097,1	5042,6
DIV	131,46	355,25	0	2355,2
ΔW	66,23	664,92	-2587,6	4243,4
I	257,16	1412,6	-4226,6	14668
C	1190	4610,2	-3204	39925
ΔE	277,05	1374,7	-4226,6	14668
LTDR	0,31	0,26	0	1,91
MLTDR	0,22	0,21	0	0,99
TTDRA	0,56	0,22	0,11	1,88
LTDRA	0,31	0,19	-0,12	1,31
LTD	1208,2	1817,7	0	10385
DEF	551,37	1736,4	0	19710

Annex 4. Descriptive statistics for testing the trade-off hypothesis.

Variables	Mean	Std. dev.	Minimum	Maximum
Market Leverage	0,41	0,23	0,02	1
Profitability	0,203	0,213	-0,292	1,014
Size	8,146	1,304	4,192	11,508
Market-to -Book	1,721	0,962	0,223	7,372
Tangibility	0,57	0,217	0,08	1,013
Industry Median Debt				
Depreciation	0,043	0,081	-0,6	0,506
Expected Inflation	0,019	0,02	-0,008	0,038
R&D Expenditure	0,019	0,044	0	0,312
No R&D Expenditure Reported [Dummy]	0,553	0,5	0	1
Firm is Rated [Dummy]	0,5	0,501	0	1

Appendix B

Content of Enclosed DVD

There is a DVD enclosed to this thesis which contains empirical data and Gretl source codes.

• Folder 1: Dataset for leverage testing

• Folder 2: Dataset and source codes for testing POH

• Folder 3: Dataset and source codes for testing the STOH

• Folder 4: Dataset and source codes for testing Conventional model