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DIPLOMA THESIS

Capital Structure - Theory and the Czech Practice

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Declaration

I declare that the whole of the diploma thesis was elaborated on my own and that I used only the listed sources and literature.

Michal Palata
Prague, June 25, 2004

Acknowledgements

I would like to kindly thank to all who supported me during my work on this diploma thesis.

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Thanks to all involved again.

Michal Palata

Abstract

The thesis examines the validity and applicability of concepts and pieces of knowledge of four capital structure theories in the institutional environment of the Czech Republic. In its theoretical part it presents the trade-off, signaling, pecking order, and agency theories, as well as possible ways of their testing. These are then employed in the practical part, which consists of an equity-oriented discussion of the economic and legal environment for financing of Czech-based companies, and a sector-level and company-level analyses of the capital structure of Czech joint-stock companies.

The conditions on the capital and venture capital markets, as well as the legal imperfections, are found to be rather unfavorable for raising equity capital in the Czech Republic and point at the applicability of the pecking order hypothesis. Together with the results from the empirical analysis, however, it has to be stated that the findings of the thesis do neither explicitly support the argumentation of any of the theories, nor can any theory be rejected as entirely inapplicable with respect to the Czech environment.

Diplomová práce se zabývá otázkou, zda a do jaké míry lze aplikovat poznatky a závěry čtyř teorií kapitálové struktury v institucionálním prostředí České republiky. V její teoretické části jsou představeny hlavní myšlenky trade-off, signaling, pecking order a agency teorií, spolu s možným způsobem jejich testování. Tyto jsou následně využity v praktické části, která sestává jednak z diskuze ekonomického a právního prostředí pro financování českých společností, jednak z empirické analýzy kapitálové struktury českých akciových společností a jednotlivých odvětví.

Z provedeného zkoumání vyplývá, že podmínky na kapitálovém trhu a trhu rozvojového a rizikového kapitálu, spolu s nedostatky v legislativě, nejsou příliš příznivé pro externí financování vlastním kapitálem a nasvědčují použitelnosti a platnosti pecking order hypotézy. Nicméně pokud vezmeme v úvahu i výsledky empirické analýzy, je nutno konstatovat, že závěry diplomové práce ani jednoznačně nepotvrzují argumentaci některé z teorií, ani není možné na jejich základě prohlásit, že by argumentace některé z uvedených teorií byla zcela nepoužitelná v českém prostředí.

Diploma Thesis Project

Title: Equity Financing - Theory and the Czech Practice

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Overview

The goal of the diploma thesis will be, firstly, to analyze the prevailing theories and undertaken research related to the companies' decisions on financing by equity and, secondly, to reflect and compare the conclusions drawn from this analysis with the practice of Czech companies. The theoretical background will focus on two areas: 1) the search for an optimal capital structure and 2) the assessment of the role of dividend policy and their influence on the companies' value. The outcome of this part should provide results indicating which factors play a crucial role in companies' decisions to choose equity financing as an alternative to debt.

The second part will aim to evaluate the equity financing decisions made by companies in the Czech Republic. The core of the chapter will lie in the comparison of factors that determine these decisions in Czech companies to the factors established in the theoretical part. For this purpose, a database of financial reports of listed Czech companies is to be used. The last chapter will be dedicated to the special case of venture capital and private equity and its role in the financing of Czech companies.

Hypothesis

As the contemporary theories, as well as most of the empirical research, are predominantly based on attributes of and data from developed western countries, the major contribution of the diploma thesis should be the examination of the validity of these concepts and pieces of knowledge also for a developing country like the Czech Republic. The hypothesis will be that "*the conclusions of equity financing theory apply also in the institutional environment of the Czech Republic*", i.e. that the factors (variables) determining equity financing decisions in the Czech Republic are similar to the ones in developed countries. Should the hypothesis prove false and significant differences would be found, the author will attempt to suggest possible explanations of these differences. A similar analysis, however of a much more concise scope, is to be carried out also for the case of venture capital financing in the Czech Republic.

Prague, October 10, 2003

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INTRODUCTION

Choosing the ratio of debt to equity in a company's capital structure belongs to the most basic and, at the same time, most fundamental policy choices of corporate financial officers all over the world. The aim of this thesis is to explore the topic of capital structure, primarily from the point of view of equity financing, and to find out what role equity should and does play in the capital structure of Czech companies. This is naturally impossible to do without looking also at the other side of the same coin, i.e. the role of debt. The focus on equity financing will thus come forward predominantly in chapters discussing the environment and conditions for raising equity capital in the Czech Republic.

Unfortunately, the theory of capital structure remains one of the most controversial issues in modern corporate finance. Not only is there no universal theory of capital structure, but the predictions of the several conditional theories are often in contradiction. In addition to that, despite decades of intensive research, there is a surprising lack of consensus even about many of the basic empirical facts. Such disagreement over basic facts then implies disagreement about desirable features for theories. Rajan and Zingales (1995) support this proposition when they aptly state that "... very little is known about the empirical relevance of the different theories."

Moreover, the contemporary theories, as well as most of the empirical research, are principally based on attributes of and data from developed western countries. Studies analyzing capital structure of companies in developing countries have not appeared until recently and there has been only pioneering research undertaken in this area that would work with data from the Czech Republic. The major contribution of this thesis should thus be the *examination of the validity and applicability of the concepts and pieces of knowledge presented by different theories in the institutional environment of the Czech Republic.*

In order to do that, a discussion of economic and legal environment for equity financing in the Czech Republic as well as an empirical analysis of the capital structure of Czech joint-stock companies will be performed. Reading the thesis, one should thus not only be able to find out what are the implications of the current Czech institutional environment for the possibility to raise equity capital by Czech companies and how do these correspond to the theoretical predictions of various capital structure theories, but one will be also able to contrast the theories with results obtained from

a database of recent financial statements of Czech companies. The analysis in these two areas should help us to judge the relevance of each of the conditional capital structure theories in the Czech Republic.

The approach of the thesis will be as follows. In the theoretical part (chapters I. to IV.) the four major theories of capital structure, together with a short recapitulation of the Miller and Modigliani propositions, will be introduced. The presented theories include the trade-off, signaling, pecking order and agency theory. In addition to that, a possible way of testing these theories will be proposed. The theoretical predictions will then be put across and referred to in the second practical part of the thesis.

The analysis of the Czech practice with respect to the theoretical predictions will commence with a discussion of the opportunities for raising equity capital in the Czech Republic from the two major sources for this kind of capital - the capital and venture capital markets (chapter V.). The role of these markets in the Czech Republic will be compared with their role in other European countries. After that, our attention will turn to the legal environment and the implications that the prevailing legislative framework has for the companies' decisions related to financing through equity (chapter VI.). We shall focus mainly on the problems linked to increasing of registered capital and performing an initial public offering in the Czech Republic.

Chapters VII. and VIII. will then be devoted to an empirical analysis of the capital structure of Czech companies in the 1999-2002 period. In the sector-based analysis, the degree of leverage of different sectors will be examined and the determinants that stand behind the different capital structures will be looked for on a sector level. The subsequent company-level analysis will then analyze four capital structure determinants - size, tangibility, profitability and non-debt tax shields - and their influence on the degree of leverage. The last chapter (IX.) will then summarize our findings and conclusions.

THE THEORY

"There is no universal theory of capital structure, and no reason to expect one." (Myers, 2001)

The goal of the first four chapters will be to offer a concise overview of what financial theory has to say concerning the optimal choice between the two major alternative sources of financing - equity and debt. This theoretical background will then build a foundation for the consequent empirical research and analysis of the situation in the Czech Republic.

As is already clear from the above quote, the state of art in economic theory does not offer any general explanation or guideline concerning the firms' debt-equity choices. The answer to the question "How do firms choose their capital structures?" is thus still "We don't know." (Myers, 1984). There is no reason to be pessimistic and discouraged, however. There are several useful conditional theories, each having its own distinct approach to the "capital structure puzzle" and each trying to throw light upon at least a portion of this puzzle.

The following theoretical review shall describe the most important conditional theories and their findings about the determinants of capital structure and its influence on firm value. The propositions of Miller and Modigliani, the trade-off, signaling, pecking order and agency theory (including the free cash flow hypothesis) will be presented. For each theory, also a possible way of their testing is put forward.

I. MILLER & MODIGLIANI PROPOSITIONS

It would probably be unthinkable to begin the theoretical review in some other way than with the famous “irrelevance” propositions published by Merton Miller and Franco Modigliani in their 1958 paper. These propositions laid the foundations of the modern history of finance and are, until now, crucial in our understanding of the determinants of capital structure policy.

Briefly stated, the Miller and Modigliani (M&M) propositions assert that, under a restrictive set of conditions,¹ a company’s financing policy should not be expected to affect its current market value. That value is determined solely by managerial decisions affecting the left-hand side of the balance sheet – that is, by the entire range of corporate strategic planning and operating decisions, i.e. its investment policy. The two revolutionary propositions are introduced below.

Proposition I: *The market value of any firm is independent of its capital structure.*

In other words, the value of a levered (V_L) and unlevered (V_U) company is the same. To prove this proposition, M&M argue that if $V_L \neq V_U$, rational investors would simply use what is nowadays often called “homemade leverage” to take advantage of such mispricing. As M&M state for the possibility that $V_L > V_U$: “levered companies cannot command a premium over unlevered companies because investors have the opportunity of putting the equivalent leverage into their portfolio directly by borrowing on personal account” (Miller and Modigliani, 1958). The disproof of $V_L < V_U$ is done likewise.

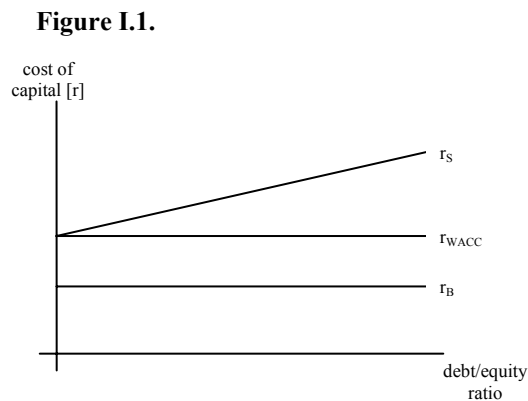
From Proposition I M&M derive Proposition II concerning the rate of return on common stock in companies, whose capital structure includes some debt. Using the denotation of Ross et al. (1996), this proposition can be expressed as follows:

$$r_S = r_0 + \frac{B}{S}(r_0 - r_B) ,$$

¹ These can be summarized as follows: 1) All investors are price takers, i.e. no individual can influence market prices by the scale of their transactions; 2) All market participants can lend or borrow at the same risk free rate; 3) There are neither personal nor corporate income taxes; 4) There are neither brokerage nor any other transaction charges; 5) Investors are all rational utility-of-expected-wealth seekers; 6) Investors formulate similar expectations about future company earnings, which are described by a normal probability distribution; 7) In the event of insolvency, assets can be sold at market values.

where r_S is the required return on equity (cost of equity), r_B the required return on debt (cost of debt), r_0 cost of capital of an all-equity firm, B the value of debt and S the value of equity.

The interpretation of this equation is a constant weighted average cost of capital, due to the fact that (in M&M words) “the increased cost of borrowed funds as leverage increases will tend to be offset by a corresponding reduction in the yield of common stock” (Miller and Modigliani, 1958). Firms thus cannot reduce the overall cost of capital by substituting debt for equity (even though debt seems to be cheaper than equity), because by adding debt the remaining equity becomes more risky. A graphical illustration makes things even clearer (Figure I.1.).



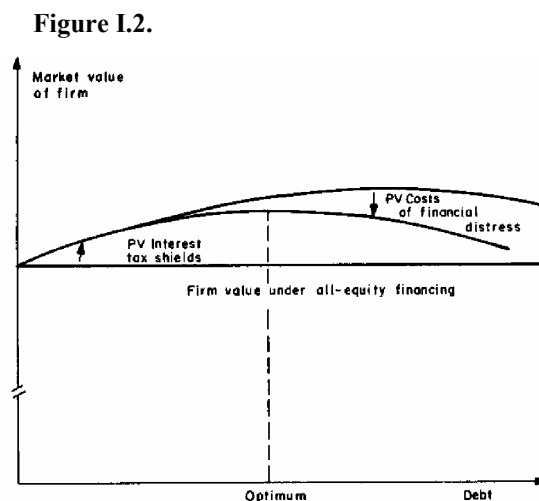
Source: Ross et al. (1996)

Having explained the two key thoughts of modern corporate finance, we can now make a step further. By dropping the unrealistic assumptions of no taxes and financial distress costs, we shall move to the trade-off theory of capital structure.

II. TRADE-OFF THEORY

The trade-off theory views the optimal debt-equity ratio of a company as being determined by a tradeoff (hence its name) between the costs and benefits of borrowing, holding the company's assets and investment plans constant. According to the trade-off theory, a firm should borrow up to the point when the marginal present value of the tax shield on additional debt is just offset by the increase in the present value of financial distress costs.

In other words, companies select their debt-equity ratios at some initial date, and depending on subsequent cash flows, either benefit from the debt tax shields and other advantages of leverage or suffer the consequences of too much debt and potential financial distress. This is depicted in Figure I.2. Below, both sides of this tradeoff are examined more closely.



Source: Myers (1984)

II.1. Taxes

Under the “no taxes” assumption, a company's capital structure was irrelevant for its total value. However, after introducing corporate taxes, this statement is no more true. As Barclay et al. (1995) sum up, the basic corporate profit tax allows the deduction of interest payments, but not dividends, in the calculation of taxable income. Thus, the choice between debt and equity financing has potentially important consequences for the distribution of the company's after-tax cash flows. Increasing the amount of debt in a company's capital structure lowers its expected tax liability and

so increases the after-tax cash flow. In the case of perpetual cash flows, it can be shown that (again using the denotation of Ross et al., 1996):

$$V_L = V_U + T_C B . \quad [\text{Proposition II then becomes } r_s = r_0 + \frac{B}{S}(1 - T_C)(r_0 - r_B) .]$$

Paraphrased, the value of a levered firm (V_L) is equal to the value of an all-equity firm (V_U) plus the present value of the interest tax shield (T_C denoting the corporate tax rate, B the value of debt). For all value maximizing firms this would, therefore, imply the optimality of an all-debt capital structure.

Nevertheless, one has to be aware, as Myers (1993) correctly points out, that few companies can be *sure* they will show a taxable profit in the future. If a company shows a loss, its interest tax shield must be carried forward with the hope of using it later. The company loses at least the time value of money while it waits. If difficulties are deep enough, the wait may be permanent, and the interest tax shield is lost forever.

Several important consequences follow:

- 1) interest tax shields are worth more to companies that have higher probability of having enough taxable income to shield;
- 2) if the company actually does have taxable income, the expected value of the tax shield depends on the company's marginal tax rate; and, finally,
- 3) the more the company borrows, the less the expected value of future interest tax shields.

As had already Miller (1977) noticed in his famous article called "Debt and Taxes", the above analysis overstates the tax advantage of debt by considering only the corporate profits tax and not taking account of the *personal income taxes*. Investors (lenders) receiving interest income must pay tax on that income in the year in which it is received. By contrast, equity investors who receive equity income in the form of capital gains (apart of dividends, of course) can postpone the payment of tax on that income by choosing not to realize those gains. This means that equity investors get a tax break relative to lenders, which to a certain extent offsets the corporate interest tax shield.

Paying an additional dollar of interest lowers the company's corporate taxes on one hand, but it increases the taxes paid by lenders on the other hand. As investors care about after-tax returns, lenders will require compensation for these taxes in the form of higher yields on corporate debt. The resulting effect is then a reduction in the tax advantage of debt over equity. Thus, the company ultimately bears all of the tax consequences of its operations, whether it pays those taxes directly (in the form of corporate income tax) or indirectly (in the form of higher required rates of return on the securities it sells).

To make our analysis complete, we should mention that after taking into account personal taxes, the value of a levered firm becomes:

$$V_L = V_U + \left[1 - \frac{(1 - T_C)(1 - T_S)}{(1 - T_B)} \right] * B ,$$

where T_B is the personal tax rate on ordinary income, such as interest, and T_S is personal tax rate on equity distributions.

II.2. Financial Distress Costs

The second assumption that was dropped when moving from M&M to the trade-off theory was the existence of financial distress costs. Financial distress costs (also called bankruptcy costs) can take two forms, direct and indirect.

Direct Costs

The legal and administrative costs of liquidation and reorganization belong to the direct costs of bankruptcy. These costs, however, while large in absolute amount, are actually quite small as a percentage of company value. Most of empirical evidence suggests that they do not exceed 3 percent. Warner (1977) for example found in his study of 20 railroad bankruptcies, that net financial distress costs were, on average, 1% of the market value of the company seven years before bankruptcy and were somewhat larger percentages as bankruptcy approached (e.g. 2.5% of market value of the company three years before bankruptcy).

It is clear, that there are “scale economies” with respect to direct financial distress costs. This would thus also imply that larger companies, *ceteris paribus*, should have higher leverage ratios than smaller firms. Despite that, direct bankruptcy costs are, due to their above-mentioned extent, probably not a very significant factor in corporate financing decisions.

Indirect costs

There are, nevertheless, indirect bankruptcy costs that may well be significant for large and small companies alike. Such indirect costs are perhaps best thought of as the reduction of company value caused by more or less predictable changes in corporate investment policy that occur when companies get into financial difficulty (Barclay et al., 1995). They include primarily the impaired ability to conduct business and the tendency to underinvestment.

Impaired ability to conduct business. Difficulties with managing the business appear not only due to the control of a court-appointed judge about all non-routine corporate expenditures, but also due to fear of both suppliers and customers of the firm. Sometimes only impending bankruptcy is enough to drive them away and force the company to declare bankruptcy.

Tendency to underinvestment. Managers, even in circumstances much less extreme than bankruptcy, often pass up good investment opportunities in an attempt to conserve cash and keep the firm “alive”. The extent of loss depends on how valuable the foregone investments are and on how costly it would be for the firm to catch up. The loss is likely to be greatest for firms whose market value rests primarily on technology, human capital and growth opportunities. Such firms will also suffer greatest loss in case that they actually do go bankrupt – it will be very difficult for them to reorganize, as these intangible assets have value only as part of a going concern. Myers (1993) aptly brings up: “The moral is: think not only of the probability that borrowing will bring trouble. Think also of the value that may be lost if trouble comes.”

As Myers in his earlier paper (1984) sums up, the literature on costs of financial distress supports two qualitative statements about financing behavior:

1) Risky firms, where risk would be defined as the variance rate of the market value of firm’s assets, ought to borrow less, other things equal.

2) Companies whose value consists primarily of investment opportunities and specialized assets, as opposed to “assets in place” (tangible assets that provide good collateral for lenders) with

active second-hand markets, are likely to find debt financing very costly, i.e. are likely to have lower debt-equity ratios. Specialized intangible assets or growth opportunities are more likely to lose value in financial distress.

II.3. Testing the Trade-off Theory

To study the effects of the above-mentioned factors on a company's leverage and verify the predictions of the trade-off theory, the following regression model can be employed:

$$L_{it} = \alpha + \beta F_{it} + \varepsilon_{it} ,$$

where L_{it} denotes the leverage of firm i on the date t and F_{it} the set of factors observed at company i at the date t .² In line with the above discussion, the vector of explanatory variables should incorporate the below factors,³ making the above regression model into:

$$L_{it} = \alpha + \beta_{SIZE} SIZE_{it} + \beta_{PROFIT} PROFIT_{it} + \beta_{TANG} TANG_{it} + \beta_{MTB} MTB_{it} + \beta_{TAX} TAX_{it} + \varepsilon_{it} .$$

To conclude, let us shortly recapitulate the influence that these factors should have on capital structure according to the trade-off theory, and identify possible proxies for these factors.

Size (SIZE). Larger firms tend to be more diversified and fail less often, so size is an inverse proxy for the probability of bankruptcy (Rajan and Zingales, 1995). The trade-off theory expects size to be positively related to leverage ($\beta_{SIZE} > 0$). The usual proxy for size used in the majority of studies is either natural logarithm of sales or natural logarithm of total assets.

Profitability (PROFIT). The trade-off theory predicts that profitable firms should be more highly leveraged to offset corporate taxes. Different proxies may be used for profitability, the most common one being earnings before interest and taxes (EBIT) divided by total assets (TA) or EBITDA (EBIT minus depreciation and amortization) over total assets. $\beta_{PROFIT} > 0$ is predicted.

² For some factors it may be more appropriate to use factors that are lagged one year. Some studies (e.g. Frank and Goyal, 2003) use this approach, however, receive very similar results when using lagged and not lagged factors.

³ For a more detailed discussion on the choice of factors and their expected effect on leverage see e.g. Rajan and Zingales (1995), Antoniou et al. (2002) or Frank and Goyal (2003).

Nature of Assets (TANG). Tangible assets can serve as collateral - and the more collateral a company has the greater its ability to issue secured debt. Using e.g. the tangible (fixed) assets to total assets ratio (FA/TA) as a proxy for tangibility, a positive relationship between tangibility and leverage is predicted ($\beta_{TANG} > 0$).

Growth opportunities (MTB). With market-to-book ratio representing the market's expectations of the value of future investment opportunities and growth of the company, the general prediction is its negative relationship with leverage, $\beta_{MTB} < 0$. As *MTB* increases, so does the cost of financial distress (Rajan and Zingales, 1995).

Taxes (TAX). Companies with higher tax liability have an incentive to use more debt. With only one single top tax rate in a given year, non-debt tax shields are rather used as proxies for taxation, as they represent alternative ways (to interest expenses) of protecting income from taxation. As predicted by the trade-off theory, they are associated with reduced leverage ($\beta_{TAX} > 0$). Depreciation over total assets can be used as a proxy.

After discussing the trade-off theory, which more or less links up to and develops the argumentation of Miller and Modigliani, we can now move to other theories with a little different approach to the explanation of companies' capital structure choices. We shall begin with the discussion of the two theories based on asymmetric information.

III. THEORIES BASED ON ASYMMETRIC INFORMATION

Asymmetric information theory, pioneered by the 2001 Nobel laureates, introduced the concept of adverse selection. When contracting with an agent with superior information, an uninformed agent faces the consequences of adverse selection because he does not know if the relevant characteristics of the informed agent are good or bad. To demonstrate the adverse selection problem and how signaling can resolve it, Akerlof (1970) used the “lemons” market for used cars to illustrate how sellers of good quality cars can use a warranty to signal quality to buyers who cannot otherwise distinguish between good cars and lemons. He argued that this signal has to be a credible one, meaning that the owner of a lemon will have no incentive to mimic it.

There are several capital structure theories that work with the notion of asymmetric information and apply it in different ways trying to explain the role it plays in the financing decisions of corporations. Taking into consideration the scope of this chapter, the two major ones – the signaling and the pecking order theory – will be mentioned and briefly explained.

III.1. Signaling Theory

The foundations of signaling theory and its various extensions were laid by Ross (1977). According to him, managers, having full information about their firm and with rewards depending on the current value and future returns of the firm, have the motivation to credibly signal this information to outside investors. Let us now look at how they do so.

In Ross’s model, managers know the true distribution of firm returns while investors do not. Managers benefit if the company’s securities are more highly valued by the market but are penalized if the firm goes bankrupt. Under such circumstances, the level of debt the company managers choose serves as a signal about the quality of the company, a signal sent from the managers as possessors of private insider information towards outside investors. Since lower quality firms have higher marginal expected bankruptcy costs for any debt level, managers of low quality firms do not imitate higher quality firms by issuing more debt. Therefore, higher leverage is a “good signal” in this model.

In order to demonstrate how the Ross signaling model works in more detail, the view of Klein et al. (2002) will be used. Assume there are two companies, good (G) and bad (B). During the next period, they realize a cash flow \tilde{x} , where the density function $f^t(x)$ is uniform on the interval $[0, x^t]$, where $t = G, B$. The cash flow distributions are ordered by first-order stochastic dominance $x^G > x^B$. The market knows the distributions of cash flows, but cannot distinguish company G from company B because they are identical in all other respects. By pooling firms, the market undervalues the good company and overvalues the bad company, so the good company would like to convey its quality to the market. Conversely, the bad firm would prefer to hide in the uncertainty.

The objective function that Ross's signaling model uses is the manager's wage. This wage is assumed to have two components. One is a function of company value, and the other is a bankruptcy penalty. This penalty is a cost the manager incurs (separate from any bankruptcy costs the firm may incur) if the company goes bankrupt. The manager's objective is to choose the company's level of debt, D , to maximize his wage.

Suppose that managers have the following wage contract:

$$W^t = \alpha V_0(D^t) - L \int_0^{D^t} f^t(x) dx .$$

The first term is a positive scalar times the current market value of the company, $V_0(D^t)$, which is a function of the face value of debt, D^t , that the company t issues. This term reflects the fact that the market uses the company's debt level as a signal of company value. The second term is the bankruptcy penalty, L , times the likelihood of bankruptcy, $F^t(D^t)$. The incentive compatibility condition requires:

$$\alpha V_0(D^G) - L \int_0^{D^G} f^B(x) dx \leq \alpha V_0(D^B) - L \int_0^{D^B} f^B(x) dx .$$

The left-hand side of this condition is manager B 's wage if he chooses D^G , the debt level chosen by manager G . The right-hand side is his wage if he chooses not to mimic. Because debt is personally

costly to managers, in a separating equilibrium $D^G=D^*$ will be the lowest debt level sufficient to satisfy incentive compatibility.

Also, $D^B=0$ because any debt level above this, but strictly less than D^* , imposes a cost on the B manager while still revealing his company's type to the market. Finally, in a separating equilibrium, the market correctly identifies and thus correctly values, the firms. We can rearrange the incentive compatibility condition and make some substitutions to interpret the requirement for D^* :

$$L \int_0^{D^*} f^B(x) dx \geq \alpha [V_0(D^*) - V_0(0)]$$

$$LF^B(D^*) \geq \alpha \left(\frac{x_G - x_B}{2} \right)$$

The last condition tells us that if D^* is set so that company B manager's expected bankruptcy penalty from financing with D^* outweighs the gain in wage from being perceived as firm G , then incentive compatibility results.

As Ross points out, one empirical implication of this theory is that in a cross section, the values of companies will rise with leverage, since increasing leverage increases the market's perception of value. The debt-equity ratio will thus be positively correlated also with the company's profitability.

The second essential leverage signaling model is that of Leland and Pyle (1977), who based their theory on managerial risk aversion. In their model, it is *insider ownership* that provides a signal of firm quality. Under certain conditions, managers of high-quality companies signal their type by retaining a high proportion of ownership, and therefore finance with higher levels of debt than managers of low-quality companies. Financing with debt allows a manager to retain a larger ownership stake in the company, but the larger equity stake is costly to a risk-averse manager. The fact that a larger equity stake is less costly to a manager of a high-quality company drives the incentive compatibility of the signal. As in Ross (1977), the Leland and Pyle model predicts a positive correlation between company quality and leverage.

Before we move to the possible way of testing of the signaling theory, we should mention another implication of the above-mentioned fixed-investment leverage signaling models. This is the

assertion that if a company's managers believe that future profitability will be higher (lower) than current market expectations, then they should conduct a leverage-increasing (decreasing) capital structure transaction.

The empirical implication of this finding is that one would expect positive (negative) stock price reactions in response to capital structure changes that increase (decrease) leverage. This is in contrast with the pecking order theory, where, as will be shown, debt issues should not cause any stock price movements.

III.2. Testing the Signaling Theory

Empirical testing of the signaling theory can be done in several ways. The regression in chapter II.3. might be used to verify the predictions of the signaling theory with respect to profitability and growth opportunities (above we have explained that it predicts $\beta_{\text{PROFIT}} > 0$ and $\beta_{\text{MTB}} > 0$). Another approach would be to examine the immediate stock price effects on announcements of capital structure changes⁴ or the influence of insider ownership on leverage (see chapter IV.3. for a short demonstration of this). The approach presented hereafter is inspired by Vermaelen (1981) and is based on the theory's implication, that a leverage increasing announcement should be followed by "abnormal" cash flow increases. Assuming earnings per share as a reasonable proxy for net cash-flows per share, the following forecast model can be used to test the hypothesis that leverage increasing announcements are followed by statistically significant standardized (in the way described below) forecast errors. Denoting:

$EpS_{i,t}$	earnings per share for company i in the year t relative to the announcement year,
$f(EpS_{i,t})$	a forecast of earnings per share for company i in the year t ,
$f(\Delta EpS_{i,t})$	a forecast of first differences in earnings per share for company i in the year t ,
$EpS_{m,t}$	average earnings per share for year t using an equally weighted average of EpS numbers of all companies available in year t ,
$\Delta EpS_{m,t}$	$= EpS_{m,t} - EpS_{m,t-1}$,

the forecast model used goes as:

⁴ This was done e.g. by Masulis (1980), Cornett and Travlos (1989) and others.

$$f(EpS_{i,t}) = EpS_{i,t-1} + \frac{1}{K_i} \sum_{k=1}^{K_i} \Delta EpS_{i,t-k} ,$$

where K_i is the number of EpS changes available for firm i before year t , and

$$f(\Delta EpS_{i,t}) = \frac{1}{K_i} \sum_{k=1}^{K_i} \Delta EpS_{i,t-k} .$$

Therefore, forecast errors are

$$e_{i,t} = \Delta EpS_{i,t} - \frac{1}{K_i} \sum_{k=1}^{K_i} \Delta EpS_{i,t-k} ,$$

and are computed for a number of years (e.g. five) before and after the announcement.

Assume that for a given company i , $e_{i,t}$ is normally and independently distributed. Define the standardized forecast error SFE_{it} as $e_{i,t} / \hat{\sigma}(e_{i,t})$ with

$$\hat{\sigma}(e_{it}) = \frac{1}{N_i - 1} \sum_{t=-5}^{N_i} (e_{it} - \bar{e}_i)^2 , \text{ where } \bar{e}_i = \frac{1}{N_i} \sum_{t=-5}^{N_i} e_{it} ,$$

and where N_i is the number of forecast errors available for company i from $t = -5$ on.

Under the stated assumptions, it follows that SFE_{it} has a mean equal to 0 and a variance equal to 1. Because for all companies the SFE_{it} are identically and independently distributed, a cross-sectional t-test becomes possible. Define the average standardized forecast error as

$$ASFE_t = \frac{1}{n_t} \sum_{i=1}^{n_t} SFE_{it} ,$$

where n_t equals the number of companies available in year t , relative to the announcement year. In line with Vermaelen (1981), for each forecast year a t-value can then be estimated by

$\hat{t}_t = ASFE_t / \hat{\sigma}(ASFE_t)$, where

$$\hat{\sigma}(ASFE_t) = \sqrt{\sum_{i=1}^{n_t} \frac{1}{n_t^2} \sigma^2(SFE_{it})} = \sqrt{\sum_{i=1}^{n_t} \frac{1}{n_t^2} * 1} = 1 / \sqrt{n_t}.$$

One then looks whether or not the average standardized prediction error is significantly positive/negative in any of the relevant years. The prediction of the signaling theory is an abnormal performance in the years after the leverage increasing announcements, or, in other words, a significantly positive average standardized prediction error in these years.

This approach is, however, quite demanding on the data that it requires in order to deliver robust results and predictions. With the data available for the practical part of the thesis it could not be employed. We shall now proceed to the second major theory based on asymmetric information - the pecking order theory.

III.3. Pecking Order Theory

The pecking order theory had long roots in the descriptive literature, however, it was Myers (1984) and Myers and Majluf (1984) who clearly articulated and developed this hypothesis for the first time. The pecking order theory reflects the information asymmetry between managers (insiders) and investors, which leads to an adverse selection problem when a company needs to raise external capital to fund new projects. Companies with less valuable opportunities can issue securities that mimic those offered by companies with more valuable opportunities, resulting in overvalued securities for low-valued companies and undervalued securities for high-valued companies.

In the Myers and Majluf model, managers with superior information about the value of the company's assets and acting in the best interests of existing shareholders, will issue equity when the equity is overpriced. Moreover, managers may pass up positive NPV investments if the equity necessary to finance them is sufficiently underpriced by the market, as this could lead to a net loss to existing shareholders. Therefore, the decision to issue equity and invest will convey negative information to the market and the price of the company's shares will drop at the announcement.

The underinvestment problem can be avoided if the firm can finance the new project using a security that is not so severely undervalued by the market. Internal finance and/or riskless debt, for example, involve no undervaluation, and, therefore, will be preferred to equity in this situation. Capital structure is thus driven by a hierarchy of preferences, or a pecking order, for the issuance of new capital.

To review the major predictions and contributions of the Myers-Majluf model, let us now examine the essential arguments of the model that were presented by Myers in his 1984 paper. The consecutive paper by Myers and Majluf (1984) then offer a more detailed discussion and analysis of the pecking order hypothesis.

Let's consider a company that has to raise N dollars in order to undertake some potentially valuable investment opportunity. Let y be this opportunity's NPV and x be what the company will be worth if the opportunity is passed by. The company's managers know what x and y are, but investors in the capital markets do not: they see only a joint distribution of possible values (\tilde{x}, \tilde{y}) . The information asymmetry is taken as given. M&M's Proposition I holds in the sense that the stock of debt relative to real assets is irrelevant if information available to investors is held constant.

The benefit of raising N dollars by a security issue is y , but there is also a possible cost as the company may have to sell the securities for less than they are really worth. Suppose the company issues *stock* with an aggregate market value, when issued, of N . However, the manager knows the shares are really worth N_I , i.e. this is what the shares will be worth, other things equal, when the investors acquire the manager's special knowledge.

In line with the Myers-Majluf argumentation, the manager cares primarily about the value of the stake of the existing shareholders. At the same time, investors know the manager will do this. Thus particularly the new investors who purchase any stock issue will assume the manager is *not* on their side and will rationally adjust the price they are willing to pay.

With $\Delta N = N_I - N$, i.e. the amount by which the shares are over- or undervalued, the manager will issue and invest when

$$y \geq \Delta N .$$

If the manager's inside information is unfavorable, ΔN is negative and the company will always issue, even in case of a zero-NPV investment. If the inside information is favorable, however, the company may pass up a positive-NPV investment opportunity rather than issue undervalued shares.

But if management acts this way, its decision to issue will signal bad news to both old and new shareholders. Let V be the market value of company if it does not issue, and V' be market value if it does issue; V' includes the value of the newly issued shares. Thus if everyone knows that managers will act according to the above-mentioned inequality, the conditions for a rational expectations equilibrium are, according to Myers (1984):

$$V = E(\tilde{x} | \text{no issue}) = E(\tilde{x} | y < \Delta N) \quad \text{and} \quad V' = E(\tilde{x} + \tilde{y} + N | \text{issue}) = E(\tilde{x} + \tilde{y} + N | y \geq \Delta N) .$$

The total dollar amount raised is fixed by assumption, but the number of new shares needed to raise that amount is not. Thus ΔN is endogenous: it depends on V' . Therefore, given N , x and y , and given that stock is issued, the greater the price per share, the less value is given up to new stockholders, and the less ΔN is.

The way to reduce ΔN is to issue the safest possible securities – strictly speaking, securities whose future value changes least when the manager's inside information is revealed to the market. This condition is naturally fulfilled in case of internal financing and default-free debt. But even if default risk is introduced, the absolute value of ΔN will be less for debt than for new equity, implicating that if the manager has favorable information ($\Delta N > 0$), it is better to issue debt than equity.

Above we assumed that the new shares or risky debt would be underpriced. What if managers' inside information is unfavorable, so that any risky security issue would be overpriced? In this case, wouldn't the firm want to make ΔN as large as possible, to take maximum advantage of new investors? If so, stock would seem better than debt. The decision rule seems to be "issue debt when investors undervalue the firm, and equity, or some other risky security, when they overvalue it." The problem is, that investors know this, and they will thus refuse to buy equity unless the firm has already exhausted its "debt capacity" – that is, unless the company has issued so much debt already that it would face substantial additional costs in issuing more. Thus, investors would effectively

force the company to follow a pecking order. Further, a possible way to test the validity of these predictions is suggested.

III.4. Testing the Pecking Order Theory

In reality company operations and the associated accounting structures are more complex than the standard pecking order representation. This implies that in order to test the pecking order, some form of aggregation must be used. With notation defined as follows:

DIV_t	cash dividends in year t ,
I_t	net investment in year t ,
ΔW_t	change in working capital in year t ,
C_t	cash flow after interest and taxes,
ΔD_t	net debt issued in year t ,
ΔE_t	net equity issued in year t ,

we get the aggregated flow of funds deficit as:

$$DEF_t = DIV_t + I_t + \Delta W_t - C_t = \Delta D_t + \Delta E_t.$$

Myers and Shyam-Sunder (1994) argue that under the pecking order hypothesis, after an initial public offering, equity issues are only used in extreme circumstances. The hypothesis to be tested is thus given as:

$$\Delta D_{it} = \alpha + \beta DEF_{it} + \varepsilon_{it}, \text{ expecting } \alpha=0 \text{ and } \beta=1.$$

However, as Frank and Goyal (2003a) correctly point out, excluding the conventional set of factors for leverage from consideration might be a significant omission. A more appropriate regression to test for the pecking order hypothesis might be thus:

$$\Delta D_{it} = \alpha + \beta_{SIZE} \Delta SIZE_{it} + \beta_{PROFIT} \Delta PROFIT_{it} + \beta_{TANG} \Delta TANG_{it} + \beta_{MTB} \Delta MTB_{it} + \beta_{TAX} \Delta TAX_{it} + \beta_{DEF} DEF_{it} + \varepsilon_{it},$$

which is simply the regression from chapter II.3. run in first differences but with financing deficit as an added factor.

As follows from the above discussion, the pecking order theory predicts, $\beta_{\text{PROFIT}} < 0$ (retained earnings are used where possible), $\beta_{\text{TANG}} < 0$ (firms with few tangible assets have greater asymmetric information problems) - both of these predictions being in contrast with the trade-off theory. Moreover, if company size is assumed to be as a proxy for the information that outside investors have, one can expect $\beta_{\text{SIZE}} < 0$ (larger firms tend to provide more information to lenders than smaller ones, i.e. have less asymmetric information problems and tend to have more equity than debt) - again contrary to the trade-off theory. No conclusions can be drawn for β_{MTB} and β_{TAX} from the pecking order theory.

To conclude let us again sum up the key implications of the model (Myers and Majluf, 1984):

1) It is generally better to issue safe securities than risky ones. External financing using debt is better than financing by equity.

2) Companies whose investment opportunities outstrip operating cash flows, and which have used up their ability to issue low-risk debt, may forego good investments rather than issue risky securities to finance them. This is done in existing shareholders' interest. However, stockholders are better off when the firm carries sufficient financial slack to undertake good investment opportunities that may arise.

3) Companies can build up financial slack by restricting dividends when investment requirements are modest or by issuing stock in periods when managers' information advantage is small (e.g. shortly after the financial reports are released etc.).

4) When managers have superior information, and stock is issued to finance investment, stock price will fall, other things equal. This will not happen in case of issuance of default-free debt.

As we have seen, there is no well-defined optimal capital structure in the pecking order theory. The attraction of the interest tax shield and the threat of financial distress are assumed second order. Observed leverage is simply the sum of past events. Debt ratios change when there is an imbalance of internal cash flow, net of dividends, and real investment opportunities.

The theory helps to explain why the most profitable companies generally borrow less. It is not because they would have low target debt ratios but because they have internal funds sufficient for their capital investment.

Before we advance to the discussion of the agency theory, it should be mentioned that a number of authors have extended the basic Myers-Majluf idea. A recent comprehensive overview of the further research on this topic, as well as a summary of empirical findings, is included e.g. in Klein et al. (2002).

IV. AGENCY THEORY

All of the previously described models have implicitly assumed that the interests of managers and shareholders are perfectly aligned. However, it was already Adam Smith who recognized the potential problems that may arise when ownership and management of a company are separated:

“The directors of such [joint-stock] companies, however, being the managers rather of other people’s money than of their own, cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master’s honor, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company.” Adam Smith (1776) as quoted in Jensen and Meckling (1976)

Jensen and Meckling, in their now classic paper from 1976, developed this well-known idea describing the conflicting interest of principals (shareholders) and their agents (managers) into a whole agency theory. With help of agency costs arising in such relationships, they explain how optimal capital structure can be determined. It is probably needless to say that their theory was extended by a number of authors. In the brief overview below, the latter contributions of Myers (1977) concerning agency costs of debt, and Jensen (1986) dealing with the role of free cash flow, will be included.

The models based on agency costs identify two types of conflicts – between managers and shareholders (also called agency costs of equity) and between debt holders and equity holders (also called agency costs of debt). Let us now look more closely at each of them separately and examine what influence has debt on the agency costs that arise from these relationships.

IV.1. Agency Costs of Equity – Benefits of Debt Financing

Agency costs of outside equity can be demonstrated by comparing the behavior of a manager when he owns 100 percent of the residual claims on a company with his behavior when he sells off a portion of those claims to outsiders. If a company is managed by the owner, he will make operating

decisions that maximize his utility, i.e. also the value of the company. However, as the owner-manager's fraction of the equity falls, also his fractional claim on the outcomes falls, generating a divergence between his interests and those of the outside shareholders.

As only a partial owner, the manager will not capture the entire gain from possible value increasing activities, but he will bear the entire cost of these activities. Managers will thus be tempted to put less effort into managing company resources and rather transfer company resources to their own, personal benefit, by consuming perquisites (such as corporate jets, luxurious offices, etc.). Once again, we can see the consequence of divergent interests: the manager bears the entire cost of refraining from his perquisites but captures only a part of the gain. As a result, managers behave in a manner that does not maximize the firm's value – the decrease in value caused by such managers' behavior is called *agency cost of equity*.

This inefficiency is reduced the larger is the fraction of the company's equity owned by the manager. Holding constant the manager's absolute investment in the company, increases in the fraction of the firm finance by debt increase the manager's share of equity and mitigates the loss from the conflict between the manager and shareholder (Harris and Raviv, 1991).

As Jensen and Meckling declare (1976), the owner will bear the entire wealth effects of the above mentioned agency costs of equity, so long as the equity market anticipates these effects. Prospective minority shareholders will realize that the owner-manager's interests will diverge somewhat from theirs; hence the price which they will pay for shares will reflect the monitoring costs and the effect of the divergence between the manager's interest and theirs. This also makes it desirable for the minority shareholders to expend more resources in monitoring his behavior. Thus, the wealth costs to the owner of obtaining additional cash in the equity markets rise as his fractional ownership falls.

Let us now examine the second benefit of debt financing, the reduction of *free cash flow* as described by Jensen (1986). Jensen defines free cash flow as cash flow in excess of that required to fund all projects that have positive net present values. The problem is how to motivate managers to pay out this cash to shareholders rather than invest it at below the cost of capital or wasting it on organization inefficiencies. Jensen argues that by issuing debt, managers are bonding their promise to pay out future cash flows. In doing so, they give the debt holders the right to file the firm for bankruptcy if they do not maintain their promise to make the interest and principle payments. Thus

debt reduces the agency costs of free cash flow by reducing the cash available for spending at the discretion of managers.

It has to be also mentioned, that the control function of debt is more important in companies that generate large cash flows but have low growth prospects and even more important in firms that must shrink. In these firms the pressure to waste cash flows by investing them in uneconomic projects is most serious.

Having analyzed the two major benefits that debt financing can have on pushing down agency costs of equity and thus increasing the value of a company, let us now focus on the other side of the problem – the costs of debt from the point of view of the agency theory.

IV.2. Agency Costs of Debt – Benefits of Equity Financing

When a company has debt, and especially when financial distress is incurred, conflicts of interest arise between debtholders and shareholders. Under such circumstances shareholders are tempted to pursue selfish strategies that lead to suboptimal investment. The negative effect of such behavior on the company value is called the *agency cost of debt financing*.

Firstly, as Jensen and Meckling point out (1976), heavily leveraged companies, or those near bankruptcy, have the incentive to invest into very risky projects, as they feel that they are playing with someone else's money. If an investment yields large returns that is well above the face value of the debt, shareholders will capture most of the gain. On the other hand, if the investment fails, debtholders will bear the consequences due to the limited liability of the shareholders. As a result, shareholders will go even for unreasonably risky projects that they wouldn't normally carry out as they are value-decreasing.

As Harris and Raviv (1991) describe, such investments result in a decrease in the value of the debt. The loss in value of the equity from the poor investment can be more than offset by the gain in equity value captured at the expense of debtholders. However, if the debtholders correctly anticipate shareholders' future behavior already when the debt is issued, shareholders should receive less for the debt than they otherwise would. Thus, the cost of the incentive to invest in value-decreasing projects created by higher proportion of debt in the capital structure is borne by the shareholders

who issue debt. This effect, called the “*asset substitution effect*”, is one of the agency costs of debt financing.

Another significant agency cost of debt represents the *underinvestment problem* identified by Myers (1977). He argues that shareholders of a company with a significant probability of bankruptcy often find that investing new capital would help the bondholders at their expense, even if this capital were invested into value-increasing projects. The reason is that shareholders bear the entire cost of the investment, but the returns from the investment would be captured mainly by the debtholders. Thus larger debt results in the rejection of more value-increasing projects. An extreme case might be the so called “milking of property” (Ross et. al 1996), meaning the pay out of extra dividends or other distributions in times of financial distress. Again, we see a clear agency cost of debt.

As Jensen and Meckling (1976) state, in summary then the agency costs associated with debt consist of: 1) the opportunity wealth loss caused by the impact of debt on the investment decisions of the company; 2) the monitoring and bonding expenditures by the bondholders and the company; 3) the bankruptcy and reorganization costs.

IV.3. Conclusions and Testing of Agency Theory

It has been shown that the agency effects of debt are definitely a potential determinant of capital structure. The optimal capital structure can be determined by trading off the agency costs of debt against the benefits of debt as they were previously described.

The implications that can be drawn from the agency models of capital structure are summarized by Harris and Raviv (1991). Firstly, one would expect bond contracts to include features that attempt to prevent asset substitution, such as interest coverage requirements, prohibitions against investments in new, unrelated businesses, etc. Secondly, industries in which opportunities for asset substitution are more limited and those with fewer growth opportunities will have higher debt levels, *ceteris paribus*. Thirdly, companies for which slow or even negative growth is optimal and those with large cash inflows from operations should have more debt, as increasing debt reduces the amount of free cash flow.

It is quite difficult to formalize and statistically verify the conclusions of the agency theory, however, a possible way to test it is to look at the influence of insider ownership on a company's leverage. This could be done, similarly as in Kim and Sorensen (1986), by adding a one-zero dummy "INSIDER" variable into the regression from chapter II.3.:

$$L_{it} = \alpha + \beta_{SIZE}SIZE_{it} + \beta_{PROFIT}PROFIT_{it} + \beta_{TANG}TANG_{it} + \beta_{MTB}MTB_{it} + \beta_{TAX}TAX_{it} + \beta_{INSIDER}INSIDER_{it} + \varepsilon_{it},$$

With the INSIDER variable being one for firms with a relatively high proportion of insider ownership. One could then test whether or not companies, whose equity ownership is concentrated among insiders, make use of long-term debt in capital structure differently from firms that are owned by a large number of outside shareholders.

CONCLUSIONS

To conclude, the key assumptions⁵ as well as predictions and implications of each of the previously described theories will be summarized. Some of them were already explicitly mentioned during the analysis, others can be easily derived from it.⁶ That is also the reason why they are listed without any explanatory commentary.

Theory

Key assumptions

Key predictions

Trade-off

Releases the "no taxes" and "no financial distress costs" assumptions.

- *Companies follow a trade-off process of capital structure adjustment that leads to an optimal leverage level over the long-term.*
- *The effective tax rate is positively related with the debt level.*
- *Default risk is negatively correlated to firm's debt ratio.*
- *Companies with greater growth opportunities will have a lower target debt ratio.*
- *Company debt is positively correlated with the tangibility of its assets.*
- *The size of a company is positively correlated to the level of debt.*
- *There is a negative relationship between leverage and profitability.*

Signaling

Information asymmetry between managers and investors.

- *Leverage is positively correlated with company value.*
- *The debt-equity ratio will be positively correlated with the company's profitability.*
- *Leverage is positively correlated with default probability.*
- *Leverage is positively related to the extent of managerial ownership.*
- *One can expect positive (negative) stock price reactions in response to capital structure changes that increase (decrease) leverage.*

Pecking order

Information asymmetry between managers and investors.

- *There is a pecking order: companies prefer internal to external finance and issuance of safer securities to more risky ones.*
- *Leverage increases with the extent of information asymmetry.*
- *The level of company's debt is negatively correlated with the volume of free cash flow.*
- *There is a negative relationship between the debt level of a firm and its profitability.*
- *Debt issues do not cause any stock price movements.*
- *Firms tend to issue equity when information asymmetry is smallest.*

⁵ Only assumptions specific for each theory are mentioned. One should reflect some of the common assumptions mentioned in connection with the Miller and Modigliani propositions in chapter I.

⁶ See also discussion in chapter VIII.1.

Agency

Interests of managers, shareholders and debtholders are not perfectly aligned.

- *Leverage is positively correlated with the volume of free cash flow.*
- *Bond contracts will include features that attempt to prevent asset substitution.*
- *Firms with fewer growth opportunities will have higher debt levels.*
- *Leverage is negatively related to monitoring and investigation costs.*

For the purposes of statistical testing, the following table might be also useful. It summarizes the predictions that each of the theories makes about the effect of a chosen factor on the degree of a firm's leverage. A prediction of a positive relationship is denoted as "+", a negative one as "-". The cell is left blank when a theory is silent or when there is ambiguity regarding the appropriate interpretation.

Factor	Possible proxy*	Trade-off	Signaling	Pecking order	Agency
<i>Size</i>	Ln of Sales, Ln of TA	+		-	+
<i>Profitability</i>	EBIT/TA, EBITDA/TA	+	+	-	+
<i>Tangibility</i>	FA/TA	+		-	+
<i>Growth opportunities</i>	MTB	-	+		-
<i>Taxes</i>	Depr/TA, NDTS/TA	-			

* TA = total assets; EBIT = earnings before interest and taxes; EBITDA = EBIT minus depreciation and amortization;
FA = fixed assets; MTB = market-to-book ratio; Depr = depreciation, NDTS = non-debt tax shields.

As the reasoning that stands behind the indicated relationships has been discussed in detail throughout the preceding chapters, also the above table will be left without further commentary at this stage. Nevertheless, please recall that the theoretical predictions linked to four of the above factors are, together with their rationalization, again summarized in more detail in the beginning of chapter VIII., which deals with empirical testing of these capital structure determinants.

THE CZECH PRACTICE

Armed with the theoretical knowledge we can now progress and approach the reality of the Czech Republic. We will be able to reflect how various theoretical predictions and concepts apply in the Czech environment, and see which theory finds most support in the Czech Republic. The approach of the practical part is as follows.

The first two chapters (V. and VI.) deal with the institutional environment in the Czech Republic and its potential influence on the capital structure decisions of Czech companies. With a focus on equity financing, the conditions at the Czech capital and venture capital markets, as well as the legal considerations to be taken into account when raising equity, and their implications for the behavior of Czech corporations, are analyzed.

The subsequent two chapters (VII. and VIII.) then work with the data provided for the purposes of this thesis by the Czech Capital and Investment Association. A sector-level as well as a company-level analysis of the capital structure of Czech joint-stock companies is performed. As the prevailing international literature has primarily been based on data from developed western countries, results from this part of the thesis are one of the first to contribute to the capital structure debate with data from the Czech Republic.

V. RAISING EQUITY CAPITAL IN CZECH REPUBLIC

When analyzing the environment for equity financing in a particular country, the first steps should logically lead to the analysis of the country's capital market, one of the major sources for this kind of financing in the western world. The approach of this thesis won't be different. The Czech capital market will be compared to its European peers. Thereafter, the possibilities for raising capital at the Prague Stock Exchange will be analyzed more closely. In the second part of this chapter, our attention will turn to the Czech venture capital market, another increasingly important source of equity financing for companies, whose shares are not listed and that do not wish to go public for the time being.

V.1. Czech Capital Market

In order to see what role the capital market plays in the Czech Republic and what kind of opportunities it offers to Czech companies, the Czech capital market will be firstly compared to other European markets⁷ from the perspective of its market capitalization and volume of trading of equity and bonds, as well as the role and preferences of institutional investors. After that we will look more closely at the development of the aforementioned indicators over a longer period of time and discuss recent securities issues at the Czech capital market. This should help us to understand the attitude of Czech companies towards the capital market and their perception of the capital market as a potential source of equity financing.

Two comments should be made before we start. The first one concerns the fact, that it is solely the data from the Prague Stock Exchange (PSE) that have been used as a proxy for the analysis of the whole Czech capital market. The second public market - the RM-System - has been omitted. However, this should not pose any significant discrepancy, as in the last three years the volume of trading in the RM-System amounted to approximately 1%, leaving 99% of trading to the Prague Stock Exchange.

The second comment regards the robustness of the conclusions drawn from our analysis of the capital market. One should keep in mind that the capital market is, even in developed countries,

⁷ Other important international markets (especially the United States) are not included in the analysis, as the business and institutional environment there is quite different from the European one.

usually regarded as a source of financing for big mature companies or for fast growing companies. A lot of companies included in the quantitative analysis (chapters VII. and VIII.) do not fit into this category. On the other hand, for these the capital market can be regarded as a potential source of financing should they be successful. In any case, the findings about the capital market have to be combined with the discussion of the venture capital market.

V.1.1. International Context

Let us first look at the *market capitalization* of the Czech capital market as compared to its European peers at the end of year 2003. In absolute terms (Table V.1.) the Czech market can obviously not compete with the biggest markets such as the London Stock Exchange or Euronext. Whereas in comparison with other eastern European markets the Czech one right behind Poland and Hungary, compared to its Austrian neighbor its market capitalization is almost four times smaller.

Much more interesting is, however, when market capitalization is expressed as a percentage of GDP. Here the Prague Stock Exchange is at the very end of the countries listed in Table V.2., with a market capitalization of 16.2%, followed only by the Stock Exchange in Bratislava (7.6%) and Warsaw (15.8%). While in developed countries stock exchanges usually have a market capitalization over one third of their GDP, eastern European ones exceed the 20% level only in a few cases. This indicates that capital markets in eastern European countries do probably not represent such an important source of financing.

The second key characteristic of a capital market is the *value of trading* performed there during a certain time period. We shall examine both the value of equity trading as well as the value of traded bonds during the year 2003, both in absolute terms and as a percentage of GDP. This should provide us with a good picture about the activity of investors at these markets and about the liquidity of individual markets.

Table V.1.

Market Capitalization of Domestic Equity	
(as of Dec 2003, mil. EUR)	
1. London SE	1 923 168
2. Euronext	1 646 178
3. Deutsche Börse	855 452
4. Spanish SEs	575 766
5. Italian SE	487 446
6. Stockholmsbörsen	229 355
7. Helsinki SEs	135 001
8. Copenhagen SE	93 701
9. Athens SE	84 547
10. Oslo Børs	75 779
11. Irish SE	67 444
12. Wiener Börse	44 811
13. Luxembourg SE	29 598
14. Warsaw SE	29 350
15. Budapest SE	13 228
16. Prague SE	12 288
17. Iceland SE	7 361
18. Ljubljana SE	5 660
19. Cyprus SE	3 807
20. Lithuanian SE	2 783
21. Bratislava SE	2 204
22. Malta SE	1 467

Table V.2.

Market Capitalization of Domestic Equity	
(as of Dec 2003, % of GDP)	
1. Luxembourg SE	126.1%
2. London SE	121.1%
3. Helsinki SEs	94.1%
4. Stockholmsbörsen	85.8%
5. Iceland SE	79.6%
6. Spanish SEs	77.5%
7. Euronext	72.2%
8. Athens SE	55.4%
9. Irish SE	51.1%
10. Copenhagen SE	49.9%
11. Deutsche Börse	40.2%
12. Oslo Børs	38.6%
13. Italian SE	37.5%
14. Malta SE	34.4%
15. Cyprus SE	33.6%
16. Ljubljana SE	23.1%
17. Wiener Börse	20.0%
18. Budapest SE	18.1%
19. Lithuanian SE	17.2%
20. Prague SE	16.2%
21. Warsaw SE	15.8%
22. Bratislava SE	7.6%

Source: Federation of European Securities Exchanges, author's calculations

The value of equity trading (Table V.3.) at the Prague Stock Exchange is similar to other eastern European stock exchanges, however, considerably lags behind the western European ones (except for the Vienna Stock Exchange). When comparing the value of equity trading expressed as a percentage of GDP (Table V.4.), the difference between eastern and western capital markets becomes even more prominent. With 9.9%, the Prague Stock Exchange hardly reaches a third of the trading volume of the smallest western stock exchanges.

Table V.3.

Value of Equity Trading	
(year 2003, mil. EUR)	
1. London SE	3 174 122
2. Euronext	1 665 227
3. Deutsche Börse	1 139 899
4. Spanish SEs	820 437
5. Italian SE	721 525
6. Stockholmsbörsen	269 323
7. Helsinki SEs	145 646
8. Oslo Børs	68 432
9. Copenhagen SE	56 044
10. Irish SE	38 758
11. Athens SE	32 505
12. Wiener Börse	9 804
13. Warsaw SE	8 777
14. Prague SE	7 471
15. Budapest SE	7 231
16. Iceland SE	6 319
17. Ljubljana SE	627
18. Bratislava SE	588
19. Cyprus SE	264
20. Luxembourg SE	233
21. Lithuanian SE	161
22. Malta SE	31

Table V.4.

Value of Equity Trading	
(year 2003, % of GDP)	
1. London SE	199.8%
2. Spanish SEs	110.4%
3. Helsinki SEs	101.6%
4. Stockholmsbörsen	100.7%
5. Euronext	73.1%
6. Iceland SE	68.3%
7. Italian SE	55.5%
8. Deutsche Börse	53.5%
9. Oslo Børs	34.9%
10. Copenhagen SE	29.8%
11. Irish SE	29.4%
12. Athens SE	21.3%
13. Budapest SE	9.9%
14. Prague SE	9.9%
15. Warsaw SE	4.7%
16. Wiener Börse	4.4%
17. Ljubljana SE	2.6%
18. Cyprus SE	2.3%
19. Bratislava SE	2.0%
20. Lithuanian SE	1.0%
21. Luxembourg SE	1.0%
22. Malta SE	0.7%

Source: Federation of European Securities Exchanges, author's calculations

The situation with bonds is (Table V.5. and V.6.), on the other hand, quite different. Both in absolute terms as well as when expressed as a percentage of GDP, the activity in the debt segment of the PSE is rather vivid. With a trading volume of 33.5 billion Euros, which represents more than 44% of the Czech GDP, the PSE need not be ashamed in comparison with its European peers.

Table V.5.

Value of Bond Trading (year 2003, mil. EUR)	
1. Spanish SEs	2 763 426
2. London SE	1 913 677
3. Stockholmsbörsen	1 097 078
4. Copenhagen SE	925 542
5. Deutsche Börse	400 592
6. Italian SE	148 874
7. Oslo Børs	119 112
8. Irish SE	37 234
9. Prague SE	33 560
10. Bratislava SE	25 832
11. Euronext	23 462
12. Iceland SE	12 289
13. Warsaw SE	1 328
14. Budapest SE	1 212
15. Wiener Börse	508
16. Ljubljana SE	478
17. Lithuanian SE	401
18. Luxembourg SE	380
19. Malta SE	119
20. Helsinki SEs	42
21. Athens SE	41
22. Cyprus SE	4

Table V.6.

Value of Bond Trading (year 2003, % of GDP)	
1. Copenhagen SE	492.7%
2. Stockholmsbörsen	410.2%
3. Spanish SEs	371.9%
4. Iceland SE	132.8%
5. London SE	120.5%
6. Bratislava SE	89.6%
7. Oslo Børs	60.7%
8. Prague SE	44.3%
9. Irish SE	28.2%
10. Deutsche Börse	18.8%
11. Italian SE	11.4%
12. Malta SE	2.8%
13. Lithuanian SE	2.5%
14. Ljubljana SE	1.9%
15. Budapest SE	1.7%
16. Luxembourg SE	1.6%
17. Euronext	1.0%
18. Warsaw SE	0.7%
19. Wiener Börse	0.2%
20. Cyprus SE	0.0%
21. Helsinki SEs	0.0%
22. Athens SE	0.0%

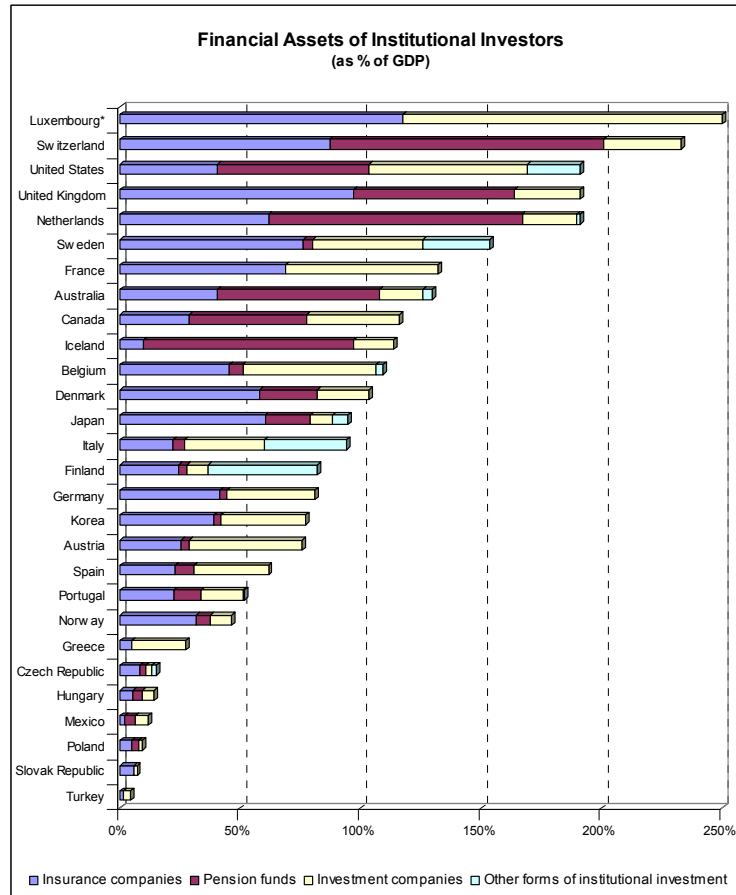
Source: Federation of European Securities Exchanges, author's calculations

The last area that will be included in our analysis concerns the *role and preferences of institutional investors* at the Czech market as compared to other OECD countries. Before we turn our attention to the graphs, it has to be noted that banks are not included in this analysis.⁸ Unfortunately, data on the whole financial sector has not been available. We are thus not exploring the role of loans as compared to other forms of financing, but we are investigating merely the role of individual types of investors in the economy and the composition of their portfolio.

From Graph V.1. one can see that the amount of financial assets invested through institutional investors in the Czech Republic is negligible in comparison with developed economies. Although the Czech Republic is ahead of other eastern European countries such as Hungary or Poland, the volume of financial assets of institutional investors as a percentage of GDP is at about one third of the level in western countries.

⁸ To be more precise, we should say that it is bank loans that are not included in the analysis. When banks invest on the capital market, they do so by means of their own investment funds, pension funds, etc., which are, of course, included in the analysis.

Graph V.1.



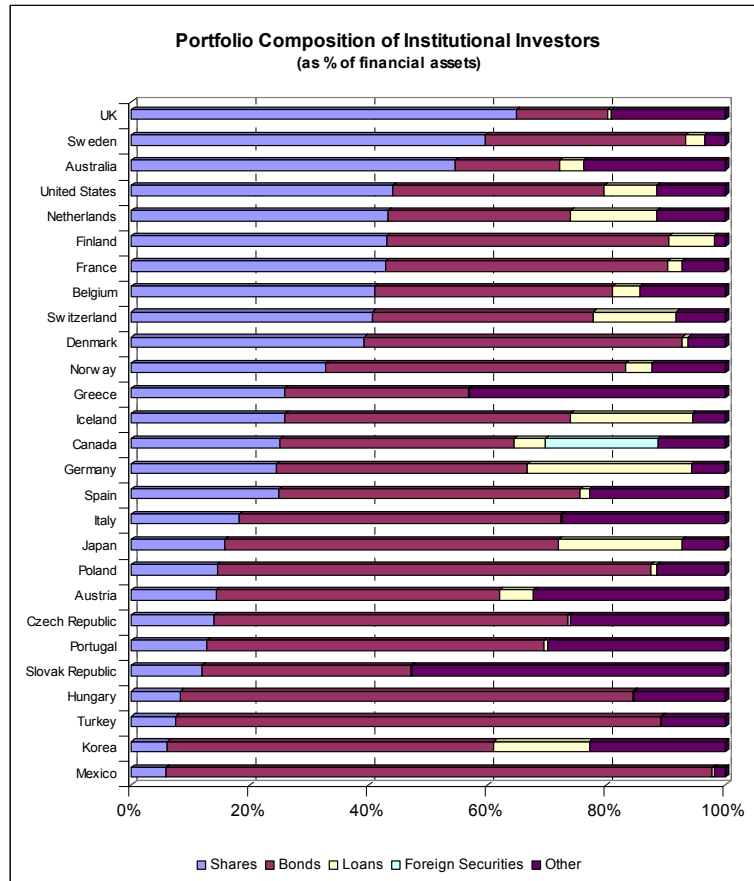
* In case of Luxembourg financial assets of institutional investors represent 4337% of GDP.

Source: OECD

This can lead us to two closely related conclusions. Firstly, it is the judgment that Czechs belong to quite risk-averse and conservative nations and prefer to invest their money in save ways such as e.g. depositing them in a bank. Secondly, one can deduce that banks (bank loans) will probably play a much greater role as a source of financing in the Czech Republic than the funds of institutional investors. This is supported by the fact that, according to Czech National Bank, the financial assets of banks represented ca. 80% of total assets of the Czech financial sector.

Looking at the portfolio composition of Czech institutional investors (Graph V.2.), it is clear that investing into shares is not very popular and the majority in their portfolio is represented by bonds. Again, this leads us to a conclusion that should a company wish to boost its equity at the Czech capital market, it might face considerable difficulties.

Graph V.2.



Source: OECD

V.1.2. Prague Stock Exchange

With an idea of how the Prague Stock Exchange was doing in comparison to other European stock exchanges at the end of 2003, we can now look at the development of the above-mentioned indicators over the last years. Let us again start with *market capitalization*.

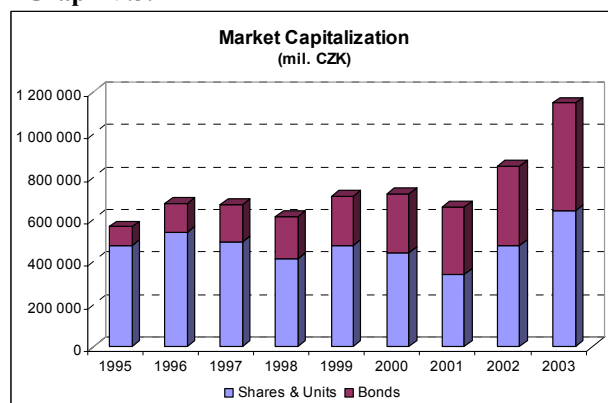
In absolute terms, we can observe a growing trend in the market capitalization of securities traded at the PSE (Graph V.3.). In the last six years, the only year where a year-on-year decrease could be observed was 2001, which was influenced primarily by the situation on international markets. In 2002 the market recovered again and in 2003 the market capitalization reached a level 1.75 times higher than in 2001, and 35% higher compared to 2002.

When we express market capitalization as percentage of GDP (Graph V.4.), however, the growing trend virtually disappears. In 2002 the market capitalization reached 37.4% of GDP, which is a

similar level as in 1997 (39.9%). Year 2003 was then again strong, and the Czech capital market grew to 47.7% of GDP, its highest level in the examined period.

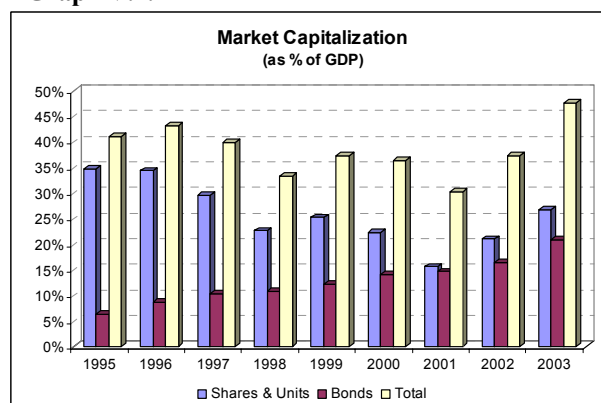
One important note should be made concerning the relative role of shares and bonds with respect to market capitalization. From both of the below graphs we can see that until 2001 bonds contributed to the total market capitalization of PSE by a permanently increasing portion. Whereas e.g. in 1996 the ratio of shares & units to bonds was about 80:20, in 2001 it became almost 50:50. Both the decreasing number of companies with listed shares as well as a growing interest of investors for debt instruments stand behind this trend.

Graph V.3.



Source: PSE, Czech Statistical Office

Graph V.4.



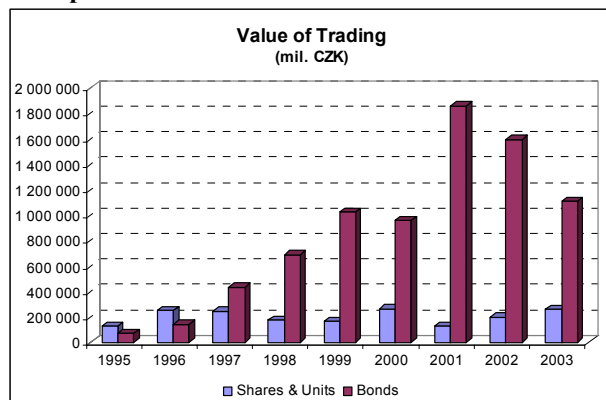
Source: PSE, Czech Statistical Office

Looking at the *value of trading*, (Graphs V.5. and V.6.) the difference between shares and bonds becomes even more pronounced. Already in the previous comparison of PSE it has been shown that while the value of trading for bonds is on a similar level as at developed markets, for shares the value of trading at the PSE is significantly lagging. Moreover, when we realize that most of the trading of shares happens only with several issues,⁹ it is clear that the equity market on the PSE is very illiquid and thus not very attractive for both investors and companies.

From 1995 the value of trading was visibly growing until its peak in 2001, when this trend stopped, and in the following two years the value of trading fell back almost to its levels in 1999 and 2000. As the value of trading of shares & units only seldom exceeded 10% of GDP, most of the changes in the value of trading at the PSE were caused by the changing interest in bonds.

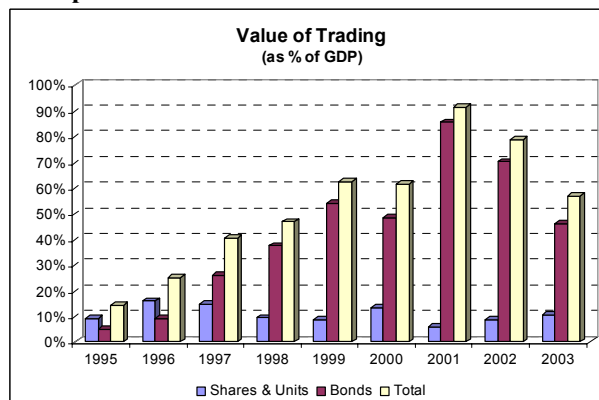
⁹ The six leading issues represent 97% of total equity trading.

Graph V.5.



Source: PSE, Czech Statistical Office

Graph V.6.



Source: PSE, Czech Statistical Office

Another interesting contribution to our discussion of the Czech capital market is the data on the development of the *number of issues* traded at PSE (Table V.7.). While the number of bond issues stayed more or less constant (especially for bond issues traded on the PSE's main market) since 1998, the situation with shares is quite different. The number of share issues is on a permanent decrease. Three main factors lie behind this. Firstly, it is the historical reasons - during the privatization a huge number of companies involuntarily appeared on the public market (the number of listed companies in 1995 and 1996 are a reminiscence of this). Secondly, it is the ever-stricter conditions and demands of both the legislator and the PSE on a security to be listed. And thirdly, this trend reflects the fact that Czech companies do not regard the capital market as a significant source of financing and leave it voluntarily. This way they avoid the disclosure obligations and thus also the control of the market.

Table V.7.

	Number of Issues (at year end)																	
	(S = shares, B = bonds)																	
	1995		1996		1997		1998		1999		2000		2001		2002		2003	
	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B
TOTAL	1716	48	1670	80	320	92	304	98	195	95	151	94	102	84	79	74	65	81
Main Market	62	20	44	26	45	33	10	33	8	30	5	30	5	28	5	20	5	27
Secondary Market	6	0	52	1	58	2	96	3	81	3	60	11	48	14	41	18	34	20
Free Market	1648	28	1574	53	217	57	198	62	106	62	86	53	49	42	33	36	26	34

Source: Czech Securities Commission

The last two Tables (V.8. and V.9.) present information on the number and volume of *new bond issues* and *new tranches of shares*. This data is of high importance and explanatory power, as it shows whether and how Czech companies use the capital market when they need to raise funds for their investments.

Once again the preference of bonds becomes evident. Although in 1999 and 2000 the number of new bond issues was lower than the number of new tranches of shares, the volume of funds raised through bond issues as compared to the volume raised through share issues was four times higher in 1999 and even seven times higher in 2000. In the consecutive two years the number of companies issuing new tranches of their shares further decreased. Although this might have been caused by global downturn of share prices and an overall skepticism in international capital markets, the favor for bonds is undisputable.

On the other hand, a closer look at Table V.9. reveals an interesting finding concerning new bond issues: it is not the corporations who would predominantly go to the capital markets to fund their investments but it is the government who is the biggest customer for money invested in bonds. Especially in the last years when the indebtedness of Czech government started to grow fast, government bonds represented a large portion of the newly issued bonds. The government thus pushes out funds that could have potentially been invested into the private sector.

Table V.8.

New Bond Issues and New Tranches of Shares				
	1999	2000	2001	2002
TOTAL	89	69	35	19
Shares	66	40	13	2
Bank Shares	4	4	0	0
Industrial Shares	30	8	4	1
Other Shares	32	28	9	1
Bonds	23	29	22	17
Government Bonds	4	11	15	8
Bank Bonds	6	6	0	2
Industrial Bonds	8	9	6	3
Communal Bonds	0	1	0	0
Mortgage Bonds	5	2	1	4

Source: Czech Securities Commission

Table V.9.

Volumes of New Bond Issues and New Share Tranches				
(mil. CZK)				
	1999	2000	2001	2002
TOTAL	91 141	105 974	97 662*	92 152
Shares	17 186	13 896	14 980	2
Bank Shares	7 622	11 009	0	0
Industrial Shares	7 553	1 103	1 954	2
Other Shares	2 011	1 784	13 026	0
Bonds	73 955	92 050	82 682*	92 150
Government Bonds	22 000	47 000	67 682	60 000
Bank Bonds	15 255	20 250	0	15 000
Industrial Bonds	25 300	17 700	8 000*	9 800
Communal Bonds	0	0	5 000	0
Mortgage Bonds	11 400	7 100	2 000	7 350

* + 21 mil. EUR

Source: Czech Securities Commission

With a complete discussion of the main factors of the Czech capital market, we shall now proceed to the analysis of the main alternative source of equity financing - the venture capital market.

V.2. Venture Capital

Even in well functioning market economies raising equity funds on the capital market is, as was already mentioned above, usually only worth for big and mature or middle-sized and fast growing companies. For those companies that are not mature enough to approach investors via the capital market, or for those who simply do not want to go public, there is the possibility to raise equity funds at the venture capital market.

The perception of venture capital is, nowadays, quite broad. It includes not only the often very risky investment in the initial stages of company development (seed and start-up capital), but also investment in more latter stages, as well as financing of management buy-outs and buy-ins, expansion capital or debt replacement capital. However, a common link of all types of venture capital financing is that investors invest directly into the equity of companies, which are generally not publicly traded. In this way he gains a significant share in the company, which he holds for a longer period of time and, together with the management of the company, strives for increasing its value.

Let us now examine the role of this type of equity capital in the Czech Republic. To do so, we will first compare the Czech venture capital market to other European markets. Similarly as above in the discussion of the capital markets, other non-European markets are excluded from the analysis, due to the different nature of their business environment.

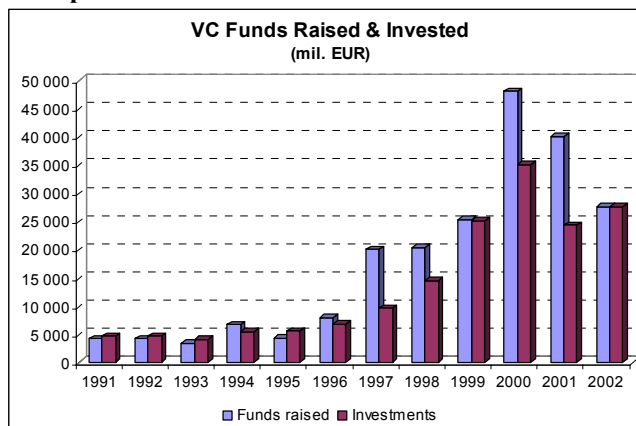
V.2.1. International Context

Before we start the comparisons, it might be interesting to see how the volumes of venture capital investments developed in the recent years. This is depicted in Graph V.7., which shows the volumes of funds raised as well as the volumes of funds invested in individual years.

From the graph it is clear that the role of venture capital did not start to grow significantly until the second half of the nineties. The peak was reached in 2000, when the volume of investment reached almost EUR 35 billion. In this year also the greatest volume of funds was raised. The decline in the two subsequent years, when the volume of investments reached about the 1999 level, can be explained by the overall recession of the European economy. Although the data for 2003 was not yet

available, one might expect that venture capital investment has probably returned to a growing trend as the economy recovered.

Graph V.7.



Source: European Private Equity & Venture Capital Association (EVCA)

We shall now step to the actual comparison of individual European countries. To increase the explanatory power of the data and to avoid distortions caused by year by year fluctuations, which can be quite substantial in this area, all of the analysis will be based on three year (2000-2002) averages.

First, the European countries will be compared along the absolute amounts and numbers of venture capital investments. In Table V.10. countries are ordered according to the amounts invested by the investors residing there. The numbers of investments carried out is also stated for each country. One can see that among the countries with most active venture capital investors (judging both by the amounts invested and number of investments) belong the United Kingdom, France and Germany, which is quite understandable regarding their size. These three countries together represent almost two thirds of the whole European venture capital market. It is obvious that the Czech Republic cannot compete with them in absolute terms.

Since the previous table presented the investments as by country of management, it does not necessarily mean that all of the capital coming investors residing in these countries was invested domestically. That's why Table V.11. shows the amounts of venture capital invested by the destination of investments. Although the order of countries stays almost the same, the share of the first three countries on the whole European venture capital market declines from 65% to 53%.

Table V.10.

Venture Capital Investments (country of management, mil. EUR)				
	Amount	%	Number	%
1. UK	10 164	35.1	2 178	19.2
2. France	4 814	16.6	2 233	19.7
3. Germany	3 903	13.5	2 348	20.7
4. Italy	2 593	8.9	479	4.2
5. Sweden	1 937	6.7	677	6.0
6. Netherlands	1 842	6.4	621	5.5
7. Spain	1 098	3.8	416	3.7
8. Belgium	445	1.5	385	3.4
9. Switzerland	394	1.4	175	1.5
10. Finland	366	1.3	448	3.9
11. Denmark	282	1.0	269	2.4
12. Norway	259	0.9	304	2.7
13. Ireland	158	0.5	197	1.7
14. Poland	157	0.5	91	0.8
15. Austria	152	0.5	178	1.6
16. Portugal	120	0.4	114	1.0
17. Greece	115	0.4	57	0.5
18. Hungary	70	0.2	39	0.3
19. Czech Republic	61	0.2	28	0.2
20. Iceland	56	0.2	87	0.8
21. Slovakia	4	0.0	14	0.1
EUROPE Total	28 988	100.0	11 336	100.0

Source: EVCA

Combining the amounts by country of management and by country of destination we can find out, whether a country is a net "exporter" or net "importer" of venture capital funds. This is reported in the last column of Table V.11. While the countries on the first places are generally (except for France) net exporters of venture capital, the situation turns as one progresses down the table. Noticeable is, however, the fact that most central European countries (including Czech Republic but excluding Slovakia) are net exporters of venture capital - one would expect exactly the opposite. A possible explanation could be that investors chose them as headquarters for their investment also to other eastern European countries. This hypothesis would, nevertheless, have to be verified.

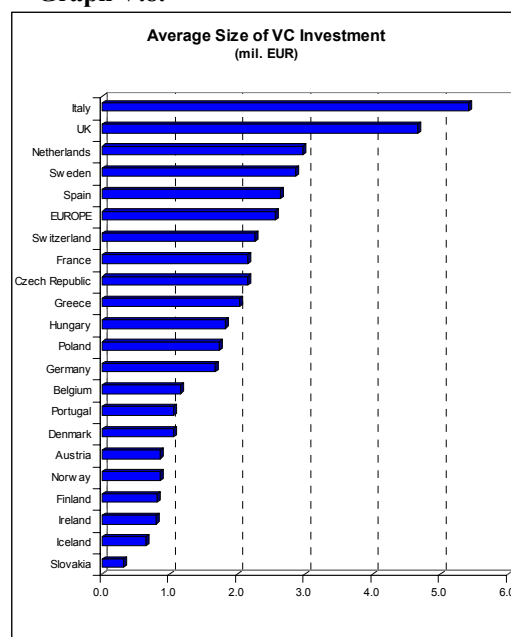
Table V.11.

Venture Capital Investments (country of destination, mil. EUR)			
	Amount	%	% of amount by c. of mgmt
1. UK	6 912	23.8	68.0
2. France	5 200	17.9	108.0
3. Germany	3 540	12.2	90.7
4. Italy	2 490	8.6	96.0
5. Sweden	1 401	4.8	72.3
6. Netherlands	1 378	4.8	74.8
7. Spain	1 122	3.9	102.2
8. Switzerland	538	1.9	136.7
9. Finland	518	1.8	141.7
10. Denmark	330	1.1	116.8
11. Norway	317	1.1	122.6
12. Belgium	302	1.0	67.9
13. Austria	252	0.9	165.6
14. Ireland	164	0.6	104.2
15. Portugal	163	0.6	135.6
16. Poland	121	0.4	77.2
17. Hungary	58	0.2	82.5
18. Czech Republic	50	0.2	82.5
19. Iceland	49	0.2	86.4
20. Slovakia	42	0.1	961.5
21. Greece	41	0.1	36.0
Unknown European	2 217	7.6	
Other European	189	0.7	
EUROPE Total	27 395	94.5	
Rest of World	1 593	5.5	
TOTAL	28 988	100.0	

Source: EVCA

Let us now proceed to the evaluation based on relative numbers. From the data in Tables V.10. and V.11., the average size of investment can be calculated. This is presented in Graph V.8. One can see that the average size of investment in the Czech Republic is below the European average, but in comparison with other European countries it is neither unusually high nor unusually low. It is, however, greater than in any other central European country.

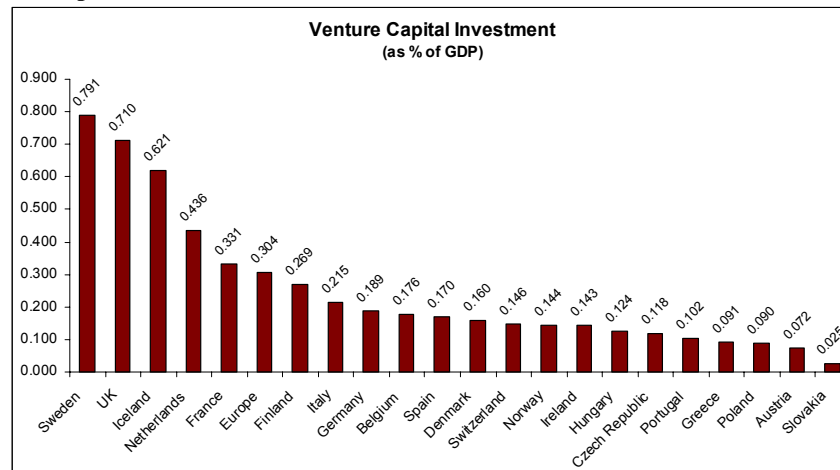
Graph V.8.



Source: EVCA, author's calculations

Finally, probably the most relevant way how to compare the size of the venture capital markets in European countries is presented. In Graph V.9. below, the amounts of venture capital invested in each country are express as a percentage of the country's GDP.

Graph V.9.



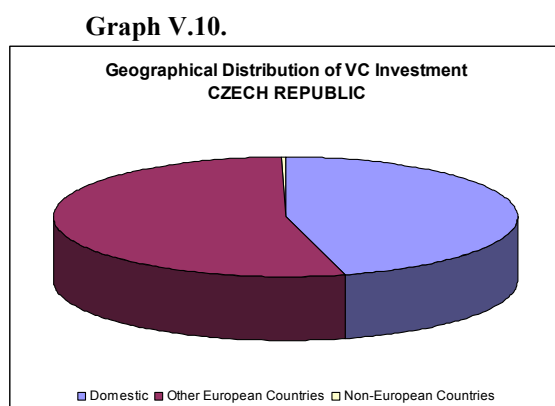
Source: EVCA

What one could anticipate from the absolute numbers in Tables V10. and V.11. is now confirmed in the above graph - namely that the Czech Republic belongs to countries, where venture capital investment plays a relatively small role. In the analyzed three year period these investments represented on average only about 0.118% of GDP. On the other hand, this was still more than e.g. in Portugal and Greece, and not much less than in Hungary, the central European country with the highest proportion of venture capital investments on GDP in the region. One can thus only guess, whether there would be room for more investments or whether this amount of funds already fully satisfied the demand. Whatever case is true, financing equity through venture capital seems to be less popular in the Czech Republic than in the majority of other developed western European countries.

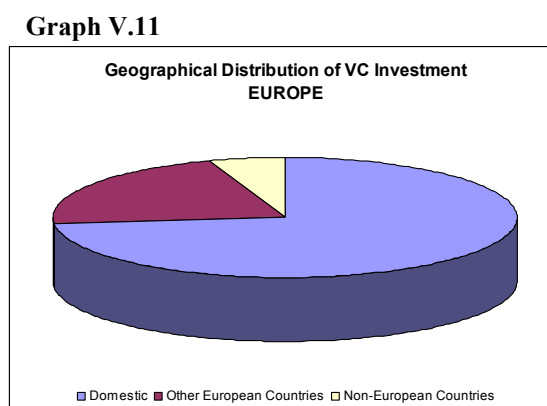
V.2.2. Venture Capital in the Czech Republic

Having set the Czech venture capital market into an international context, we can now focus more closely at some of its specific characteristics. These will then again be reflected with the European averages. Just like before, three year averages of years 2000-2002 will be used to minimize the bias caused by year by year fluctuations.

The first interesting point to be made is that out of the EUR 183 million of venture capital invested in the Czech Republic during the 2000-2002 period (out of that EUR 122 mil. were invested in 2000), only 46% were invested domestically (Graph V.10.). Compared to other European countries, where on average 73% of investments made "stay at home", this seems quite surprising. As was already mentioned, a possible explanation could be that venture capital investors choose Czech Republic as a country of management for other central and Eastern European countries. This hypothesis is, however, questionable, as also in the neighboring countries (e.g. Poland and Hungary) the amounts invested by country of destination exceed the amounts invested by country of management (see again Table V.11.).



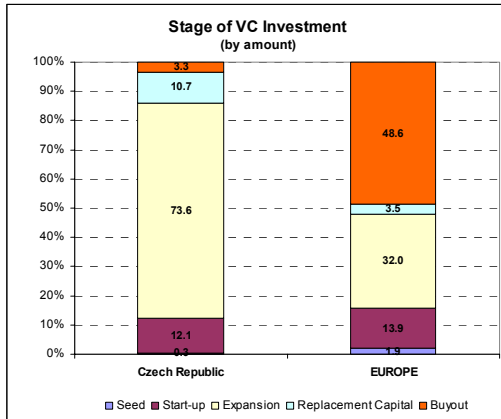
Source: EVCA



Source: EVCA

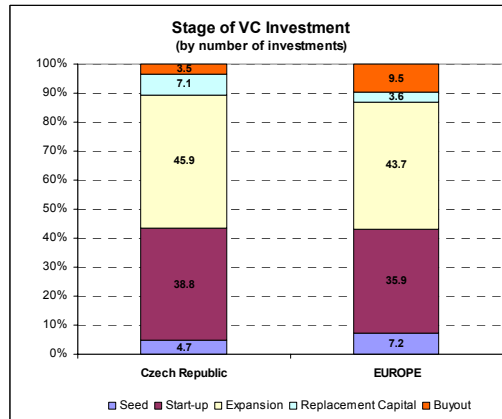
The second pair of graphs (V.12. and V.13) shows into which stage the funds were invested. Judging both by the amounts invested as well as by the number of investments, we can see that expansion capital was the most popular stage of investment. Out of the total 85 deals executed in the three years, 39 were spent on expansions (i.e. about 46%); this represented almost 74% of all funds. This was also the reason why seed capital (only 4 deals, all in 2001, 0.3% of capital) and buyouts (3 deals, 3% of capital) didn't receive as much attention as in Europe. The higher proportion of start-up capital, when judging by number of deals rather than by amount invested, is understandable due to the relatively smaller volume of these investments (39 deals represented only about 12% of all capital) and corresponds to the European trend.

Graph V.12.



Source: EVCA

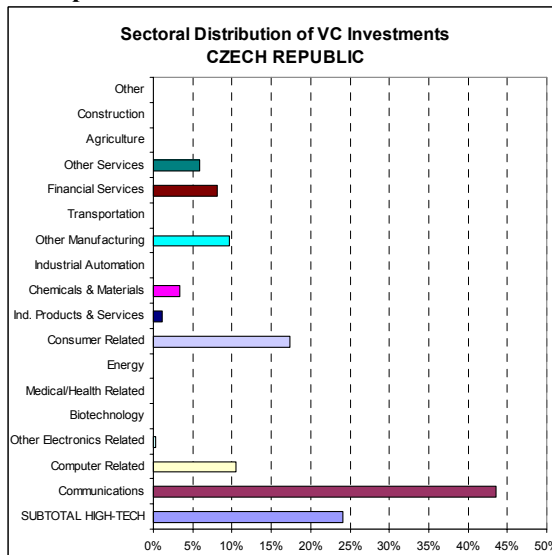
Graph V.13



Source: EVCA

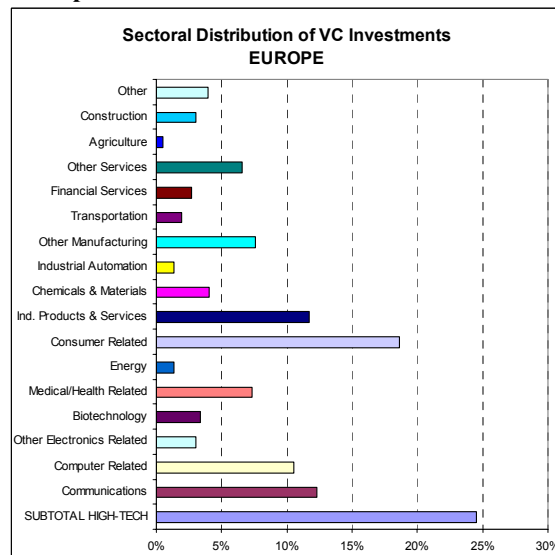
Let us now have a short look also at the sectoral distribution of venture capital investments in the Czech Republic and Europe (Graphs V.14. and V.15.). Although the investments in the Czech Republic were made into only several sectors, they more or less copied the sectoral distribution of investments in Europe. Most funds were invested into communications, consumer related and computer related business, i.e. sectors which are also the most popular in Europe. The proportion of investments into high-tech businesses was also almost the same as in Europe.

Graph V.14.



Source: EVCA

Graph V.15.

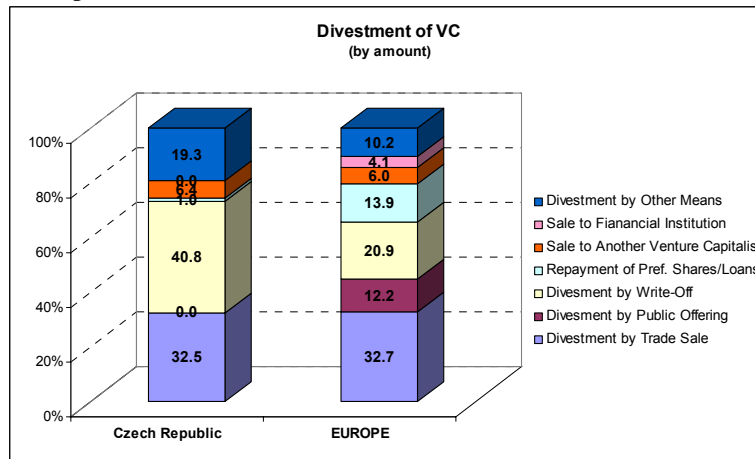


Source: EVCA

The last issue to be discussed, which is inevitably bound to every investment, is the possibility to sell it or to divest and realize the desired profit (or at least minimize the loss). Graph V.16. depicts the ways that divestments were carried out on average during the 2000-2002 period in the Czech Republic. Two things deserve our attention. The first one is the relatively higher divestment by

write-offs (41% as compared to 21% in Europe). The second is the missing divestment by public offerings, caused by the weak Czech capital markets (see also discussion in chapter V.1.). That was also the reason why divestment by trade sales were predominantly utilized as an exit route in the Czech Republic.

Graph V.16.



Source: EVCA

V.3. Conclusions

To conclude, the major findings will be recapitulated and contrasted with the theoretical predictions presented in the first half of the thesis. We shall point out the implications of the situation at the Czech capital and venture capital markets for the behavior of Czech companies with respect to their capital structures.

As it has been shown, the Czech capital market does not play a very important role as a source of financing for Czech companies. Not only is its market capitalization negligible compared to the developed economies, but the low value of trading at the Czech market also points at its low liquidity. The situation is especially poor in the case of opportunities for equity financing via the capital market. With value of equity trading at 9.9% of GDP (as compared to 44.3% for bonds), it is no wonder that there has not been any successful initial public offering in the modern history of the Czech capital market and that the volume of new tranches of share issues here is decreasing and substantially lagging behind new bond issues. Also the role and preferences of institutional investors indicate the poor capacity of the Czech capital market and the limited possibilities for Czech companies to raise equity capital there.

These findings can lead us to two assumptions concerning the capital structure and financing of Czech companies. Firstly, since the Czech capital market cannot offer many opportunities for financing, Czech companies will probably primarily look for funds elsewhere. We can thus expect that retention of earnings and bank loans will be crucial for companies to finance their growth - an expectation that is in line with the pecking order hypothesis. The inclination to debt financing can be also anticipated from the popularity of bonds at the Czech capital market. However, bond issues will become a potential financing source only when the government stops to overload the market with its own government bond issues.

The second assumption is based on the fact that institutional investors on capital markets serve as "watchdogs" of the financial condition of traded companies. Since the volumes of trading (especially for shares) are not very high, and since the number of share listings on the PSE is steadily decreasing (often because the companies do not want to disclose information about their activities), one can expect an extensive information asymmetry between the firm insiders and outsiders. The theory predicts two consequences of information asymmetry with respect to capital structure.

According to the signaling theory, we should assume that higher quality companies will, in such information asymmetric environment, have a strong motivation to signal their quality with a higher level of debt and higher level of insider ownership. Both of these signals should be positively correlated with company value. The second consequence of information asymmetry leads us again to the pecking order hypothesis. For the reasons described in chapter III.2. one should expect that Czech companies will rely principally on the possibilities of internal financing. Should they need to raise some additional (external) funds, they will prefer debt to equity.

Concerning the venture capital market, an important source of equity financing for companies that are not publicly traded, also this was found as not so significant as in other developed western European countries. With an average (over the 2000-2002 period) 0.118% share of venture capital investments on GDP, the Czech Republic belongs to countries where venture capital plays a relatively small role. On top of that, this negligible role is underlined by the fact that only 46% of the investments are domestic. On the other hand, the situation is not different, if not worse, also in other central European countries. One of the key reasons for modest venture capital investments in

the Czech Republic could be the difficult exit from them, due to the virtual impossibility to divest by a public offering.

Similarly as in the case of the capital market, the weakness of the venture capital market indicates that Czech companies do not have many chances to raise equity capital, should they need it for their investments. They can thus be expected to take precautionary steps and retain their earnings, as this is the easiest way to increase the share of equity in their capital structure. When they will need more substantial funds, they will probably have to look for them primarily in the debt market - a reasoning in line with the pecking order hypothesis.

VI. LEGAL CONSIDERATIONS

The legal considerations¹⁰ linked to capital structure of Czech joint-stock companies will be the next area of our interest. If a company wishes to change its capital structure, it can do so in several ways. Probably the easiest and fastest way how to change the ratio of debt to equity would be to either increase or decrease the level of debt. Issuing new or buying back outstanding bonds or taking an additional loan or negotiating an earlier redemption of the existing one are only some of the possibilities how to achieve that.

However, as the topic of this thesis is equity financing, our attention will be primarily directed to this part of the balance sheet. That is also the reason why we will further assume that a company is in a situation when it wants to alter its capital structure in favor of equity and, at the same time, cannot afford to reduce the level of its indebtedness. In other words that it is left only with the possibility to raise additional equity capital. This could happen for example to a company, which is already heavily leveraged and is looking for funds to finance its further growth.

If the internal resources are not sufficient, the only eventuality is an increase of registered capital. The legal considerations that need to be taken into account when doing so in the Czech Republic and their consequences for the motivation to equity financing are the very topic of the following paragraphs. The most attention is devoted to an increase of registered capital through subscription of new shares and to initial public offerings. Nevertheless, other ways of increasing registered capital as well as the Czech regulation of registered capital decrease are briefly mentioned. For the analysis to be complete, a discussion about debt issuance is included, too.

VI.1. Increasing Registered Capital

Under Czech law, a management's decision to increase the company's registered capital has to be approved by shareholders at a general meeting. Unless the company's articles of association state otherwise, such approval requires a 2/3 majority of votes of present shareholders. The quorum is set at 30%.

¹⁰ All of the analysis is performed on basis of legislation effective before May 2004.

To avoid this quite demanding and lengthy approval procedure (e.g. when a necessity of a repeated capital increase is expected), the Czech Commercial Code (CC) also allows the general meeting to authorize the board of directors to decide on the increase of a company's registered capital¹¹ by up to one-third of its amount. Such authorization may be conferred on the board of directors for a maximum of five years. Again a 2/3 majority is required and again the articles of association can stipulate this issue differently.

Let us now focus on the various ways how registered capital can be increased under Czech law. The Commercial Code recognizes an increase of registered capital through subscription of new shares, conditional increase of registered capital, increase of registered capital from own resources, and a combined increase of registered capital. The most attention will be devoted to the first and third case, as they are most relevant to our topic. Moreover, initial public offerings (IPOs), as a special case of subscription of new shares, will be discussed in a separate section.

1) Increasing registered capital through subscription of new shares

New shares can be subscribed either to a limited number of investors or via a public offer. Since the public offer will be discussed in connection with IPOs, for the purposes of this section we shall assume a private placement of the newly subscribed shares.

The Commercial Code requires in § 203 that all previously subscribed shares are paid up in full before the new share subscription.¹² Whereas this condition should not be a serious problem, the pre-emptive rights of existing shareholders could pose a significant obstacle to the speed and smooth execution of the subscription.

Pre-emptive rights. Under Czech law, any newly issued shares must be first offered to the existing shareholders, who have the right to subscribe a proportional portion of the new shares, and only if those shareholders do not exercise their pre-emptive rights within a certain period can the shares then be offered to third parties. Although the pre-emptive right can be conveyed separately, there is

¹¹ However, only through subscription of new shares or from own resources of the company (except for retained earnings).

¹² This condition doesn't apply if the registered capital is to be increased by a share subscription in which the issue price is to be paid only by nonmonetary contributions. As this is an exceptional case - CC § 204/3 states that nonmonetary contributions may only be used to subscribe for shares if it is in an important interest of the company - it will be left out from our discussion.

no functioning market for these rights. The management will thus most likely wish to avoid the obligation to make a first offer to existing shareholders in order to speed up the whole process.

As the pre-emption rights may not be suppressed or modified in the company's articles of association, there are only two other options. Firstly, the general meeting may suppress these rights in an "important interest" of the company (CC § 204a/5). It is clear that this is a very vague concept, which is open to challenge by any minority shareholder who did not vote in favor of the suppression. Due to the ineffectiveness of the Czech judicial system, any such lawsuit will freeze the process of registration in the Commercial Register (described below), thus effectively frustrating the subscription. The consequences of this are especially burdensome in case of an IPO.

The second option for removing the pre-emption right is their waiver by the shareholders in advance. However, if only some shareholders waive their pre-emptive right, the remaining ones would still be entitled to their portion of the new shares. This could thus again complicate the planning of the subscription and particularly of a public offer.

Minimum subscription price. In compliance with EU directives, the subscription price of the newly issued shares may not be below their nominal value (CC § 163a/1). Otherwise, the company must cover the difference from its own capital. As will be shown, this provision may be a problem mainly when the shares are offered in an IPO. Czech companies have, for historical reasons, always had high nominal values, and the quoted price at which the shares trade is often lower than their nominal value. Shares with a subscription price higher than the quoted price are obviously not an attractive investment.

A company could resolve the problem by reducing its registered capital and the nominal value of its shares. However, this is a very lengthy procedure that requires two corporate registrations and can be delayed, if not blocked, by the company's creditors requiring additional guarantees for their receivables. The Commercial Code, therefore, allows a concurrent decrease and increase of the registered capital (see below), in cases where the increase is made by an IPO.

Registration in the Commercial Register. The general meeting's resolution on the increase of registered capital needs to be entered into the Commercial Register - this is the duty of the board of directors who have to file a petition for entry of such decision within 30 days. The share subscription

may not commence prior to this entry, except when the shares are subscribed under the condition that such entry would become legally effective (CC § 203/4).

Although this might not seem as a difficulty at the first sight, one has to realize that the time needed for registration in the Commercial Register may be quite long - in the past it has often taken several months. Recent legislative reforms addressed this problem by requiring the courts administering the Commercial Register to take an initial action in a matter within 15 days after a filing, but this still does not mean that the court will actually make a final decision on registration in that 15-day period. Also, even though subscription of the new shares could begin before the general meeting decision is registered, it would have to be cancelled if the court then rejected the registration (e.g. for formal reasons).

Subscription and issuance of shares; second registration. As it was mentioned, subscription may begin at any time after the company files its decision on the issue of new shares with the court administering the Commercial Register. Theoretically, the subscribers do not need to pay up more than the amount of the subscription premium (defined as the difference between the issue price of the shares and their nominal value) plus 30 percent of the nominal value of the subscribed shares prior to the registration of the capital increase in the Commercial Register. However, the company cannot issue shares, only interim certificates, until the full amount of the subscription price is paid up.

The company may not issue the new shares until the capital increase is registered with the Commercial Register (the second registration within the capital increase process). The company may apply for such registration only after all the new shares have been subscribed and 30 percent of the nominal value plus the whole premium is paid up - again filing such application is an obligation of the board of directors.

Share voucher. The institute of a share voucher was introduced by a recent amendment of the Commercial Code. Before, an investor had to wait for the decision of the court on the registration of the capital increase, in order to be able to trade his subscribed shares (these can be issued only after the registration), which was obviously a serious obstacle. Nowadays, if the subscriber pays the subscription price in full and if the general meeting allows so, he can obtain a share voucher, which has the same form as the share for which it will be subsequently exchanged. The share voucher

makes it thus possible to transfer rights to shares before they are actually issued. Once the increase of registered capital is recorded in the Commercial Register, the owner of the voucher is entitled to exchange it for the newly issued shares of the company.

After the discussion of the major issues pertinent to increasing registered capital through subscription of new shares, the remaining methods and modalities will be mentioned now.

2) Conditional increase of registered capital

A general meeting's decision on a conditional increase of registered capital is related to an issue of convertible bonds or bonds with warrants attached. When such bonds are issued, it means that registered capital could increase in the future, therefore, concurrently with their issue a decision has to be made on a conditional increase of registered capital in the extent to which the rights of conversion or pre-emptive rights may be exercised.

The amount of conditional increase of registered capital may not exceed one half of the registered capital on the day when the general meeting passes its resolution on the issue of convertible bonds or bonds with warrants. Again this resolution has to be entered in the Commercial Register and the issue of such bonds may not begin until such entry is legally effective.

3) Increasing registered capital from own resources

In theory also called "stock dividend", increasing registered capital from own resources means that net income (or other own resources) is distributed in the form of new common stock. Under Czech law a stock dividend is not regarded as a dividend and is thus neither subject to dividend taxation nor is it restricted by provisions (CC § 178) on net income distribution. The Commercial Code regulates the increase of registered capital from own resources in § 208 and following.

Technically, the pay out of a stock dividend can be realized by: 1) free distribution of shares among shareholders in proportion to the nominal value of their shares; 2) raising the nominal value of existing shares; 3) redemption of part of the issue price.

Although the stock dividend is not regarded as a dividend according to Czech law, there are also some legislative restrictions on its pay out. These include:

- After the increase of registered capital from own resources, the following inequality has to hold: $E \geq RC + ORF$, where E stands for equity, RC for registered capital, and ORF for obligatory reserve fund.

- Reserve funds created for other purposes and equity capital intended for a particular purpose, which the company is not allowed to change, may not be used to increase the registered capital.

- Financial statements have to be audited without reservations and compiled on the basis of data established no later than on a day, which preceded the day of the general meeting's resolution on increasing the company's registered capital, by not more than six months.

4) Combined increase of registered capital

A combined increase means that part of the issue price of newly subscribed shares is covered from own resources of the company. This can be done only in two situations: (a) in case of a company with listed shares, whose price on the public market is below their nominal value; and, (b) if the new shares are subscribed by the company's employees. Excluding or restricting the shareholders' pre-emptive rights is forbidden in such case.

Moreover, prior to the entry of the increased amount of registered capital in the Commercial Register, each subscriber has to pay up no less than 50% of that part of the share issue price that will be borne by the subscriber (compared to 30% under normal circumstances).

Having analyzed the alternatives for increasing the relative role of equity (registered capital) in a company's capital structure, let us now shortly discuss a mirror situation and suppose that the management wishes to alter the financing side of the balance sheet in favor of debt. At the same time let's assume that no additional funds are needed for investment, i.e. that the debt-equity ratio cannot be increased by raising additional debt.

The usual, and probably also the simplest way to do so under such circumstances, would be a pay out of an extraordinary dividend to the shareholders. The payout of dividends is regulated by the Commercial Code primarily in § 178. However, in case the company either didn't meet the conditions stipulated by law for dividend pay out, or simply didn't wish to decrease equity in this way (e.g. for taxation reasons), it will need to decrease its registered capital to achieve this. This alternative is described below.

VI.2. Decreasing Registered Capital

Should a company decide to change its capital structure by reducing its registered capital, under Czech law it can do so either by reduction of the nominal value of shares (or interim certificates), by withdrawal of shares from the market by drawing, by withdrawal of shares from the market on the basis of a public offer, or by desistance from the issue of shares. The decrease of registered capital is decided upon by the general meeting, whose resolution has to be entered into the Commercial Register.¹³ Similarly as for the increase of registered capital, a 2/3 majority of votes of present shareholders (quorum 30%) is required.

Decreasing registered capital by reducing the nominal value of shares is a method preferred by the Commercial Code, as it may be carried out without being specified in the company's articles of association; other methods can only be applied if the articles of association so stipulate and the general meeting so decides.

Let us now shortly comment on each of the possibilities.

1) Reduction of the nominal value of shares/interim certificates. The nominal value is decreased pro rata for all shares, except when the purpose of reducing the registered capital is to waive the obligation to settle the unpaid portion of the issue price of shares.

2) Withdrawal of shares from the market by drawing lots. Shares may only be withdrawn from circulation by lot if the articles of association of the company permitted so at the time when such shares were subscribed. The minimum price that has to be paid for these shares is determined according to the rules stated in CC § 186a/4.

3) Withdrawal of shares from the market on the basis of a public offer. If shares are withdrawn from the market on the basis of a public offer, the general meeting's resolution may determine that the registered capital will be reduced either: (a) to the extent of the nominal value of the shares withdrawn from the market; or, (b) by a fixed amount. The way such public offer is carried out is described in CC § 183a and following.

¹³ Again this is the obligation of the board of directors who have to file a petition within 30 days after the resolution is passed.

4) *Desistance from the issue of shares.* This method of reducing registered capital can be used when subscribers are in default with the payment of the nominal value of their shares. Registered capital is then reduced to the extent in which the price was not paid up.

Protection of creditors. Since the decrease of registered capital could mean a significant impairment of the position of the company's creditors, the Commercial Code includes several provisions to protect them. The company's creditors have to be not only informed about such capital reduction, but are also entitled to require from the company to sufficiently secure their claims. If the company and its creditors fail to come to an agreement on securing the creditors' claims, a court will rule on this matter. Considering the speed of Czech court proceedings, this could be a serious obstacle in the capital reduction process.

Concurrent Decrease and Increase of Registered Capital

For the legal analysis of registered capital changes to be complete, the possibility of a concurrent decrease and increase of registered capital should be included at this stage. However, this possibility will be mentioned below in connection with initial public offerings.

VI.3. Initial Public Offerings

After a short digression to a way how to decrease equity, we will now return again to a situation when equity needs to be raised - this time through an initial public offering (IPO). Under an initial public offering one can, in a narrow sense, understand an offer of ordinary shares to the public made by a company, whose shares are not yet registered for public trading, with a view towards registering them for public trading and listing them on a Stock Exchange, or, in a broader sense, also an offer of a new tranche of shares made by a company, which is already listed on a stock exchange. On developed markets, an IPO belongs to key sources of equity financing. Therefore, attention is to be dedicated to this topic also with respect to the Czech environment.

In an IPO, newly issued shares should be offered to the public preferably directly without any waiting periods. However, the current legal environment in the Czech Republic presents considerable obstacles for IPOs, making the IPO process long and ineffective. That is also one of the reasons, why there hasn't been any successful IPO (in the narrow sense) carried out during the ten

year history of Czech capital markets. Below, the main issues related to the execution of an IPO in the Czech Republic will be described.

Pre-emptive rights. Concerning the pre-emptive rights of existing shareholders, all that has been said in connection with subscription of new shares (chapter VI.1.) applies also for an IPO. However, as the speed of the IPO process is one of the main factors of its success, the existence of pre-emptive rights is here a crucial factor. The fact that pre-emptive rights may not be suppressed or modified in the company's articles of association, and that the only possibility to avoid them is their suppression by the general meeting (while it is not clear if an IPO can be always regarded as an "important interest" of the company) or their waiver by the shareholders, complicates and slows down the IPO significantly.

Concurrent decrease and increase of registered capital. Reflecting the requirement that the subscription price must not be below the nominal value of the shares, a recent amendment has introduced a new procedure for a concurrent decrease and increase of registered capital, in case the increase is made by an IPO. Thanks to this, the time needed to (a) decrease the company's registered capital (and enter that in the Commercial Register) to match the shares' nominal and market values, and (b) increase the company's registered capital (and enter that in the Commercial Register) once the new shares are subscribed, is dramatically shortened. However, the registration procedure still remains a major obstacle.

Registration in the Commercial Register. As was already mentioned in chapter VI.1., one has to bear in mind that despite the courts administering the Commercial Register are obliged to take an initial action within 15 days after a filing, this does not mean that a final decision will be really made in this period, as there is no legal period set for courts to resolve filings. A company could still wait for a final decision for several months. Although the subscription of new shares could begin before the general meeting decision is registered, it would have to be cancelled if the registration were then rejected by the court.

Marketing of the issue. Preliminary marketing of the issue and finding the right price is another problematic area in the Czech regulation of IPOs. Since prior to any public offering, which is defined in § 78c of the Securities Act (SA)¹⁴ as "any action in which an offeror communicates to a

¹⁴ Since May 2004 public offerings are regulated in the Capital Market Act (no. 256/2004 Coll.).

wider circle of people the conditions for acquisition of securities, if their acceptance results in the conclusion of a contract leading to their acquisition, or if an offeror calls on the basis of these conditions for bids for the conclusion of such a contract", the company has to publish a full prospectus, it is very difficult to find the correct pricing and size of the issue. The Czech law does not know anything like a "preliminary prospectus", an institute to be found in Anglo-Saxon law.

There is, however, one possible way how to map the demand of potential investors - SA § 78d states that if the addressees of the offer are exclusively institutional investors, stockbrokers, or a limited circle of people not exceeding 100, such offer is not a public offer. This means that one can find out their interest even before a prospectus is published.

Approval of prospectus. The prospectus must be approved by the Czech Securities Commission (SEC) before it can be published. By law, the SEC has 30 days to approve a prospectus, but this period may be exceeded in practice if the SEC requires additional information from the issuer. Moreover, the stock exchange may not admit any security to trading until one day after the prospectus is published.

Subscription and issuance of shares. Second registration. As it was mentioned above, the subscription process may begin at any time after the company files its decision on the issue of new shares with the court administering the Commercial Register, however, it is advisable to wait until the decision is actually registered. After all the new shares have been subscribed, and at least 30 percent of their nominal value plus the whole issue premium is paid up, the company may apply for the registration of the capital increase in the Commercial Register (the second registration). Shares may not be issued until this capital increase is registered. Having in mind the speed of Czech courts, this is probably the greatest obstacle in the whole IPO process. Although the investor has a share voucher (if he paid up the whole subscription price), which he can sell, the trading on the stock exchange cannot begin before shares are actually issued. And while he is waiting, the conditions on the market can change dramatically.

Admission to stock exchange, commencement of trading. The last stage of the IPO process is the acceptance of the shares for trading on a public market. The condition to do so is that the price or estimated price multiplied by the number of shares issued is at least 1 000 000 Euros.¹⁵ This does

¹⁵ If the price cannot be estimated, this minimum applies to the issuer's equity.

not apply in case the company has already issued shares of the same class and these shares have been accepted in the public market, in which the application for the acceptance of shares for trading is being made. However, the stock exchange may grant a dispensation from this provision, if it finds that there will be a sufficient demand even for a smaller amount.

The fact that the time between a decision to realize an IPO and the moment, when this actually happens, can hardly be predicted, and would most probably exceed one year, is certainly discouraging enough for Czech companies. One cannot wonder, taking into account also the state of the Czech capital market discussed in the previous chapter, that Czech firms do not regard an IPO as a realistic alternative for financing.

VI.4. Raising Funds through Debt Instruments

Despite the primary focus of the thesis is on equity financing, we cannot ignore the other side of the coin - financing through debt. The following lines will thus shortly deal with the issues relevant to increasing or decreasing the level of indebtedness in the Czech legal environment. Our attention will aim at the two most important sources of debt financing: bank loans and corporate bonds.

Loans. Unlike in the case of registered capital increases or decreases, the decision whether to or not to take a loan is solely in the discretion power of the company's management, or to be exact, the board of directors, which is the statutory body in Czech joint-stock companies. Depending on the volume of funds that shall be lent, the negotiation of a loan contract can take from weeks to months.

In the last years, with the entrance of foreign banks to the Czech banking market, the environment in this sector became quite competitive. Especially in the biggest corporations segment, the competition pushed down the pricing of loans to a very low level. Often the banks lend money at extremely low interest rates, in order to keep the client and be able to cross sell other products to him, which shall compensate for such low pricing.¹⁶

At the same time, lending to companies, whose financial situation is not that sound, and where the credit conditions would require taking a certain degree of risk (and higher interest rates, of course),

¹⁶ This argumentation cannot, of course, be supported or documented by any verifiable data. However, the author draws his conclusions from his work experience in the banking sector, as well as from discussions with his colleagues and friends working in the field.

is still not very popular. Having in mind the problems with bad loans and several bank bankruptcies in the 90s, Czech banks still remain quite conservative and fear to issue "junk" debt. If they actually do so, they usually require adequate collateral, mostly in the form of a pledge.

On the other hand, there are two important reasons that justify such behavior and make it more understandable. The first and major one is, once again, the speed and effectiveness of Czech courts - this time in the case of bankruptcy proceedings. Should a debtor go bankrupt, the bank would either have to undergo a long and uncertain legal procedure or sell its claim at a significant discount. The second reason is the fact that even if the loan is collateralized, according to the Czech bankruptcy code the creditor receives only 70% of proceeds from the sale of the collateral. The remaining unsatisfied portion of the claim is treated in the same way as if it were not collateralized.

Bonds. Similarly as in the case of loans, should a company wish to issue bonds, this will have to be approved only by the board of directors. Nevertheless, there are two exceptions - convertible bonds and bonds with attached warrants (CC § 160). Since the issuance of these types of bonds is interlinked with a potential increase of registered capital, the general meeting has to approve a conditional increase of registered capital (see chapter VI.1.) prior to their issue.

The condition set by law for bond issues is that the total volume of any bond issue in the nominal value must not be lower than the equivalent of 200 000 Euros. A similar condition is set also as a prerequisite for registering the bond issue on a public market - however, here a minimum of 200 000 Euros is required for the true value of the issue.

From the point of view of legal requirements, issuing bonds as compared to shares is much less complicated and time consuming. Since no general meeting's approval, as well as no registration in the Commercial Register are required, the time needed for a bond issue is significantly shorter. The major obstacle will thus probably be, in case of publicly traded bonds, the time needed for the approval of a prospectus by the SEC and the saturation of the market by low-risk government bonds.

VI.5. Conclusions

From the above analysis it is clear that legal requirements could considerably influence a company's financing decision. Should a company need to raise funds, the Czech legal environment poses rather cumbersome obstacles to the option of financing through equity increases. In case the company wishes to increase its registered capital through the subscription of new shares, it has to face two major problematic areas.

Firstly it has to deal with the regulation of pre-emptive rights. These cannot be suppressed or modified in the company's articles of association. The vague concept of an "important interest" of a company, which can justify their suppression by the general meeting, can lead to a complaint of any minority shareholder and thus freeze the process of registration in the Commercial Register.

Secondly, there is the time needed for a registration in the Commercial Register. Differences in the speed of registration exist not only between different courts, but the time needed for registration can differ significantly also for the same court. As a consequence, the time required for the two necessary registrations during the registered capital increase is absolutely unforeseeable and can take also several months.

In the case of an IPO, these timing problems become even more relevant. In addition to that, there is the time needed for SEC to approve the prospectus. When we recall the capacity of the Czech capital market and realize that the legal procedure of getting a bank loan or issuing bonds is much simpler, one can expect that Czech companies will prefer debt financing to equity financing. Moreover, they will probably have a strong tendency to retain their earnings in order to keep a reasonable debt-to-equity ratio - a financing strategy compatible with the pecking order hypothesis.

However, the discussion of legal considerations in the Czech Republic can provide us also with some further conclusions and assumptions with respect to the capital structure of Czech companies. As it was mentioned above, there is a quite high competition among banks for the loans to biggest corporations. The motivation to keep the key customer and be able to cross sell other products to him leads to very low interests on loans to these "top" corporations. The smaller the size of the company, the smaller the motivation for such low pricing. Big corporations will, therefore, be tempted to raise funds by means of bank loans and have a tendency to be more highly leveraged. In

line with the theoretical predictions, size of the company thus should (apart from the arguments already presented in the theoretical part) be positively correlated with degree of leverage.

The fact that Czech banks very often require collateral for their loans, supports another hypothesis established by the trade-off theory and concerning the relationship between a company's leverage and the nature of its assets. The more tangible assets, which can serve as collateral, the higher the potential to issue secured debt and the higher the possibility to use leverage. Tangibility of assets and leverage can be expected to be positively correlated in the Czech Republic.

One should also not forget that the quality of courts, their speed and effectiveness, but also the predictability of their decisions, could influence the capital structure of Czech companies. On one hand, there are creditors who could be discouraged by the poor enforceability of law in the Czech Republic. In case a company fails to repay the debt, the enforcement of the claim might be a long and painful process (not to mention the shortcomings of bankruptcy proceedings in the Czech law). As collateral is not always the solution, it might be quite difficult to issue risky debt for not yet established companies. On the other hand, however, the position of a shareholder is not much better. Although the corporate governance legislation is nowadays more or less consistent with other western European countries, agency costs are still extensive, especially due to the speed and quality of the judicial system. Summing up, it is not clear whether the low enforceability of law points at higher or lower leverage expectations, but one should keep it in mind in order to fully understand the motives of investors investing in the Czech Republic.

Preface to the Empirical Analysis

After the discussion of the environment and conditions for equity financing in the Czech Republic and their potential influence on the choice of capital structure of Czech companies, we can now proceed to the actual empirical analysis of their financial statements. The main focus will be devoted to the investigation of selected capital structure determinants and their impact on the degree of leverage. In addition to that, a sector-based analysis of capital structure will be performed, in order to find out whether sectors differ among each other significantly with respect to their leverage, and what are the determinants of leverage on a sector level. The results of the empirical analysis will then be reflected with the theoretical predictions presented in the first part of the thesis.

Before we start, a note should be made on the previous empirical research undertaken in this area. Whereas the international literature is quite rich - from the more recent one we can name e.g. Frank and Goyal (2003) analyzing data of U.S. firms, Rajan and Zingales (1995) or Wald (1999) studying data for G7 countries, or Booth et al. (2001) and Huang and Song (2002) dealing with data from developing countries¹⁷ - there has been only little research done on data from the Czech Republic. Although there were published some studies analyzing the financial statements and ways of financing of Czech companies, such as the analyses of the Ministry of Industry and Trade or the studies of Neumaierová and Neumaier (1996), and Buchtíková (1997), none of them dealt in more depth with the empirical testing of capital structure theories. As far as the author, is aware the only published research on this topic that includes also data from the Czech Republic, was carried out by Bauer and Bubák (2003) and Bauer (2003).

The aim of the following chapters is thus to contribute to these and some of the forthcoming studies in this field. Compared to the above-mentioned studies, the database used in our analysis does not restrict itself to publicly traded companies. While on one hand this gives our conclusions greater robustness, on the other hand it does not allow us to work with market values and thus perform certain types of relevant analyses. Despite that, some interesting conclusions have been gathered. Let us now proceed to the first part of our analysis which deals with the differences of leverage among various sectors.

¹⁷ A summary of empirical studies is included e.g. in Harris and Raviv (1991).

VII. SECTOR ANALYSIS

VII.1. Data and Data Cleaning

The data used in the following analysis were kindly provided by the Czech Capital Information Agency (CEKIA) and come from its "Top 2000" database. This database contains information on approximately two thousand (hence its name) most important Czech companies and includes, apart from others, an indication about the company's field of business and its financial statements based on Czech accounting standards. The author was provided with a four year series of data ranging from year 1999 to year 2002.

The original set of data contained 5835 entries, where under one entry is understood information on one company in one year. Out of that, 3816 entries (i.e. more than 65%) were for joint-stock companies, which are of primary interest in this thesis. Nevertheless, the analysis is performed also on the full sample including also other than joint-stock companies, in order to be able to see whether there appears any significant difference when non-joint-stock companies are included.

Not all companies have entries for all four years, meaning that the number of entries for each year varies. While in the first two years the number of observations was above 1650, in 2001 it was less than 1500 and for 2002 there are only around 1000 entries. A similar decreasing trend can be observed in the case of entries on joint-stock companies only.

For the purpose of the sector analysis, the entries were divided according to the company's field of business¹⁸ into 24 different groups (sectors). Subsequently, the companies that didn't fit into any particular sector, as well as companies whose field of business was a financial one, were excluded. This left us with 5529 entries, out of which 3554 were for joint-stock companies. The numbers in brackets in Table VII.1. depict the structure of the data set before the "data cleaning" procedure.

¹⁸ It follows the Czech sectoral classification (the so called "OKEC"). The letters used to denote the sectors further in this chapter also correspond to the OKEC notation.

Table VII.1.

Overview of the Analyzed Data (before and after data cleaning)*												
Sector	1999-2002		1999		2000		2001		2002		ALL	J-S
	ALL	J-S	ALL	J-S	ALL	J-S	ALL	J-S	ALL	J-S		
A,B Agriculture & fishery	146 (157)	121 (129)	45 (48)	38 (40)	42 (45)	35 (37)	32 (36)	26 (29)	27 (28)	22 (23)		
C Mining of raw materials	87 (91)	63 (66)	22 (24)	16 (17)	23 (24)	16 (17)	23 (23)	17 (17)	19 (20)	14 (15)		
DA Food and tobacco	491 (530)	373 (398)	148 (159)	112 (119)	143 (155)	109 (116)	120 (129)	92 (98)	80 (87)	60 (65)		
DB Textile, clothing & leather	204 (214)	155 (163)	57 (61)	43 (46)	58 (63)	41 (45)	52 (52)	41 (41)	37 (38)	30 (31)		
DD Wood working	54 (60)	23 (28)	17 (18)	8 (9)	18 (21)	8 (10)	12 (13)	4 (5)	7 (8)	3 (4)		
DE Paper and printing	153 (162)	88 (93)	40 (44)	24 (26)	43 (45)	26 (27)	39 (42)	22 (24)	31 (31)	16 (16)		
DF Coal & crude oil treatment ...	19 (21)	17 (17)	6 (6)	5 (5)	5 (5)	4 (4)	4 (5)	4 (4)	4 (5)	4 (4)		
DG Chemical and pharmaceutical	163 (171)	112 (118)	46 (47)	32 (33)	46 (49)	31 (33)	39 (42)	27 (29)	32 (33)	22 (23)		
DH Rubber and plastic	103 (113)	49 (49)	29 (33)	15 (15)	29 (32)	14 (14)	26 (29)	11 (11)	19 (19)	9 (9)		
DI Glass, ceramics, building mat.	221 (230)	126 (133)	59 (62)	34 (36)	61 (63)	35 (37)	58 (61)	31 (33)	43 (44)	26 (27)		
DJ Metal production & m. industry	331 (348)	200 (208)	93 (97)	57 (59)	95 (102)	55 (58)	86 (91)	50 (52)	57 (58)	38 (39)		
DK Prod. of machines & equipment	287 (306)	195 (212)	81 (88)	54 (60)	82 (88)	55 (61)	70 (73)	47 (50)	54 (57)	39 (41)		
DL Prod. of electric & optic equip.	255 (270)	126 (128)	69 (74)	37 (37)	75 (81)	37 (38)	67 (69)	31 (31)	44 (46)	21 (22)		
DM Prod. of means of transport	169 (186)	94 (108)	43 (49)	23 (28)	47 (51)	27 (30)	46 (48)	25 (27)	33 (38)	19 (23)		
DN Furniture & secondary materials	120 (125)	70 (75)	34 (35)	19 (20)	34 (35)	19 (20)	28 (30)	17 (19)	24 (25)	15 (16)		
E Utilities	340 (360)	288 (298)	91 (98)	77 (80)	94 (100)	78 (81)	83 (87)	70 (72)	72 (75)	63 (65)		
F Building industry	316 (332)	176 (190)	88 (93)	47 (52)	89 (93)	49 (53)	81 (84)	44 (47)	58 (62)	36 (38)		
G Trade & rep. of vehicles & CG	872 (948)	460 (520)	245 (271)	126 (145)	252 (275)	130 (147)	232 (249)	122 (138)	143 (153)	82 (90)		
H Accommodation & restaurants	52 (61)	34 (41)	14 (18)	9 (13)	14 (16)	10 (12)	14 (16)	9 (10)	10 (11)	6 (6)		
I Transp., warehousing, telecoms	237 (253)	161 (167)	69 (71)	46 (47)	65 (72)	45 (49)	59 (64)	41 (41)	44 (46)	29 (30)		
K Real-estate, and renting	515 (539)	370 (387)	138 (148)	94 (101)	156 (164)	108 (113)	134 (138)	98 (102)	87 (89)	70 (71)		
N Health services	51 (52)	26 (26)	15 (15)	7 (7)	13 (14)	7 (7)	12 (12)	6 (6)	11 (11)	6 (6)		
TOTAL	5186 (5529)	3327 (3554)	1449 (1559)	923 (995)	1484 (1593)	939 (1009)	1317 (1393)	835 (886)	936 (984)	630 (664)		

* Numbers in brackets represent values before the data cleaning. J-S stands for joint-stock companies. For the full names of individual sectors please refer to Appendix 1.

Data cleaning. Before we step to the comparison and analysis of results for individual sectors, we have to clean the data from extreme observations, which could otherwise substantially distort our conclusions. Since the major criterion of comparison will be the degree of leverage in various sectors, the cleaning procedure was performed along the ratio of total assets minus equity over total assets, i.e. (TA-E)/TA (further to be referred to as "debt-to-assets ratio").¹⁹ In order to arrive to sensible values, the data cleaning procedure was done separately for each sector and consisted in two steps.

Firstly, the Dixon test was applied in order to get rid of entries with extreme debt-to-assets ratios. Although one could assume a normal distribution of the observations, the nonparametric Dixon test was preferred to the parametric Grubsson test, not only for its greater simplicity but also because it delivered better results. The Dixon test presumes that the observations are in an ascending order, i.e. that $x_1 \leq x_2 \leq \dots \leq x_n$, where x_n is the debt-to-assets ratio of the n 's entry (company in a particular year). Subsequently, the tested values Q_n , or Q_1 are computed as

$$Q_n = \frac{x_n - x_{n-1}}{x_n - x_1} \text{ and } Q_1 = \frac{x_2 - x_1}{x_n - x_1},$$

if we expect the greatest observation x_n , or the smallest observation x_1 , to be extremely distant from the rest of the population. If $Q_n > Q_{n,\alpha}$ or $Q_1 > Q_{n,\alpha}$, where $Q_{n,\alpha}$ is the critical value of the Dixon test

¹⁹ For a commentary on the choice of this leverage ratio see chapter VII.2.

for a given level of significance α , and n is the number of observations, we reject the hypothesis and exclude the tested observation from the population. The level of significance was in our case selected at 5%. The whole testing process is repeated until the population doesn't contain any extreme observations.

Since the Dixon test helps us only with those observations that are alone and are far enough from the next observation (i.e. it doesn't work well for groups of extreme observations), after this primary cleaning process a second step was performed. It consisted in excluding those observations that were outside the region characterized as $\bar{x} \pm 2s$, where \bar{x} is the average and s the standard deviation of the observations in a particular sector. Let us now look at how the data set changed after the data cleaning process.

In order to better see the changes in individual groups, years and sectors, which are summarized in Table VII.1., another Table (VII.2.) presents the percentages of observations that were excluded in the data cleaning process. We can see that for the majority of aggregated groups, i.e. the total values for ALL (all companies) and J-S (joint-stock companies only) in individual years, the percentage of excluded observations was about the same in each case and ranged between 5% and 7%. From this point of view, the distortion should be minimal.

Table VII.2.

Sector	Percentage of Observations Excluded*									
	1999-2002		1999		2000		2001		2002	
	ALL	J-S	ALL	J-S	ALL	J-S	ALL	J-S	ALL	J-S
A,B Agriculture & fishery	7.0	6.2	6.3	5.0	6.7	5.4	11.1	10.3	3.6	4.3
C Mining of raw materials	4.4	4.5	8.3	5.9	4.2	5.9	0.0	0.0	5.0	6.7
DA Food and tobacco	7.4	6.3	6.9	5.9	7.7	6.0	7.0	6.1	8.0	7.7
DB Textile, clothing & leather	4.7	4.9	6.6	6.5	7.9	8.9	0.0	0.0	2.6	3.2
DD Wood working	10.0	17.9	5.6	11.1	14.3	20.0	7.7	20.0	12.5	25.0
DE Paper and printing	5.6	5.4	9.1	7.7	4.4	3.7	7.1	8.3	0.0	0.0
DF Coal & crude oil treatment ...	9.5	0.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	0.0
DG Chemical and pharmaceutical	4.7	5.1	2.1	3.0	6.1	6.1	7.1	6.9	3.0	4.3
DH Rubber and plastic	8.8	0.0	12.1	0.0	9.4	0.0	10.3	0.0	0.0	0.0
DI Glass, ceramics, building mat.	3.9	5.3	4.8	5.6	3.2	5.4	4.9	6.1	2.3	3.7
DJ Metal production & m. industry	4.9	3.8	4.1	3.4	6.9	5.2	5.5	3.8	1.7	2.6
DK Prod. of machines & equipment	6.2	8.0	8.0	10.0	6.8	9.8	4.1	6.0	5.3	4.9
DL Prod. of electric & optic equip.	5.6	1.6	6.8	0.0	7.4	2.6	2.9	0.0	4.3	4.5
DM Prod. of means of transport	9.1	13.0	12.2	17.9	7.8	10.0	4.2	7.4	13.2	17.4
DN Furniture & secondary materials	4.0	6.7	2.9	5.0	2.9	5.0	6.7	10.5	4.0	6.3
E Utilities	5.6	3.4	7.1	3.8	6.0	3.7	4.6	2.8	4.0	3.1
F Building industry	4.8	7.4	5.4	9.6	4.3	7.5	3.6	6.4	6.5	5.3
G Trade & rep. of vehicles & CG	8.0	11.5	9.6	13.1	8.4	11.6	6.8	11.6	6.5	8.9
H Accommodation & restaurants	14.8	17.1	22.2	30.8	12.5	16.7	12.5	10.0	9.1	0.0
I Transp., warehousing, telecoms	6.3	3.6	2.8	2.1	9.7	8.2	7.8	0.0	4.3	3.3
K Real-estate, and renting	4.5	4.4	6.8	6.9	4.9	4.4	2.9	3.9	2.2	1.4
N Health services	1.9	0.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0
TOTAL	6.2	6.4	7.1	7.2	6.8	6.9	5.5	5.8	4.9	5.1

* For the full names of individual sectors please refer to Appendix 1.

Also in individual sectors, the percentages of excluded observations were quite similar and usually didn't exceed 10%. Nevertheless, there were some exceptions that deserve more attention. The highest number of excluded observations was in sectors DD (Wood working industry), DM (Production of means of transport), G (Trade and repair of motor vehicles and consumer goods) and H (Accommodation and restaurants).²⁰ Whereas for the first and last mentioned cases (DD and H) this is caused foremost by the relatively small number of observations in these sectors, in the case of the other two the number of excluded observations was quite high and might possibly distort our further analysis. Moreover, it could point at a great volatility of leverage of companies in these two sectors.

One should also not neglect the fact, that in sectors DF (Coal and crude oil treatment, nuclear fuels and radioactive elements production) and DH (Rubber and plastic industry) only non-joint stock companies were excluded, while for DF this happened only in the years 2001 and 2002. Again, this could possibly lead to a distortion of our conclusions. Having in mind the mentioned potential sources of discrepancies, we can now move to the actual analysis of the data set.

VII.2. Comparing Sector Leverage

After the data cleaning process we are left with 5186 entries, out of which 3327 entries are for joint-stock companies only. Concerning the distribution of entries among years, the number of entries decreases quite significantly in 2001 and especially in 2002. This fact, as well as the rather low number of entries for some sectors in individual years (e.g. for DD - Wood working industry, or N - Health services) were one of the reasons, why the entries were pooled and examined over the whole four year period and not on a year-by-year basis. The main reason, however, was the assumption that there is a typical level of leverage of a particular sector, which should not change dramatically over such a short period of time.

Looking at the number of entries for individual sectors, the relatively small number of entries in several sectors has to be pointed out (please see again Table VII.1.). In sectors DD (Wood working), H (Accommodation & restaurants), and N (Health services) the number of entries is only around 50, in sector DF (Coal & crude oil treatment) it is only 19. When we limit ourselves to joint-stock companies only, the number of entries in these sectors then of course further decreases, and another

²⁰ For the full names of individual sectors please see Appendix 1.

sector (DH - Rubber and plastic) will have less than 50 entries. Despite this, the mentioned sectors won't be omitted from the subsequent analysis, in order to keep the comparisons complete. When discussing the results one should, nevertheless, keep in mind that the low number of entries is probably the greatest potential source of distortions.

As it was already mentioned, sectors will be compared principally along the debt-to-assets ratio, defined as:

$$\text{debt-to-assets ratio} = \frac{(TA - E)}{TA}, \text{ where } TA \text{ stands for total assets and } E \text{ for total equity.}$$

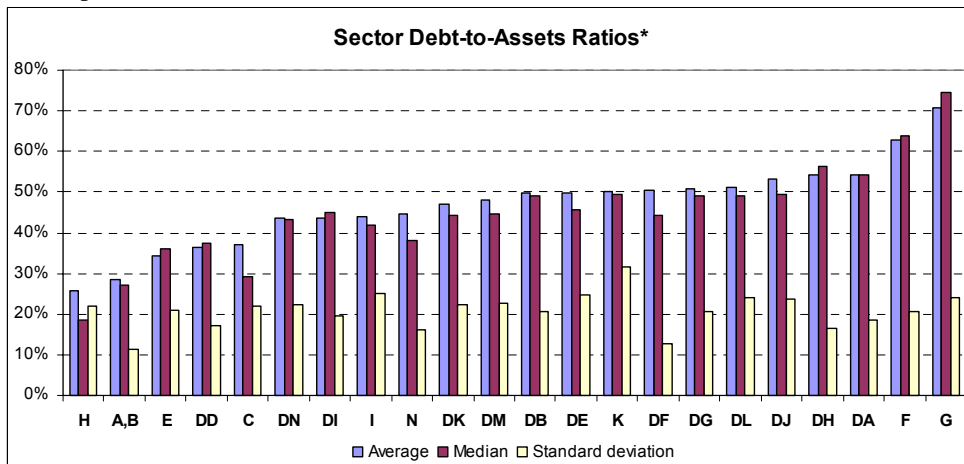
Since the thesis is primarily oriented on equity financing, it seems logical to choose a ratio that indicates what is left to shareholders after all debtors are satisfied. To control for the long-term capital structure of the companies in a particular sector, the comparison then also focuses on the long-term-debt-to-assets ratio, which is defined as:

$$\text{LT-debt-to-assets ratio} = \frac{LTL}{TA}, \text{ where } TA \text{ means total assets and } LTL \text{ long-term liabilities,}$$

which are the sum of long-term bank loans and long-term payables.

Let us now see what the results are for joint-stock companies. Since the number of sectors is relatively small, it would not be very sensible to apply statistical evaluation of the results and we shall limit ourselves to qualitative interpretation only. In Graph VII.1. (the exact numbers that were used for this graph are in Appendix 2) the sectors are arranged according to their average *debt-to-assets ratios* in an ascending order.

Graph VII.1.



* Please refer to Appendix 1 (or e.g. Table VII.2.) to find out which sector the letters represent.

One can notice that this criterion divides the sectors in about four groups. In the first, low-leverage group, there is A&B (Agriculture & fishery) and H (Accommodation & restaurants). The second group includes E (Utilities), DD (Wood working) and C (Mining of raw materials) and could be classified as sectors with below-average leverage. As the mentioned sectors (except for H) are mostly mature ones with relatively low growth opportunities, the low leverage of these groups would be in line with the signaling theory, however, in contradiction to the trade-off and pecking order theories predicting an opposite relationship.

The third and biggest group includes the majority of sectors, in which the average debt-to-assets ratio lies around the 50% level. A more specific leverage can be then again observed for the two sectors in the fourth group - F (Building industry) and G (Trade and reparation of vehicles and consumer goods) - whose leverage is significantly greater than average. The explanation of the high debt-to-assets ratios in these sectors lies in the nature of the businesses, which are in both cases based to a great extent on purchases on credit. The values in Graph VII.2. support this hypothesis, as it becomes clear that the debt in these sectors is predominantly short-term.

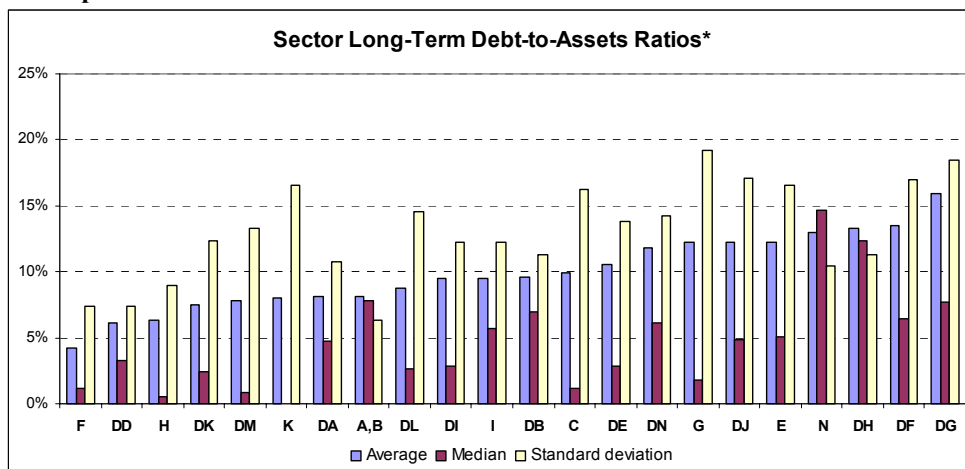
The conclusions drawn from the analysis of average debt-to-assets ratios should be, however, contrasted with the median values of these ratios. For most of the sectors, the median values of leverage are smaller than the average values, pointing at an upward distortion by highly indebted companies in individual sectors. The relative order of the sectors stays, nevertheless, more or less the same, allowing us to stick to the former division into four groups. The only and major adjustment would regard sector C (Mining of raw materials), which would probably be moved further down to the low-leverage group, and sector N (Health services) that could be moved to the group with below-average leverage. In the first case, the argumentation of the low leverage might be again based on the signaling theory and its prediction of low levels of debt in companies/sectors with unsound growth opportunities. In the second case the theoretical justification is unclear.

The last interesting aspect to examine is the standard deviation of the debt-to-assets ratios in individual sectors. Unfortunately, for the majority of sectors the standard deviation is about the same and oscillates around 21%, making it thus difficult to differentiate among sectors along this criterion. The relatively low volatility of debt-to-assets ratios in the A&B (Agriculture & fishery) sector with standard deviation of 11.4% points at the different nature of the business in this sector,

as well as the homogeneity and similar strategy of agricultural companies with respect to leverage. The high standard deviation of 31.5% for sector K (Real-estate and renting) could be, on the other hand, caused by the variety of activities included in this sector.

Noteworthy are, however, also the results obtained from the analysis of the *long-term indebtedness* of Czech companies. These are presented in the following Graph VII.2. (the exact numbers used for this graph can be found again in Appendix 2).

Graph VII.2.



* Please refer to Appendix 1 (or e.g. Table VII.2.) to find out which sector the letters represent.

The first and most striking observation, which can be made from the comparison with the previous Graph VII.1., is that the role of long-term debt in the capital structure of Czech companies is relatively minor. With the proportion of long-term to total debt being about five to one in most of the sectors, it can be deduced, that there necessarily has to be quite a strong inconsistency in the time structure of assets and liabilities. It would be probably absurd to look for causes of this sub-optimal behavior on the side of financial officers. The reason for this lies much more likely on the side of Czech banks, which are not willing to undergo the risks of long-term lending and prefer cyclical loans with short maturities.

The fact that the role of long-term debt is inferior then also explains, why the correlation of average total leverage $[(TA-E)/TA]$ and average long-term leverage $[(LTL)/TA]$, as well as the correlation of median total leverage and median long-term leverage, is almost zero. The above division into four groups according to total leverage is thus very much inconsistent with the results received in case of long-term leverage. Due to the questionable explanatory power of long-term indebtedness and due to the only negligible (for most cases) differences in long-term indebtedness among sectors, it would

thus be probably useless to try to interpret the results for the LT-debt-to-assets ratios or to try to re-group our sectors.

The last issue that should be shortly discussed is the difference of results obtained for *joint-stock* companies *vis-à-vis* the results for *all companies* altogether. To make this more obvious, Table VII.3. summarizes the difference that one gets after subtracting the values for joint-stock companies from the values for all companies.

Table VII.3.

Comparison of Joint-Stock vs. All Companies (differences between J-S and ALL)*							
Sector	% of J-S on ALL	debt-to-assets			LT debt-to-assets		
		AVG	MED	SD	AVG	MED	SD
A,B Agriculture & fishery	82.9	-0.8	-1.0	1.1	0.3	-0.4	1.4
C Mining of raw materials	72.4	-0.3	2.6	1.2	-0.7	0.1	-1.7
DA Food and tobacco	76.0	0.7	0.9	0.9	0.9	0.2	1.6
DB Textile, clothing & leather	76.0	0.5	0.1	0.4	1.4	0.6	0.8
DD Wood working	42.6	13.1	13.6	4.2	8.0	8.0	7.7
DE Paper and printing	57.5	0.0	2.9	0.0	0.2	2.4	-0.3
DF Coal & crude oil treatment ...	89.5	3.9	1.3	3.9	0.0	0.3	-1.0
DG Chemical and pharmaceutical	68.7	-1.3	-0.8	2.5	-3.0	-3.9	-1.4
DH Rubber and plastic	47.6	-2.3	-4.0	0.2	-2.6	-4.9	0.1
DI Glass, ceramics, building mat.	57.0	-0.5	-0.6	0.5	1.3	0.8	2.7
DJ Metal production & m. industry	60.4	1.1	2.4	0.0	0.0	0.7	-0.6
DK Prod. of machines & equipment	67.9	3.2	3.5	0.7	0.2	-0.1	-0.1
DL Prod. of electric & optic equip.	49.4	6.5	8.2	0.4	2.8	0.3	4.0
DM Prod. of means of transport	55.6	7.3	10.3	1.7	0.8	-0.1	1.6
DN Furniture & secondary materials	58.3	4.4	4.5	0.2	-0.5	-1.3	-0.2
E Utilities	84.7	-1.2	-2.2	0.7	-0.7	-0.3	0.1
F Building industry	55.7	2.7	3.5	-0.6	0.1	-0.1	0.9
G Trade & rep. of vehicles & CG	52.8	1.7	2.3	-0.7	-2.0	-1.4	-1.2
H Accommodation & restaurants	65.4	0.9	0.2	-1.4	0.7	0.1	1.3
I Transp., warehousing, telecoms	67.9	1.2	0.5	2.9	-1.1	-2.6	0.1
K Real-estate, and renting	71.8	3.2	4.0	0.5	0.5	0.0	0.5
N Health services	51.0	1.5	5.5	0.7	4.3	0.7	5.7

* The results were obtained by subtracting the respective values for joint-stock companies from the values for all companies. AVG = average, MED = median, SD = standard deviation. For the full names of individual sectors please refer to Appendix 1.

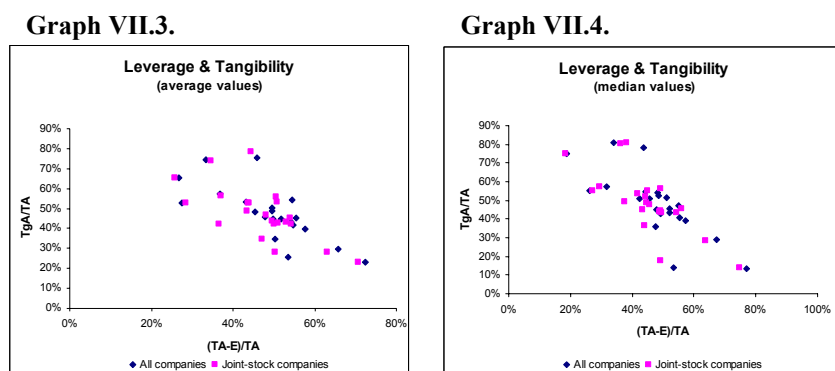
Although it might be more appropriate to explore the differences between joint-stock and non-joint-stock companies, we shall limit ourselves to the above approach, as the key purpose of this chapter is to find typical levels of leverage for sectors and not to explore differences among various legal types of companies. The aim is to verify, if limiting the analysis only to joint-stock companies doesn't significantly modify the results obtained for individual sectors. The overall conclusion to be drawn from Table VII.3. is that there is only negligible alteration of results when non-joint-stock companies are added into the analysis, with the only exceptions worth attention being sector DD (Wood working), and maybe also DL (Production of electric and optic equipment) and DM (Production of means of transport).

VII.3. Tangibility and Size Analysis

Having analyzed the extent to which leverage is used in individual sectors, we can now take a step further and examine what factors drive the degree of leverage. Although the determinants of capital structure will be discussed predominantly in the next chapter, the following analysis can be regarded as an alternative, sector-based approach. Not to mention that the data set used in this analysis is different from the one used in chapter VIII. One can then compare if the results will be similar.

The two factors to be explored which, according to the theory, influence the level of leverage, are the tangibility of assets and the size of the companies belonging to a particular sector. Other determinants of leverage investigated in the next chapter are not included in this sector-based analysis, as they can be hardly regarded as sector-specific. While tangibility of assets is quite closely bound to the nature of business, the sector-specificity of a companies' size might be, of course, more questionable.

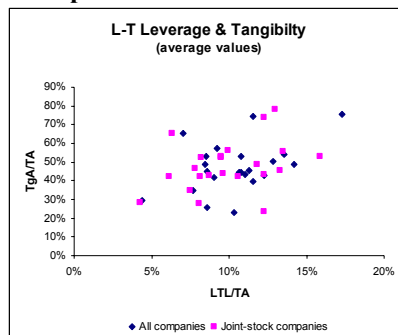
The proxy chosen for *tangibility* is, similarly as in the next chapter, tangible assets²¹ over total assets. In case of size, however, natural logarithm of total assets (rather than natural logarithm of sales, as in the subsequent analysis) had to be chosen, since the data on sales were not available for all companies in the examined data set. The relationships between average and median sector tangibility and average and median sector leverage²² (both total and long-term) are summarized in Graphs VII. 3., VII.4., VII.5. and VII.6.



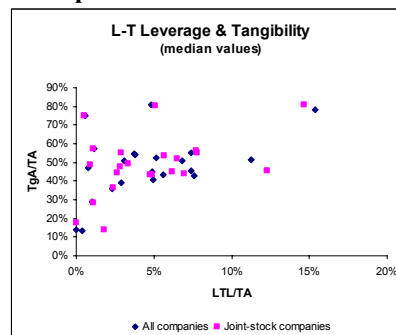
²¹ In Czech accounting terminology it is the "tangible investment property".

²² To be more precise we should say average (median) tangibility (size) of companies belonging to a particular sector.

Graph VII.5.



Graph VII.6.



From Graph VII.3. one can observe a quite clear negative relationship between the average sector debt-to-assets ratios and average sector tangibility. This negative relationship is then again supported by the median values of the same variables in Graph VII.4. Our findings can be verified in Tables VII.4. and VII.5. (at the end of this chapter), which express the relationships quantitatively and show the correlations between sector leverage and tangibility. Both values point at a quite strong negative relationship. In the first case (for average values) the correlation is -0.75 for all companies and -0.67 for joint-stock companies only. In the second case (for median values) it is -0.77 and -0.74 respectively.

When we exchange total debt for long-term debt, however, the conclusions become suddenly rather ambiguous. From Graphs VII.5. and VII.6. we can see that the relationship between long-term sector leverage and sector tangibility seems more as a positive one, again for both average and median values. This is then again supported by the calculated correlations presented in Tables VII.4. and VII.5. Although these correlations are not as strong as in the previous case, a positive relationship is undoubted.

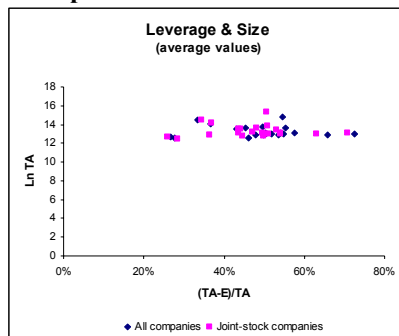
Let us now contrast our conclusions with the theoretical predictions regarding the influence of tangibility on the level of leverage. Also the theory isn't uniform about this issue. Whereas the trade-off and agency theories predict a positive relationship, the pecking order theory says exactly the opposite (for more detail on theoretical predictions please see either the theoretical part of the thesis or the summary in chapter VIII.1.). The results thus don't incline to any of the theories. When we look at the argumentation of individual theories, however, the different results for long-term and total leverage might become clearer.

The major reason why the trade-off theory predicts a positive relationship between leverage and tangibility is because of the ability of tangible assets to serve as collateral and thus a greater

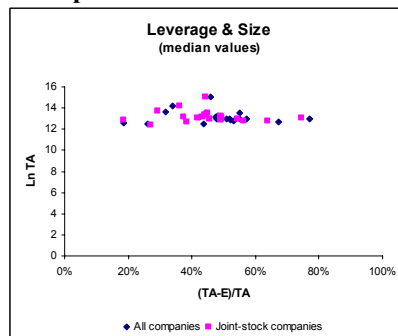
potential of firms holding such assets to issue debt. Securing debt with collateral is, however, much more typical for long-term debt, and short-term debt/payables (which are also included in the debt-to-assets ratio) are usually unsecured. The argumentation of the pecking order and agency theories is, on the other hand, based on the greater information asymmetry in case of firms with few tangible assets and is thus not bound to the maturity of the debt. The negative relationship observed for our data, therefore, casts doubt on the argumentation of the agency theory and supports the pecking order theory.

After discussing the influence of tangibility on leverage let us now focus on the second capital structure determinant - the *size of a company*. Relationships between average and median sector size (measured by natural logarithm of total assets) and average and median sector leverage (both total and long-term) are presented in Graphs VII.7., VII.8., VII.9., and VII.10.

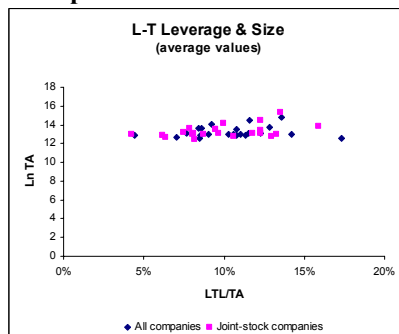
Graph VII.7.



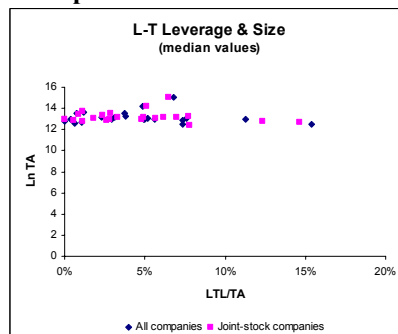
Graph VII.8.



Graph VII.9.



Graph VII.10.



While in case of tangibility we could observe some obvious relationships, in case of size this is, unfortunately, not the case. Although both the trade-off and agency theories predict a positive correlation between the size of a company and its degree of leverage, neither the results in the graphs nor the correlations presented in Tables VII.4. and VII.5. are convincing enough to either accept or reject this hypothesis. The only result supporting the theoretical predictions might be the

positive correlation of average sector long-term leverage and average sector size for joint-stock companies, but as the remaining correlations are close to zero or even negative, this value should probably be regarded as exceptional.

Table VII.4.

Correlation Matrix (average values)			
		TgA/TA	Ln TA
ALL	(TA-E)/TA	-0.75	-0.08
	LTL/TA	0.45	0.14
J-S	(TA-E)/TA	-0.67	0.02
	LTL/TA	0.35	0.44

Table VII.5.

Correlation Matrix (median values)			
		TgA/TA	Ln TA
ALL	(TA-E)/TA	-0.77	-0.10
	LTL/TA	0.46	-0.09
J-S	(TA-E)/TA	-0.74	-0.10
	LTL/TA	0.42	-0.11

* TA = total assets, TgA = tangible assets, E = equity, LTL = long-term liabilities.

VII.4. Conclusions

Two issues were analyzed in this chapter. Firstly, it was the extent to which one can distinguish among sectors with respect to leverage, computed as the average and median debt-to-assets and long-term debt-to-assets ratios of an available sample of companies belonging to these sectors. The results obtained for long-term leverage pointed at the negligible use of long-term debt financing in the capital structure of Czech companies. Whereas this minor role of debt, which, together with the disparity of the received average and median values, didn't allow us to draw any sensible conclusions, the values received for total leverage made it possible to divide the sectors into four major groups. However, only the low-leverage and high-leverage groups differed significantly from the rest of the sectors. Since each of these groups contained only two²³ sectors, and since the leverage of most of the other sectors fluctuated along a similar level, it might be too brave to say that a significant distinction could be made among sectors as per their leverage. Nevertheless, the fact that mature sectors with low growth opportunities fell in the low-leverage group is in line with the theoretical predictions of the pecking order theory and in contradiction to both the trade-off and agency theories.

The second part of the chapter examined whether the average (median) tangibility of assets and size of companies in a particular sector can explain the average (median) leverage in this sector, i.e. looked for determinants of leverage through a sector-based approach, as compared to the company-based approach in the following chapter. For tangibility two contradictory results were obtained. The results for total leverage indicated a strong negative relationship between leverage and

²³ The low-leverage group would contain three sectors if sector C (Mining of raw materials) would be moved to this group due to its low median debt-to-assets value.

tangibility. The results for long-term leverage, on the other hand, suggested a positive relationship. While the first conclusion is consistent with the pecking-order theory and challenges the agency theory, the second conclusion is in line with the trade-off theory.

It must not be omitted to recall, however, that our conclusions regarding the capital structure determinants were based on quite a small number of observations. Moreover, all of the values for the 22 sectors were either averages or medians, making the possible discrepancies even greater. This fact would certainly make the conclusions about the role of tangibility and size at least questionable. Therefore, a company-based approach working with a larger data set and using statistical methods is adopted in the next chapter. It should provide us with more robust conclusions than the so far analysis at sector level.

VIII. CAPITAL STRUCTURE DETERMINANTS

The aim of the following chapter will be to verify the theoretical findings and predictions about determinants of capital structure on a sample of Czech joint-stock companies. When looking for these determinants, one can either refer to the conclusions in the theoretical part of the thesis, or may be inspired e.g. by Harris and Raviv (1991) who generalize in their famous paper that "Several studies shed light on the specific characteristics of firms and industries that determine leverage ratios. ... These studies generally agree that leverage increases with fixed assets, non-debt tax shields, growth opportunities, and firm size and decreases with volatility, advertising expenditures, research and development expenditures, bankruptcy probability, profitability and uniqueness of the product." However, this generalization cannot be accepted as a stylized fact applicable to all countries, due to the existence of conflicting evidence noticeable from international literature. This thesis should contribute to the prevailing literature with evidence from the Czech Republic.

Based on the data that was available, the following four determinants of capital structure will be analyzed - size, tangibility, profitability and non-debt tax shields. Let us now again shortly summarize the theoretical predictions about each of the variables, as well as select appropriate proxies for them.

VIII.1. The Variables

VIII.1.1. Size of the Firm

It is generally accepted that size is an inverse proxy for the probability of bankruptcy. Larger firms are often more diversified and have more stable cash flows, therefore, the probability of bankruptcy for large firms is smaller compared with smaller ones, *ceteris paribus*. Thus, in line with the trade-off theory, size is expected to be positively related to leverage. However, as Rajan and Zingales (1995) state, if the costs of financial distress are low, the positive relationship should not be strong.

A positive relationship of size and leverage suggests also the agency theory. It argues that the information content of small and large firms is not the same due to monitoring costs being relatively

higher for smaller firms. Thus larger firms, because of lower information asymmetry, are likely to have easier access to debt markets and be able to borrow at lower cost.

On the other hand, the relatively lower information asymmetry has an exactly opposite interpretation under the pecking order theory. The fact that larger firms have less asymmetric information problems implies, according to this theory, that they will have a higher preference for equity than smaller ones. A negative relationship is thus predicted for size and leverage.

Following the majority of previous studies, a natural logarithm of sales is used to capture the size effect on the leverage of firms. In doing so, we imply the size effect on leverage is nonlinear.

VIII.1.2. Tangibility

On the relationship between tangibility and capital structure, the trade-off and agency theories state that tangibility is positively related to leverage. Let's first explain the reasoning used by the trade-off theory that stands behind such prediction. It argues that since tangible assets can serve as collateral, the more of them a company has, the greater its ability to issue secured debt, which is generally cheaper than unsecured one. Moreover, the value of tangible assets should be higher than the value of intangible assets in case of bankruptcy, thus a high portion of tangible assets is a good sign for lenders.

The agency theory, on the other hand, points out the agency costs of debt that exist, as the company may shift to riskier investments after the issuance of debt and transfer wealth from creditors to shareholders (recall the asset substitution effect from the theoretical part). If a company's tangible assets are high, then these assets can be used as collateral, diminishing the lender's risk of suffering such agency costs of debt. Moreover, in firms with more intangible assets the costs of controlling capital expenditures are higher, as monitoring is more difficult. Hence, a high fraction of tangible assets is expected to be associated with high leverage.

The lower information asymmetry for firms with higher tangibility of their assets, however, brings us to exactly opposite conclusions in the case of the pecking order theory. As was already mentioned in connection with the size variable, less information asymmetry problems imply, under this theory,

a higher preference for equity. In other words, a negative relationship between tangibility and leverage should be expected.

The ratio of tangible assets to total assets is selected as a proxy for tangibility of assets.

VIII.1.3. Profitability

Also in the case of profitability theories do not offer uniform predictions. Whereas the trade-off, signaling and agency theories expect a positive relationship between profitability and leverage, the pecking order theory predicts a negative one. Let us summarize their argumentation.

The tax-based trade-off model suggests that profitable companies should borrow more, *ceteris paribus*, as they have greater needs to shield income from corporate tax. A different reasoning uses the agency theory, or to be more specific, the free cash flow theory, which suggests debt as a discipline device to ensure that managers pay out profits rather than build empires. For companies with free cash flow, or high profitability, high debt can restrain management discretion. In both cases, however, higher profitability should mean higher leverage.

Also the signaling theory predicts that profitability and leverage are positively related. It argues that in situations of information asymmetry, increases in the debt ratios give a signal to the market about the value of the company, i.e. its (expected) profitability.

The pecking order theory of capital structure, on the other hand, states that companies prefer to finance new investments from retained earnings and raise debt capital only if the former is insufficient. As the availability of internal capital (retained earnings) depends on the profitability of the company, one could expect an inverse relation between leverage and profitability.

Since it was not possible to calculate EBIT from the available data, and net income would not be an appropriate measure (as it is biased by the interest expenses), operating income over total assets was selected as a proxy for profitability.

VIII.1.4. Non-Debt Tax Shields

The only theory that deals with the effect of taxation on leverage is the trade-off theory. According to this theory, the higher the tax liability of a company, the higher its motivation to issue debt. However, as was already mentioned in the theoretical part, since there is only a single top tax rate in a given year it cannot serve as a good proxy for taxation and non-debt tax shields are rather used as proxies instead of it.

Under the non-debt tax shields we understand the tax deduction for depreciation and investment tax credits. Since non-debt tax shields are substitutes for the tax benefits of debt financing (the deduction of interest expenses from taxable income) a company with larger non-debt tax shields, *ceteris paribus*, is expected to use less debt. In other words, a negative relationship between non-debt tax shields and leverage should be expected.

The proxy selected for non-debt tax shield is depreciation over total assets.

The theoretical predictions are summarized in Table VIII.1. In this study the broadest measure of leverage - the ratio of total liabilities to total assets - has been chosen. It can be viewed as a proxy for what is left to shareholders in case of liquidation. Since the majority of companies included in the analysis are not publicly traded, the ratio could be expressed only in book values. With this theoretical overview in mind, let us now move on to the actual empirical analysis.

Table VIII.1.

Summary of Theoretical Predictions (relationship between factor and leverage)				
Factor	Trade-off	Signaling	Pecking order	Agency
<i>Size</i>	+		-	+
<i>Tangibility</i>	+		-	+
<i>Profitability</i>	+	+	-	+
<i>Taxes</i>	-			

VIII.2. Data

Similarly as in the case of sector analysis, the data used in this chapter stem from the Top 2000 database administered by the Czech Capital Information Agency (CEKIA). While CEKIA claims that this database contains information on two thousand most important and watched Czech companies, the criterion according to which companies are included in this database is unknown to

the author. However, due to the relatively large number of companies, the bias caused by the selective choice should not significantly influence our analysis. Again, a four year series of data, ranging from year 1999 to 2000 was provided.

From the Top 2000 database only joint-stock companies were selected. Subsequently, only those companies, for which data was available for all four years were picked out. In the end, those companies for which the database contained either incomplete or absurd entries (e.g. total assets didn't equal total liabilities + equity, etc.), were excluded. After this selective process, there were left 562 companies, i.e. 2248 entries (where one entry means information on one company in one year). The following paragraphs introduce the sample a little closer.

VIII.2.1. Descriptive Statistics

Before we focus solely on the four capital structure determinants, the characteristics of the companies in the sample should be introduced. We shall thus look at the sectors these companies belong to and at their average (median) balance sheets.

Table VIII.2. below summarizes, how individual sectors are represented in the sample. Although it might be too brave to say that the sectors are represented evenly, the sectoral variety of companies can be certainly regarded as satisfactory. Not even in the real economy are there equal numbers of companies in each sector, so our sample can be considered as a good approximation.

Table VIII.2.

Sectoral Distribution of Sample	
Sector	No. of firms
<i>A,B</i> Agriculture & fishery	19
<i>C</i> Mining of raw materials	12
<i>DA</i> Food and tobacco	60
<i>DB</i> Textile, clothing & leather	27
<i>DD</i> Wood working	3
<i>DE</i> Paper and printing	13
<i>DF</i> Coal & crude oil treatment ...	4
<i>DG</i> Chemical and pharmaceutical	22
<i>DH</i> Rubber and plastic	9
<i>DI</i> Glass, ceramics, building mat.	24
<i>DJ</i> Metal production & m. industry	33
<i>DK</i> Prod. of machines & equipment	38
<i>DL</i> Prod. of electric & optic equip.	21
<i>DM</i> Prod. of means of transport	20
<i>DN</i> Furniture & secondary materials	14
<i>E</i> Utilities	60
<i>F</i> Building industry	34
<i>G</i> Trade & rep. of vehicles & CG	62
<i>H</i> Accommodation & restaurants	4
<i>I</i> Transp., warehousing, telecoms	25
<i>K</i> Real-estate, and renting	48
<i>N</i> Health services	6
Other	4
TOTAL	562

The second interesting characteristic to deal with is the average and median balance sheet of the companies in the sample. Selected items from the balance sheet are presented in Table VIII.3. In addition to that, another Table (VIII.4.) presents a similar set of items, this time expressed as percentages of total assets (these values were computed as averages). More emphasis is naturally put on the financing side of the balance sheet.

Table VIII.3.

Selected Items from Balance Sheet & Income Statement					
<i>(averages and medians, tsd. CZK)</i>					
		1999	2000	2001	2002
<i>Total assets</i>	avg	2 568 613	2 698 737	2 711 903	2 687 981
	med	562 060	585 852	590 292	602 423
<i>Fixed assets</i>	avg	1 742 174	1 805 065	1 859 489	1 844 657
	med	282 155	289 687	285 410	283 774
<i>Tangible assets</i>	avg	1 517 096	1 545 717	1 572 922	1 545 227
	med	229 278	232 782	226 195	229 815
<i>Equity</i>	avg	1 261 371	1 347 519	1 370 441	1 442 571
	med	249 447	272 613	267 099	292 734
<i>Registered capital</i>	avg	933 230	945 234	943 391	936 430
	med	230 388	225 127	217 360	214 787
<i>Liabilities</i>	avg	1 210 889	1 248 221	1 217 632	1 140 602
	med	214 991	236 706	225 817	229 642
<i>Long-term payables</i>	avg	243 327	249 571	259 228	228 514
	med	0	0	0	0
<i>Short-term payables</i>	avg	467 953	520 159	496 622	460 559
	med	89 325	106 945	107 830	102 267
<i>Bank loans</i>	avg	392 613	363 013	340 841	278 522
	med	56 287	50 859	45 011	39 883
<i>Long-term bank loans</i>	avg	188 214	164 494	147 097	110 439
	med	3 130	1 048	452	0
<i>Sales</i>	avg	1 865 709	2 194 554	2 305 991	2 227 675
	med	475 813	563 813	610 376	567 626
<i>Operating profit margin</i>	avg	-6.1%	-11.4%	8.2%	6.9%
	med	3.3%	4.1%	4.3%	3.4%
<i>Net profit margin</i>	avg	-16.2%	-23.3%	-0.4%	-6.5%
	med	1.1%	1.7%	2.0%	1.9%

Table VIII.4.

Selected Items from Balance Sheet				
<i>(as % of total assets; averages)</i>				
	1999	2000	2001	2002
Total assets	100.0	100.0	100.0	100.0
Fixed assets	54.7	53.6	53.5	53.9
Tangible assets	46.5	44.9	44.5	44.5
<i>Equity</i>	<i>48.6</i>	<i>47.4</i>	<i>48.8</i>	<i>50.5</i>
Registered capital	44.8	43.9	43.3	46.8
Capital funds	2.9	3.0	3.3	2.2
Profit funds	4.6	4.5	4.6	4.9
Past income/loss	-2.5	-4.7	-4.9	-5.5
<i>Liabilities</i>	<i>48.4</i>	<i>49.4</i>	<i>47.9</i>	<i>46.6</i>
Reserves	2.8	3.1	3.3	3.7
Long-term payables	4.9	5.1	5.4	5.2
Sort-term payables	23.8	25.1	24.3	23.9
Bank loans	16.9	16.1	14.9	13.8
Long-term bank loans	6.0	5.6	5.3	5.1
<i>Other liabilities</i>	<i>3.0</i>	<i>3.2</i>	<i>3.3</i>	<i>2.9</i>

Judging by both total assets and by sales, the size of an average as well as median firm has grown from 1999 to 2001, when it reached its peak and fell down slightly again in 2002, although not below the 2000 level (except for average total assets). A similar trend can then be observed for average fixed assets and average tangible assets, but the median values for these two items do not fully correspond with it.

Looking at the numbers in Table VIII.4., one can find out at the same time, that the proportion that fixed assets and tangible assets had on total assets did not change dramatically. This is true especially for the last three years, when, on average, fixed assets represented about 53.7% and tangible assets about 44.6% of total assets. In 1999 these values were approximately one percentage point higher for fixed assets and two percentage points higher for tangible assets.

On the other side of the balance sheet, the variation of equity and liabilities deserves our attention. It can be observed from Table VIII.3., that whereas the average equity has been steadily increasing over the whole period, liabilities grew only in 2000, and then decreased in the subsequent two years, in 2002 even under the 1999 level. The growth mentioned in the previous paragraph thus must have been financed primarily from equity increases. As one can notice, nonetheless, it was probably not from the growth of registered capital, but from other components of equity.

More light into this issue can shed Table VIII.4. It more or less supports our hypothesis that the growth of total assets was financed primarily from increasing equity, as the proportion of equity on total assets grew (except for year 2000) over the examined period. The proportion of liabilities then, of course, developed inversely. The role of registered capital, however, becomes ambiguous. Table VIII.4. indicates that the portion of registered capital on financing was slightly decreasing in the first three years (from 44,8% in 1999 to 43,3% in 2001), but jumped back up to 46,8% in 2002.

Speaking about equity, we should also mention the remaining elements of it. It is obvious that registered capital is the most important one, as it comprises around 90% of it in all four years. Capital and profit funds do not require much commentary, because of their negligible role. What should, however, not escape our notice, is the permanently negative and deepening cumulative loss. In connection with the values for net income in Table VIII.3., it is clear that on average the firms in the sample were in loss throughout the whole four year period, making the possibility for retaining

earnings unlikely. Overall, we can thus hardly make any reasonable conclusions about the drivers of the above-mentioned equity increases.

A more detailed look at the structure of liabilities brings us to one very interesting observation concerning the role of long-term financing of Czech companies. Both of the presented tables indicate that Czech companies do not make much use of long-term financing and that they prefer short-term capital. In all four years (judging by average values), long-term bank loans composed only about one third of total bank loans and long-term payables were five times lower than short-term payables. Moreover, the overall share of long-term financing (i.e. the sum of long-term bank loans and long-term payables) on total assets was only about 11%, which is less than half of the share of short-term payables. For median values, the negligible role of long-term financing becomes even more evident - a median firm didn't have any long-term payables and only a minimal volume of long-term bank loans during the 1999-2002 period.

Concerning the time development of both total and long-term bank loans, their role was gradually decreasing from 1999. The time development of the role of short-term payables than corresponds to the time development of total liabilities. For long-term payables no clear conclusion can be made in this sense.

The last remark will be made on the profitability of the companies in our sample. It was already mentioned that, on average, the net profit margins were negative over the whole four year period. For average values, the operating profit margins were negative for the first two years, but the operations became profitable in 2001 and 2002. Turning to median values, however, one can get a different picture - the median firm had a positive operating as well as net profit margins over the whole four year period. The average results have thus been biased by a high loss of several few companies in the sample. From any point of view, the most profitable year was 2001.

VIII.3. The Models

We can now proceed to the statistical analysis of the determinants of capital structure. The analysis is performed for each of the four individual years as well as for averaged data for the whole four year period. As the averaged values should help us to minimize fluctuations caused by temporary

reasons, the results obtained in this case can be expected to be the most robust. Since the time period is relatively short, no trend analysis will be performed on the data.

First of all, outliers were excluded from the sample. The criteria for the identification of an observation as an outlier were as follows: companies, whose leverage (debt-to-assets ratio) was above 2.0 (i.e. companies, whose liabilities were twice as big as their total assets, or, in other words, who had a negative equity of the same size as their total assets); companies, whose ratio of depreciation to total assets was above 0.2 (i.e. companies that depreciated their total assets by more than 20%); and companies, whose ratio of operating income to total assets was below -0.25 and above 0.5 (i.e. companies, whose operations led to a loss of more than 25% and a profit of more than 50% of the value of their assets). For the remaining two determinants - size and tangibility - no outliers were identified.

After the outliers were removed, there were 545 observations left for 1999, 552 for 2000 and 2001, 551 for 2002 and 552 observations for the 1999-2002 averages. The averages, medians and standard deviations for each of the four examined determinants, as well as for the leverage measure, are presented below in Table VIII.5.

Table VIII.5.

	Descriptive Statistics														
	Debt-to-assets ratio			Size			Tangibility			Profitability			Non-debt tax shield		
	AVG	MED	SD	AVG	MED	SD	AVG	MED	SD	AVG	MED	SD	AVG	MED	SD
1999	0.491	0.466	0.259	13.221	13.070	1.409	0.466	0.470	0.239	0.040	0.035	0.086	0.048	0.046	0.027
2000	0.505	0.475	0.267	13.405	13.250	1.394	0.448	0.446	0.235	0.054	0.042	0.078	0.048	0.046	0.028
2001	0.489	0.464	0.274	13.444	13.329	1.407	0.444	0.451	0.235	0.058	0.047	0.075	0.048	0.046	0.029
2002	0.474	0.442	0.258	13.403	13.241	1.411	0.444	0.451	0.232	0.049	0.037	0.083	0.046	0.042	0.029
99-02	0.492	0.465	0.250	13.410	13.248	1.357	0.448	0.454	0.230	0.048	0.038	0.072	0.048	0.047	0.026

VIII.3.1. Model 1

As was already mentioned in the beginning of the chapter, four determinants of capital structure will be analyzed - size, tangibility, profitability and non-debt tax shields. The proxies selected for each of the determinants are again summarized below.

	Factor	Chosen proxy
SIZE	<i>Size</i>	Ln Sales
TANG	<i>Tangibility</i>	Tangible assets/TA*
PROFIT	<i>Profitability</i>	Operating income/TA*
TAX	<i>Non-debt tax shield</i>	Depreciation/TA*

* TA = Total Assets

The majority of previous international literature is followed by using linear regression to study the effects of these factors on leverage. Let L_{it} denote the leverage, measured as total assets minus equity over total assets, i.e. $(TA-E)/TA$, of company i in year t , and let the above abbreviations with the same company-related and time-related indices represent the respective proxies. Simple ordinary least squares estimation is then used for the estimation of α and the vector β in the following model:

$$L_{it} = \alpha + \beta_{SIZE}SIZE_{it} + \beta_{PROFIT}PROFIT_{it} + \beta_{TANG}TANG_{it} + \beta_{TAX}TAX_{it} + \varepsilon_{it} .$$

In Table VIII.6. below, the results of the estimations are reported for individual years as well as for the 1999-2002 averages. The sign of β reveals the sign of the relationship between the dependent variable and the respective regressor. The statistical significance of the relationship is reported as well, together with the standard errors and values of the t-statistics. Let us now discuss the obtained results and reflect them with the theoretical predictions summarized in the beginning of the chapter.

Table VIII.6.

	Results of Model 1									
	1999		2000		2001		2002		99-02	
	B SE	t Sig.	B SE	t Sig.	B SE	t Sig.	B SE	t Sig.	B SE	t Sig.
<i>Intercept</i>	0.178 0.094	1.899 0.058	0.076 0.100	0.757 0.449	0.072 0.104	0.696 0.487	0.178 0.100	1.791 0.074	0.067 0.094	0.707 0.480
<i>SIZE</i>	0.044 0.007	6.177 0.000	0.048 0.007	6.537 0.000	0.047 0.008	6.065 0.000	0.037 0.007	4.984 0.000	0.050 0.007	7.055 0.000
<i>TANG</i>	-0.434 0.047	-9.242 0.000	-0.436 0.049	-8.900 0.000	-0.455 0.054	-8.431 0.000	-0.370 0.051	-7.194 0.000	-0.460 0.048	-9.630 0.000
<i>PROFIT</i>	-0.547 0.116	-4.697 0.000	-0.599 0.131	-4.561 0.000	-0.577 0.146	-3.945 0.000	-0.658 0.124	-5.288 0.000	-0.861 0.132	-6.524 0.000
<i>TAX</i>	-0.852 0.416	-2.046 0.041	0.141 0.408	0.347 0.729	0.466 0.441	1.058 0.291	-0.050 0.418	-0.118 0.906	0.134 0.415	0.322 0.747
<i>R Square</i>	0.249		0.210		0.185		0.164		0.249	
<i>Adjusted R-Square</i>	0.243		0.204		0.179		0.158		0.243	
<i>No. of observations</i>	545		552		552		551		552	

Size. A positive relationship between company size, as measured by the natural logarithm of the volume of its sales, is found in all four years, as well as for the 1999-2002 averages. This result is consistent with the results of the majority of other international empirical studies. With a statistical significance at the 1% level in all five models, the positive sign supports the predictions of the trade-off and agency theories and contradicts the predictions of the pecking order theory. Size can thus be really regarded as an inverse proxy for the probability of bankruptcy. The fact that larger firms tend to be more leveraged points, however, not only at their greater stability and lower probability of

bankruptcy (as per the trade-off theory), but also (in line with the agency theory) at their easier access to debt. This easier access to debt markets then probably outweighs their preference for equity expected by the pecking order theory.

Tangibility. Concerning the tangibility of a company's assets, the theoretical predictions of its relationship with leverage are similar as in the case of size - the trade-off and agency theories predict a positive relationship, the pecking order theory a negative one. The empirical results of previous international studies then usually find a positive relationship for developed countries and a negative one for developing countries. In our case, a negative relationship is found in all five models, always with a strong statistical significance at a 1% level. This would thus suggest (trade-off theory argumentation) that the collateral role of tangible assets is low. However, it is very probably caused by the fact that a big proportion of leverage, as it is measured in our models, is short-term debt and payables, which are usually not collateralized. The negative relationship then supports the conclusions of the pecking order theory, which anticipates a higher preference for equity for firms with higher tangibility of assets (and thus lower information asymmetry), and casts doubt on the role of the asset substitution effect presented by the agency theory.

Profitability. Also in the case of profitability a negative relationship with leverage is found in all four years and for the 1999-2002 averages; PROFIT is statistically significant in all five models. The fact that more profitable Czech companies have a tendency to use relatively less debt in their capital structure is consistent with the majority of other international studies, which also come to a negative relationship between profitability and leverage. Such finding is, however, incompatible with the trade-off theory (predicting that more profitable firms will borrow more, as they will have a greater motivation to shield their income from taxation), the signaling theory (expecting higher debt to be a good signal about the profitability of a firm), as well as the agency theory (seeing higher leverage as an instrument for reducing free cash flow available to managers). It supports, on the other hand, the pecking order theory and its prediction that companies prefer to retain their earnings, in order to avoid the necessity to raise debt or external equity.

Non-debt tax shields. Our findings about the role of non-debt tax shields are, compared to the other three capital structure determinants, much more ambiguous. Not only does TAX have a very low statistical significance in all of the models, but also the sign of the relationship is not consistent. Whereas the results for 1999 and 2002 point at a negative relationship between non-debt tax shields

and leverage, the results for 2000, 2001 and 1999-2002 averages indicate a positive relationship. We can thus not make any feasible conclusions with respect to this determinant. The theoretical prediction of the trade-off theory, expecting a negative relationship, can be neither confirmed nor rejected.

Table VIII.7.

Summary of Theoretical Predictions					
<small>(relationship between factor and leverage)</small>					
Factor	Czech Practice	Trade-off	Signaling	Pecking order	Agency
<i>Size</i>	+	+		-	+
<i>Tangibility</i>	-	+		-	+
<i>Profitability</i>	-	+	+	-	+
<i>Taxes</i>	?	-			

The last remark should be made about the explanatory power of our models as measured by the adjusted coefficient of determination ($Adj R^2$). From Table VIII.6. one can see that the relatively best outcome was obtained for the 1999-2002 averages. Only in the year 1999 a similar explanatory power was reached, for other years the coefficient of determination was considerably lower. This corresponds to our expectations that the averages will help to diminish random fluctuations in both leverage and the analyzed determinants. Although the low explanatory power of our models is not unusual or exceptional as compared to other similar studies, the following model will try improve it.

VIII.3.2. Model 2

In order to increase the explanatory power of the above model, another variable will now be added into the model. Although this issue was not discussed in more detail in the theoretical part, one can intuitively expect that companies, which belong to the same sector, will have a similar level of leverage. By adding the average sector leverage in our model, we should thus considerably increase the explanatory power of the above model.

In the previous chapter, sector leverage was examined by a simple graphical analysis. Despite some difference among sectors along the level of their leverage could be observed, it was not very dramatic. Since the below regression is a linear one, the value of the estimated coefficient for the SECTOR variable should now give us a more reliable hint about the role of sector leverage as a capital structure determinant.

We will thus now be estimating α and the vector β in the following modified model:

$$L_{it} = \alpha + \beta_{SIZE}SIZE_{it} + \beta_{PROFIT}PROFIT_{it} + \beta_{TANG}TANG_{it} + \beta_{TAX}TAX_{it} + \beta_{SEC}SECTOR + \varepsilon_{it} ,$$

where SECTOR represents the relevant average debt-to-assets ratio of joint-stock companies from one of the 22 sectors analyzed in the previous chapter (see Appendix 2). No index is written at this variable, because the values are four year averages and are not company-specific. The proxies for the other capital structure determinants remain the same as in the above model.

Let us now look at whether, and if then how, adding this variable changes the results and explanatory power of the model. The results are presented in Table VIII.8.

Table VIII.8.

	Results of Model 2									
	1999		2000		2001		2002		99-02	
	B SE	t Sig.	B SE	t Sig.	B SE	t Sig.	B SE	t Sig.	B SE	t Sig.
<i>Intercept</i>	-0.055	-0.499	-0.218	-1.886	-0.197	-1.633	-0.046	-0.398	-0.174	-1.599
	0.110	0.618	0.115	0.060	0.121	0.103	0.117	0.691	0.109	0.110
<i>SIZE</i>	0.043	6.186	0.047	6.415	0.045	5.939	0.036	4.931	0.048	6.953
	0.007	0.000	0.007	0.000	0.008	0.000	0.007	0.000	0.007	0.000
<i>TANG</i>	-0.345	-6.662	-0.321	-5.970	-0.343	-0.577	-0.277	-4.854	-0.357	-6.729
	0.052	0.000	0.054	0.000	0.059	0.000	0.057	0.000	0.053	0.000
<i>PROFIT</i>	-0.531	-4.625	-0.561	-4.346	-0.519	-3.586	-0.641	-5.211	-0.815	-6.247
	0.115	0.000	0.129	0.000	0.145	0.000	0.123	0.000	0.131	0.000
<i>TAX</i>	-0.852	-2.076	0.276	0.689	0.505	1.164	-0.048	-0.116	0.173	0.424
	0.411	0.038	0.401	0.491	0.434	0.245	0.414	0.908	0.409	0.672
<i>SECTOR</i>	0.396	3.918	0.515	4.801	0.473	4.225	0.387	3.604	0.419	4.237
	0.101	0.000	0.107	0.000	0.112	0.000	0.107	0.000	0.099	0.000
<i>R Square</i>	0.270		0.242		0.211		0.184		0.027	
<i>Adjusted R-Square</i>	0.263		0.235		0.204		0.176		0.266	
<i>No. of observations</i>	545		552		552		551		552	

Comparing the explanatory power of the second model with the previous one, Adjusted R² has increased in all of the examined years, as well as for the 1999-2002 averages. However, this increase was not very dramatic and certainly lower than one might have expected. That points at a not very significant contribution of the SECTOR variable and at the fact that companies belonging to different sectors do not differ very much along the level of their leverage.

This hypothesis is supported by the values that we obtained as estimates of β_{SEC} . If the role of the average sector leverage were important, the coefficients at the sector variable would be close to 1 and the rest of the variables would then only slightly modify the leverage determined by the sector. As one can see from Table VIII.8., however, these coefficients vary approximately between 0.4 and

0.5 and are thus much lower than one might have expected. SECTOR is statistically significant at the 1% level in all five models. The average sector leverage does, therefore, not prove to be such an important capital structure determinant as it was expected to be.

Finally, we should verify if we will not have to alter our conclusions drawn about the relationships between leverage and the remaining capital structure determinants, due to results obtained for this model. In case of size, tangibility and profitability, we receive (for all individual years, as well as the 1999-2002 averages) the same signs for the respective determinants in both models. The results for non-debt tax shields are then again ambiguous, only adding to our uncertainty about this capital structure determinant expressed in the above chapter. We can thus declare that the former conclusions about the four original capital structure determinants hold also for this model.

VIII.4. Conclusions

In this chapter, an empirical analysis of financial statements of 562 Czech companies from years 1999 - 2002 was performed. The major goal was to examine the role of four capital structure determinants - size, tangibility of assets, profitability, and non-debt tax shields - and their impact on the degree of leverage of companies operating in Czech conditions and environment. The results were then contrasted with the predictions that are offered by individual capital structure theories. The following conclusions were drawn from the Czech Republic data.

The relationship between a company's size, measured as a natural logarithm of sales, and its leverage was found to be a positive one. This conclusion supports the predictions of the trade-off and agency theories and contradicts the predictions of the pecking order theory.

The findings about the impact of tangibility of a company's assets on the use of debt in its capital structure, on the other hand, are exactly opposite. This time the negative relationship supports the pecking order theory and challenges the trade-off and agency theories.

In case of profitability, all of the four discussed theories offer their predictions about its impact on the use leverage. The negative relationship between profitability and leverage points at a tendency of Czech companies to retain their earnings (pecking order theory) and it casts doubt on the argumentation of the trade-off, agency, as well as signaling theories.

Only for non-debt tax shields no feasible conclusion could be drawn, not only for its low statistical significance, but also because the observed relationship of this variable and leverage was inconsistent in individual years.

In the second part of the chapter, the average sector leverage variable was added into the model, with the aim to increase its explanatory power. However, not only was a considerable improvement not reached, but also the membership of a company in a particular sector did not prove to be such a significant capital structure determinant as expected. Nevertheless, the results of this extended model were, concerning the remaining capital structure determinants, consistent with the findings of the original model.

IX. CONCLUSIONS

To conclude, let us shortly recapitulate the major findings and outcomes presented throughout the thesis. With the purpose to apply and reflect the theory of capital structure in the institutional environment of the Czech Republic, approaches and implications of the four most influential theories - the trade-off, signaling, pecking order, and agency theory - were initially introduced in the first part of the thesis.

The trade-off theory releases the Miller and Modigliani's assumptions of no taxes and no financial distress costs. It argues that the choice of an optimal debt-equity ratio is determined by a tradeoff between the benefits of debt financing, residing in the possibility to deduce interest payments from taxable income, and costs of debt financing, caused by increasing costs of financial distress (both direct and indirect) with increasing indebtedness.

The key assumption of the signaling theory, on the other hand, is the information asymmetry between the company's shareholders and managers. According to this theory, the role of debt is primarily to credibly signal the inside information about the quality of the company - or its expected future cash flows - to outside investors. Moreover, another signaling model regards the degree of insider (managerial) ownership as an alternative signal about the company's quality.

The second theory, which also bases its argumentation on information asymmetry, is the pecking order theory. It deduces that, because of this asymmetry, companies will prefer internal to external finance and debt to equity. Firms will only issue equity when additional debt would be too costly and retained earnings are not sufficient to cover the investment needs, or when they feel it is overpriced. Since the market is aware of the management's behavior, it will force the companies to follow the pecking order.

The last discussed theory works, as the only one, with the assumption that the interests of managers, shareholders and debt holders are not perfectly aligned. It sees the capital structure decision as a result of the tradeoff between agency costs of equity (management acting in their rather than the shareholders' interests, the free cash flow available for such ineffective behavior, and the expenditures spent on controlling the management) and agency costs of debt (the asset substitution effect and the underinvestment problem).

Each of the theories thus works with dissimilar assumptions and focuses on slightly different areas. That is also the major reason why their argumentation is not in direct contradiction and why they can co-exist next to each other. The consequence is, however, that their empirical verification and testing is quite difficult. In the practical part of the thesis these conditional theories were employed in two ways: firstly, the approaches offered by the theories were used to interpret the market conditions and legal environment and their influence on the capital structure decisions (with a focus on equity) of companies residing in the Czech Republic, secondly, their predictions were used to validate, which of the theories finds most support when tested on Czech companies' data. A summary of the conclusions and findings follows.

The analysis of the conditions for raising equity capital concentrated on two areas - the capital and venture capital markets. The Czech capital market was, in comparison with its European peers, found to play an inferior role as a potential source of financing. With a relatively negligible market capitalization and low value of trading (especially in case of equity), it certainly does not serve its desired purpose. Although the situation is slowly improving, as the absurd number of share issues (a reminiscence of the privatization) is decreasing, investors at the Czech capital market seem to be oriented primarily on bonds. Unfortunately, not on corporate bonds, but rather on government ones, with which the Czech government successfully keeps to saturate the market.

In case of the Czech venture capital market, a significant alternative source of equity capital for not listed companies, this is also not exploited to such an extent as in developed countries. Not only is the volume of venture capital investments relatively lower than in western European countries, but a great portion of venture capital funds is directed abroad. The difficulties with divestment could be a possible explanation of the limited utilization of venture capital.

From the point of view of theory, such situation at the capital and venture capital markets indicates the validity of the pecking order and signaling theories. Because Czech companies will find it difficult to raise capital - and equity capital in particular - at the capital market, they can be expected to preventively retain their earnings and to prefer debt to equity. The same reasoning applies to the opportunities to raise equity capital at the venture capital market.

Furthermore, as Czech companies are neither motivated nor forced by the market to disclose information about their performance, one might assume a substantial information asymmetry between their management and potential investors. This leads us to anticipate that companies will desire to signal their higher quality with greater indebtedness and higher degree of insider ownership. Due to the information asymmetry, Czech firms will probably also have a tendency to follow the pecking order when looking for additional capital.

Concerning the legal environment, also this does not constitute very favorable conditions for raising equity capital by Czech companies. The problem, however, does not lie as much in the quality of the legislative, which is more or less in line with developed European countries, but predominantly in the effectiveness of the Czech judicial system and the enforceability of law. The regulation of preemptive rights and the delays caused by the registration in the Commercial Register are the two major factors that discourage Czech companies from boosting their equity through an increase of their registered capital. Moreover, the obstacles posed by legal shortcomings, in combination with the weak capital market, have shown as too severe for any initial public offering to successfully take place. Raising funds through debt instruments is, on the other hand, much simpler from the legal point of view.

Several theoretical implications were deduced from the state of art of Czech legislation. Firstly, it is the expected motivation to retain earnings and build up financial slack as a way to increase the proportion of equity in the capital structure, and the preference of debt to equity in case of additional need for capital, i.e. a behavior corresponding to the pecking order theory. Secondly, it is the applicability of the agency theory's predictions in the Czech environment. Both the agency costs of debt, caused by the difficult enforcement of claims, as well as agency costs of equity, consisting in the cumbersome control of the management, prove to be relevant. Thirdly, due to the fact that collateral is often required to secure debt, the trade-off theory should find support for its predicted positive relationship between leverage and tangibility of assets.

The theoretical predictions were subsequently tested on a database of financial statements of Czech joint-stock companies from years 1999 to 2002. As the presented theories use a different approach, a common criterion had to be chosen in order to compare the applicability of each theory in the Czech environment. Four capital structure determinants - size, tangibility, profitability, and non-debt tax shields - served as such (more or less) common criterion. The findings of both the sector-level and

company-level analysis with respect to these determinants, as well some further conclusions that emerged from the discussion, are summarized below.

On the sector level, we were able to distinguish four groups of sectors according to the average (median) values of the debt-to-assets ratios of companies belonging to these sectors. The fact that mature sectors with low growth opportunities fell into the low-leverage group pointed at the validity of the pecking order theory and the false assumptions of the trade-off and agency theories in this respect. The observed values of average and median sector long-term debt-to-assets ratios, on the other hand, didn't lead to any sensible conclusions. The very limited use of long-term debt in the capital structure of Czech companies is probably caused by the reluctance of banks to undergo the risks connected with it.

The second part of the sector analysis was performed along two of the above-mentioned capital structure determinants - average and median tangibility and size of companies belonging to individual sectors. A negative relationship that could be observed between tangibility and leverage is in line with the predictions of the pecking order theory and casts doubt on the argumentation of the agency theory. The relationship between tangibility and long-term leverage, however, was found to be exactly the opposite. As tangible assets usually serve as collateral for long-term debt, this finding supports the trade-off theory. In case of size, neither a positive nor a negative relationship with leverage could be observed, and thus no conclusions could be drawn.

The company-level analysis of capital structure determinants then employed statistical techniques to test the predictions of the four theories about the four above-mentioned determinants. Because not all theories offered an explicit interpretation for each determinant and the sign of its relationship with leverage, it was hard to judge which theory is most valid for Czech companies. However, with a little bit of simplification, we can say that most "successful" was the pecking order theory, as it correctly predicted the negative relationship for tangibility and profitability, and erred only in case of size. The trade-off and agency theories then identically expected a positive relationship for size, profitability and tangibility, with only the first one to show as right. No conclusion could be made about the role of non-debt tax shields due to the ambiguity of results received. The only prediction offered by the signaling theory for the profitability determinant didn't prove to be correct.

In order to try to increase the relatively low explanatory power of the model, a sector leverage variable was subsequently added into it. Although some improvement was reached, it was not very dramatic. Moreover, the membership in a particular sector did not prove to be as significant for the degree of leverage as expected. The results concerning the remaining capital structure determinants were then consistent with the first model.

To sum up, none of the discussed theories has found evident support and, at the same time, argumentation of none of the theories could be rejected as entirely inapplicable with respect to the Czech environment. While the pecking order theory seems to have gained most support and appeared to be probably the most relevant in the interpretation of the capital structure of Czech companies, one has to keep in mind that this could have been caused by the chosen testing approach and selection of variables. Moreover, the available data allowed us to work only with book values - the results could have been quite different if market values were used, not to mention the alternative testing possibilities in case market values were employed. The findings of this thesis thus should be regarded as a part of the discussion about the conditions for and means of financing of Czech companies, as well as a contribution to the international literature dealing with empirical testing of capital structure theories.

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LAWS

- Law no. 15/1998 Coll., on the Securities and Exchange Commission
Law no. 99/1963 Coll., Civil Procedure Code
Law no. 513/1991 Coll., Commercial Code (CC)
Law no. 591/1992 Coll., Securities Act (SA)

INTERNET

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| www.cnb.cz | Czech National Bank |
| www.csu.cz | Czech Statistical Office |
| www.evca.cz | Czech Venture Capital Association |
| www.evca.com | European Private Equity & Venture Capital Association (EVCA) |
| www.fese.be | Federation of European Securities Exchanges |
| www.mpo.cz | Ministry of Industry and Trade |
| www.pse.cz | Prague Stock Exchange |
| www.rmsystem.cz | RM-System |
| www.scp.cz | Securities Centre of the Czech Republic |
| www.sec.cz | Czech Securities Commission |

APPENDIX

Appendix 1 - Full Names of Sectors

Full Names of Sectors
A,B Agriculture and fishery
C Mining of raw materials
DA Food and tobacco industry
DB Textile, clothing and leather industry
DD Wood working industry
DE Paper and printing industry
DF Coal and crude oil treatment, nuclear fuels and radioactive elements production
DG Chemical and pharmaceutical industry
DH Rubber and plastic industry
DI Glass, ceramics, china and building materials industry
DJ Metal production and metal industry
DK Production of machines and equipment
DL Production of electric and optic equipment
DM Production of means of transport
DN Furniture production and secondary materials processing
E Production and distribution of electricity, gas and water
F Building industry
G Trade and reparation of motor vehicles and consumer goods
H Accommodation and restaurants
I Transportation, warehousing, post-offices and telecommunications
K Activities related to real-estate, and renting
N Health services

Appendix 2 - Sector Descriptive Statistics

Descriptive Statistics for Debt-to-Assets Ratio						
[(TA-E)/TA, in %]*						
Sector	Average		Median		Standard Deviation	
	J-S	ALL	J-S	ALL	J-S	ALL
H Accommodation & restaurants	25.8 (1)	26.7 (1)	18.5 (1)	18.7 (1)	21.9 (12)	20.5 (8)
A,B Agriculture & fishery	28.4 (2)	27.6 (2)	27.2 (2)	26.1 (2)	11.4 (1)	12.5 (1)
E Utilities	34.5 (3)	33.3 (3)	36.1 (4)	34.0 (4)	21.0 (11)	21.7 (11)
DD Wood working	36.5 (4)	49.5 (9)	37.4 (5)	51.1 (14)	17.2 (5)	21.4 (10)
C Mining of raw materials	37.0 (5)	36.7 (4)	29.3 (3)	31.9 (3)	22.1 (13)	23.3 (16)
DN Furniture & secondary materials	43.5 (6)	47.9 (8)	43.4 (8)	47.9 (10)	22.3 (14)	22.5 (12)
DI Glass, ceramics, building mat.	43.7 (7)	43.2 (5)	45.0 (12)	44.5 (7)	19.6 (7)	20.2 (7)
I Transp., warehousing, telecoms	44.0 (8)	45.3 (6)	41.9 (7)	42.4 (5)	25.1 (21)	28.0 (21)
N Health services	44.5 (9)	46.0 (7)	38.2 (6)	43.8 (6)	16.0 (3)	16.7 (4)
DK Prod. of machines & equipment	47.2 (10)	50.4 (13)	44.2 (9)	47.6 (9)	22.3 (15)	23.0 (13)
DM Prod. of means of transport	48.1 (11)	55.4 (19)	44.7 (11)	55.0 (18)	22.8 (16)	24.5 (18)
DB Textile, clothing & leather	49.7 (12)	50.2 (12)	48.9 (14)	49.0 (13)	20.6 (9)	21.0 (9)
DE Paper and printing	50.0 (13)	49.9 (11)	45.8 (13)	48.7 (12)	24.8 (20)	24.8 (20)
K Real-estate, and renting	50.3 (14)	53.5 (15)	49.3 (17)	53.3 (17)	31.5 (22)	32.0 (22)
DF Coal & crude oil treatment ...	50.6 (15)	54.5 (17)	44.4 (10)	45.8 (8)	12.8 (2)	16.7 (2)
DG Chemical and pharmaceutical	50.9 (16)	49.6 (10)	49.0 (15)	48.2 (11)	20.6 (10)	23.2 (14)
DL Prod. of electric & optic equip.	51.1 (17)	57.6 (20)	49.1 (16)	57.3 (20)	24.2 (19)	24.5 (19)
DJ Metal production & m. industry	53.1 (18)	54.2 (16)	49.5 (18)	52.0 (15)	23.7 (17)	23.7 (17)
DH Rubber and plastic	54.1 (19)	51.8 (14)	56.1 (20)	52.1 (16)	16.6 (4)	16.7 (3)
DA Food and tobacco	54.1 (20)	54.8 (18)	54.3 (19)	55.2 (19)	18.7 (6)	19.6 (5)
F Building industry	63.0 (21)	65.7 (21)	63.8 (21)	67.2 (21)	20.5 (8)	19.9 (6)
G Trade & rep. of vehicles & CG	70.8 (22)	72.4 (22)	74.6 (22)	76.9 (22)	24.0 (18)	23.2 (15)

Descriptive Statistics for Long-Term Debt-to-Assets Ratio						
[LTL/TA, in %]*						
Sector	Average		Median		Standard Deviation	
	J-S	ALL	J-S	ALL	J-S	ALL
F Building industry	4.3 (1)	4.4 (1)	1.1 (5)	1.1 (5)	7.4 (2)	8.3 (2)
DD Wood working	6.2 (2)	14.2 (21)	3.3 (11)	11.3 (21)	7.4 (3)	15.1 (14)
H Accommodation & restaurants	6.3 (3)	7.1 (2)	0.5 (2)	0.6 (3)	9.0 (4)	10.3 (3)
DK Prod. of machines & equipment	7.5 (4)	7.7 (3)	2.4 (7)	2.3 (7)	12.3 (11)	12.2 (6)
DM Prod. of means of transport	7.8 (5)	8.6 (7)	0.9 (3)	0.8 (4)	13.2 (12)	14.9 (12)
K Real-estate, and renting	8.0 (6)	8.6 (6)	0.0 (1)	0.0 (1)	16.5 (17)	17.0 (19)
DA Food and tobacco	8.1 (7)	9.0 (8)	4.8 (12)	5.0 (14)	10.7 (6)	12.3 (7)
A,B Agriculture & fishery	8.2 (8)	8.5 (5)	7.8 (20)	7.4 (19)	6.4 (1)	7.8 (1)
DL Prod. of electric & optic equip.	8.7 (9)	11.5 (16)	2.6 (8)	2.9 (8)	14.5 (15)	18.5 (22)
DI Glass, ceramics, building mat.	9.5 (10)	10.7 (12)	2.9 (10)	3.7 (10)	12.3 (9)	14.9 (13)
I Transp., warehousing, telecoms	9.5 (11)	8.4 (4)	5.7 (15)	3.1 (9)	12.3 (10)	12.4 (8)
DB Textile, clothing & leather	9.6 (12)	11.0 (14)	7.0 (18)	7.6 (20)	11.3 (7)	12.1 (5)
C Mining of raw materials	10.0 (13)	9.2 (9)	1.1 (4)	1.2 (6)	16.3 (16)	14.5 (11)
DE Paper and printing	10.6 (14)	10.8 (13)	2.8 (9)	5.2 (15)	13.8 (13)	13.6 (9)
DN Furniture & secondary materials	11.8 (15)	11.3 (15)	6.2 (16)	4.9 (13)	14.2 (14)	14.0 (10)
G Trade & rep. of vehicles & CG	12.3 (16)	10.3 (10)	1.8 (6)	0.4 (2)	19.2 (22)	18.0 (21)
DJ Metal production & m. industry	12.3 (17)	12.3 (18)	4.9 (13)	5.6 (16)	17.1 (20)	16.4 (17)
E Utilities	12.3 (18)	11.6 (17)	5.1 (14)	4.8 (12)	16.5 (18)	16.7 (18)
N Health services	13.0 (19)	17.3 (22)	14.7 (22)	15.4 (22)	10.5 (5)	16.2 (16)
DH Rubber and plastic	13.3 (20)	10.6 (11)	12.3 (21)	7.4 (18)	11.3 (8)	11.4 (4)
DF Coal & crude oil treatment ...	13.5 (21)	13.6 (20)	6.5 (17)	6.8 (17)	17.0 (19)	16.0 (15)
DG Chemical and pharmaceutical	15.9 (22)	12.8 (19)	7.7 (19)	3.8 (11)	18.5 (21)	17.1 (20)

* Sectors are in ascending order according to the average (long-term) debt-to-assets ratio of joint-stock companies. Numbers in brackets represent the relative position of the sector (1 to 22) for respective criteria.