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The determinants of corporate debt maturity structure: evidence from Czech firms

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The determinants of corporate debt maturity structure: evidence from Czech firms

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Abstract:
This paper investigates the determinants of the corporate debt maturity structure of Czech firms. The theoretical section provides an overview of contemporary theories on corporate debt maturity structure. The regression section describes an econometric model showing that the long-term debt increases with Firm size, Leverage and Asset maturity. The impact of Growth options, Collateralizable assets, Firm tax rate, and Firm level volatility has been found out as statistically insignificant. The portfolio analyses section of this paper shows the bank-based system pattern of financing of Czech firms, increasing importance of intra-group financing and increasing presence of Maturity matching principle. Finally, the paper discusses the limitations of the results in the field of data, variables, and determinants.

Keywords: corporate debt maturity structure, bank debt, bond debt, short-term debt, long-term debt, transition economy

JEL: G31, G32

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1. Introduction

If we consider the decision making in corporate financing, we can observe two main areas of interest. Besides the debt versus equity decision making (where we can find extensive research in the area of capital structure) there is also the factor of debt maturity which is of the same importance; but which usually is not in a focus of financial research. Surprisingly there is rather little empirical evidence on determinants of the corporate debt maturity structure. One of the early papers is Morris (1975), who was focused on U.S. firms. Also the other authors cover mainly U.S. firms (Mitchell, 1993; Scherr and Hulburt, 2001; Stohs and Mauer, 1996; Barclay and Smith; 1995) or U.K. firms (Ooi, 1999; Ozkan, 2002; Ozkan, 2000) and there is also only a limited list of papers focused on cross-country comparison; see Antoniou et al. (2003) and Fan et al. (2003). We can also see that empirical evidence is more available in case of market-based financial systems and more limited in case of bank-based financial systems (see cross-country comparison above or Cai et al.; 1999). And since there is a limited empirical evidence on the corporate debt maturity structure in case of advanced economies, there is no empirical evidence for transition countries. This paper presents the evidence for the Czech firms, which can be seen as a good representative of the group of transition countries.

Do we really know how financial practitioners decide on financing tools of their firms? When and why do they choose bank debt, bond debt, or leasing? According to which terms do they decide on the maturity of these debts? And are the firms really the decision makers on the financing tools, or are they only decision takers forced by the external factors (bank-based and market-based conditions, debtholders decisions)? Despite the huge theoretical and empirical research, not all of the above mentioned questions can be satisfactorily answered. This paper aims to improve our knowledge on decision making in corporate financing particularly in case of Czech firms. Are the patterns of the corporate debt maturity structure of Czech firms similar to the other developed countries or can we observe some deviations that might be the product of past dependency on command economy? This paper tries to answer this question too.

The paper aims to provide us with an additional stone for the mosaic of empirical evidence of Czech firms' financing. The capital structure issues have been already investigated by Bauer (2004) based on the data from Visegrad countries, by Weill (2001) based on the data from Eastern European countries, or by Palata (2004) focusing on data from Čekia (similar to ours, see below). Kočenda and Lízal (2003) provided empirical analyses of financial distress of the

Czech firms. Dvořák (2004) delivered an opinion survey with Czech CFO[1] on the issues of decision making in financing. This paper provides data evidence on the corporate debt maturity structure.
The paper proceeds as follows. Section two provides an overview of theories of debt maturity structure, section three provides an econometric empirical analysis, section four provides an additional portfolio analysis, section five discusses limitations of the result, and section six concludes.

2. Theories of debt maturity structure

Before we can build up an empirical model for the determinants of the corporate debt maturity structure, we need to deliver a survey of theoretical points of departure for our research. The literature offers several leading theories on debt maturity structure, namely Agency costs, Leverage, Maturity matching, Taxes, and Signaling.

2.1. Agency costs

The first group of theories on the debt maturity structure regards agency costs as an important determinant of the debt maturity. We consider Growth options, Size, and Collateralizable assets as the major ones.

Growth options

The primal study on the growth options is Myers (1977) who argues that corporate future investment opportunities can be considered as options. The value of these growth options then depends on the probability that the firms will exercise them optimally. In case of firms the profits from the investments are split among the shareholders and the debtholders accordingly. But in some cases the debtholders may capture too high share of the profit leaving a below normal returns to the shareholders. This may create incentive problems for the shareholders since in this particular case the shareholders are keen to reject an investment with a positive net present value. Myers (1977) calls this situation an underinvestment problem. He further argues that the maturity of the debt can play an important role in solving this issue. Firms can issue more short-term debt which matures and can be re-contracted before the growth options can be exercised. "Thus it seems that permanent debt capital is best obtained by a policy of rolling over short-term maturity debt claims." (Myers, 1977:159) Similarly, Barnea et al. (1980) also argue for shortening of the debt maturity, which can serve as a mitigation tool for the agency conflicts between the shareholder and the debtholders. "If the debt matures prior to the exercise of the investment option, the agency problem disappears." (Barnea et al., 1980:1233)

Size

It is widely accepted by the current literature that larger firms have lower agency costs of the debt (Ozkan, 2000; Yi, 2005; Whited, 1992), because these larger firms are believed to have an easier access to capital markets (they can more easily overcome the transaction costs) and a stronger negotiation power (they have a stronger position in the debt negotiation than smaller firms). Hence both these arguments favor larger firms for issuing more long-term debt compared to smaller firms. In addition to it Smith and Warner (1979) argue that smaller firms

[1] CFO – chief financial officer

are more likely to face higher agency costs in terms of a conflict of the interest between shareholders and debtholders.

Collateralizable assets

The volume of collateralizable assets (e.g. assets such as inventory or premises that can be pledged in favor of the creditor) in the firm's balance sheet is also believed to have an impact on the debt maturity structure (Whited, 1992). Firms with higher share of collateralizable assets can pledge this asset in favor of the long-term debtholders. This favors these firms in comparison to the firms with less collateralizable assets. The firms with less collateralizable assets are thus believed to have less long-term debt and more short-term debt. The impact of the collateralizable assets is widely accepted, especially in terms of long-term debt discussions. Although the short-term financing is to some degree provided on bianco basis (with no collateral), the bianco approach for the long-term debts is very rare and the collateral plays a very important role.
Based on these agency costs arguments, we will consider the impact of Growth options, Firm size and Collateralizable assets on the corporate debt maturity structure.

2.2. Leverage

Leland and Toft (1996) theoretically show that firms with higher leverage tend to choose longer maturity of the debt and vice versa. "Optimal leverage depends upon debt maturity, and is markedly lower when the firm is financed by shorter term debt." (Leland and Toft, 1996: 1014) Morris (1992) also argues that firms with higher debt ratio tend to issue more long-term debts in order to delay their exposure to bankruptcy risk. On the other side the tax and agency theories predict opposite effects of the leverage on the debt maturity. Therefore the impact of the leverage on the debt maturity structure is an empirical puzzle.
Based on these arguments, we will consider the impact of Leverage on corporate debt maturity structure.

2.3. Maturity matching

Maturity matching can be considered as liquidity immunization of the balance sheet structure. Stohs and Maurer (1996) or Morris (1976) argue that a firm can face risk of not having sufficient cash in case the maturity of the debt is shorter than the maturity of the assets (the debt service is shorter than the asset life cycle e.g. ability to produce the cash flow) or even vice versa in case the maturity of the debt is longer than the maturity of assets (the cash flow from assets necessary for the debt repayment terminates). Following these arguments, the maturity matching principle belongs to the determinants of the corporate debt maturity structure.
Additionally, Myers (1977) argues that maturity matching of firm assets and liabilities can also partially serve as a tool for mitigation of the underinvestment problem, which was discussed in the agency costs theory section. Here the maturity matching principle ensures that the debt repayments shall be due according to the decline of the asset value. "… we can interpret matching maturities as an attempt to schedule debt repayments to correspond to the decline in future value of assets currently in place." (Myers, 1977:171)
Gapenski (1999) differentiates two strategies of maturity matching namely the accounting and financing approach. The accounting approach considers the assets as current and fixed ones and calls for the financing of the current assets by short-term liabilities, and of the fixed assets by long-term liabilities and equity. The financing approach considers the assets as permanent and temporary. In these terms the fixed assets are definitely permanent ones and some stable

part of the fluctuating current assets is also taken as permanent. This approach then suggests financing the permanent assets by long-term funds (long-term liabilities and equity) and temporary assets by short-term liabilities. Consequently, the financing approach generally employs ceteris paribus more long-term liabilities than the accounting approach does.
The financing approach (borrowing more on long-term basis) brings more stable interest costs than the accounting approach; but as the yield curve is usually upward sloped, the financing approach is also more costly. The financing approach versus accounting approach decision-making is thus a classical risk return trade-off relationship. In praxis, the corporates commonly favor the accounting approach before the finance approach, the same holds for our consideration of maturity matching for the empirical evidence of the debt maturity structure.
Based on these Maturity matching arguments, we will consider the impact of balance sheet liquidity immunization on the corporate debt maturity structure.

2.4. Taxes

Kane et al. (1984) introduced a model that incorporated endogenous determinants of the optimum corporate debt maturity: corporate and personal taxes, bankruptcy costs and flotation costs (transaction costs of external financing). Their optimum debt maturity setting involves a trade-off between the advantage of corporate debt tax shield and the disadvantage of bankruptcy and flotation costs. They found out that the optimum debt maturity increases with
i) increasing flotation costs: "As expected, the higher the transaction costs associated with a debt issue, the grater is the optimal maturity of the debt, since more time is required to amortize the flotation costs." Kane et al. (1984:15),
ii) decreasing corporate debt tax shield: "In addition, a high personal tax rate is generally associated with higher optimal maturity. This is again due to the fact that at a lower tax advantage, a longer maturity is required to amortize the flotation costs incurred in issuing the debt. At very high personal tax rates, it becomes optimal for the firm to issue no debt because the tax advantage net of bankruptcy costs is never great enough to offset amortized transactions costs, whatever the maturity." Kane et al. (1984:15)
iii) decreasing volatility of the firm value "reflecting the fact that with less volatile asset returns, the firm rebalances its capital structure less frequently." Kane et al. (1984:17)
Based on these tax arguments, we will consider the impact of an effective Tax rate and Firm value volatility on the corporate debt maturity structure. We will omit the impact of flotation costs, as they are hard to be measured in our terms.
In order to make the survey of theories on debt maturity structure as much comprehensive as possible we deliver also a list of debt maturity arguments whose impact has not been investigated in this paper.

2.5. Signaling

Signaling quality

The signaling models predict that the corporate debt maturity structure is related to the degree of asymmetric information between insiders and outsiders (investors). It is generally accepted that the corporate debt maturity structure can signal information about quality of a firm. Flannery (1986) argues that the debt maturity can serve for more informed insiders as a signaling tool towards less informed outsiders. He further argues that low-quality firms (Bad firms in his terminology) prefer more long-term debt and high-quality firm prefer more short-term debt. This is supported by the fact that in transaction costs environment the low-quality firm cannot afford to roll-over the short-term debt as they face a considerable risk of financial

distress in case the debt shall not be prolonged. Flannery (1986) further argues that high-quality firms (Good firms in his words) will issue more short-term debt than low-quality firms. The managers of the high-quality firms voluntarily expose the firms to the risk of the debt renegotiation after more information is available to the outsiders, as they expect this information to be positive. As a result, the high-quality firms signal their type by issuing the short-term debt. Consequently, the firms will wait with the debt issue if they expect that there will be good news; but will not wait until bad news are released.
Due to the fact that the corporate quality showed to be very hardly proxied, we retreat from the investigation of the above-mentioned signaling arguments on corporate debt maturity structure.

Liquidity risk or creditworthiness risk

The liquidity risk or financial distress risk provides strong incentives for firms to borrow on long-term basis. Diamond (1991) argues that short-term debt allows for renegotiation of debt costs after good news about the firm are released, which is in line with Flannery (1986) above. On the other side the short-term debt represents liquidity risk for the debtor, which would arise if the short-term debt would not be renegotiated. Thus a typical trade-off relationship arises. Diamond (1991) further argues that low-quality debtors with low cash-flows for long-term debt repayments are forced to borrow on short-term basis. Middle-quality debtors favor long-term financing since they face higher liquidity risk than the high-quality debtors. And high-quality debtors who face low liquidity risk do favor short-term borrowing. At the end there are two types of borrowers on short-term basis: those of high-quality and those of low-quality whereas firms in between of middle-quality are expected to borrow on long-term basis. "Debt maturity choice is analyzed as a trade-off between a borrower's preference for short-term debt due to private information about the future credit rating, and liquidity risk." (Diamond, 1991:709) However the predictions of the Diamond model are not testable in the Czech environment. We lack of necessary comprehensive data, therefore we retreat from the investigation of the above-mentioned creditworthiness arguments on corporate debt maturity structure. In addition to it we see surprisingly that the arguments on signaling quality and signaling creditworthiness have produced different hypotheses for very similar determinants. Here the theory of corporate finance is to be streamlined in the future.

Firm age

Scherr and Hulburt (2001) also argue that firm age can be employed as a signaling tool. In these terms older firms are said to signal through the age to be more stable than the younger firms. Therefore the older firms are expected to have larger share of long-term debt than the younger firms do. But again since we lack of necessary data, we retreat from the investigation of the above-mentioned firm age arguments on corporate debt maturity structure.

3. Empirical analysis

At this time we have sufficiently evolved the theoretical arguments in order to be able to approach the empirical part. In this section we discuss and set the dependant variable, the explanatory variables and the hypotheses; then we compose the regression equation, describe the sample of firms, provide the descriptive statistics for the sample, deliver the regression results, and compare these results with other empirical analyses.

3.1. Debt maturity structure measure – dependant variable

The debt maturity structure is usually depicted as a ratio of long-term debt to total debt. The long-term debt is considered either as a debt maturing over one year or as a debt maturing over longer period (mostly five years). In our case the ratio of debt maturing over one year to total debt is employed and the variable is written as follows

$$\text{Debt maturity structure} = \frac{D1}{TD}\,^{2}. \tag{1}$$

There are several reasons for using this form. First, there is no data enabling differentiation of particular maturities of the debt and only two-fold differentiation of an up-to-one-year and over-one-year debt is available in the firm financials. Second, in the Czech financial system the creditors are not very keen to finance on longer than five years maturity basis, therefore the differentiation between a below-five-year debt and over-five-year debt would not be fruitful. And finally, the financial practitioners pay less attention to particular maturities of long-term debt than to short-term debt vs. long-term debt decision-making.

3.2. Proxies for debt maturity structure determinants

Growth options

Hypothesis 1: Firms with more growth options have shorter debt maturity structure.

Growth options can be measured in several ways. One approach compares the market value and book value of the assets, which can be written as

$$\text{Growth options} = \frac{MV}{BV}\,^{3}. \tag{2}$$

This follows an argument that firms with positive expectations from the financial market are to have more growth options. Consequently the difference of the market value and the book value of its assets shall be higher than it is in case of a firm with negative financial market expectations. Naturally, this approach is not employable for Czech firms, as the market value is known only to a very limited set of firms (since the Czech financial system is a bank based one).

The second approach considers development of fixed assets as a proxy for the growth options. Here investments of the firm into fixed assets are considered as a signal for the market that the firm is increasing its capacity and thus has positive future expectations. This can be depicted by either a ratio of annual depreciation to total assets (if this increases, the firm has invested into fixed assets) written as

$$\text{Growth options} = \frac{D}{TA}\,^{4} \tag{3}$$

or by a relation of annual capital expenditures (CAPEX) to total assets which is a proxy more rapidly mirroring the changes of fixed assets written as

$$\text{Growth options} = \frac{CAPEX}{TA}\,^{5}. \tag{4}$$

[2] Where D1 is debt maturing over 1 year and TD is total debt

[3] Where MV is market value of the firm and BV is book value of the firm.

[4] Where D is depreciation and TA is total assets

[5] Which stands for capital expenditures where CAPEX is capital expenditures and TA are total assets

We employed both determinants separately in the computations. Their significance shall be discussed in the regression results paragraphs.

Size

Hypothesis 2: Larger firms have longer debt maturity structure.

The size of the firm can be measured in two ways. This can be either in terms of the volume of the production (revenues in fixed price level) written as

$$\text{Firm size} = \ln R \quad [6] \tag{5}$$

or in terms of the volume of the property (total assets) written as

$$\text{Firm size} = \ln TA \quad [7]. \tag{6}$$

As the impact of the size is expected to be lower for larger firms, usually natural logarithm of the proxy for the size is used. We employed both determinants separately in the computations and have found their very similar explanatory power. Therefore only the variable from equation (5) occurs in the regression results.

Collateralizable assets

Hypothesis 3: Firms with more collateralizable assets have longer debt maturity structure.

The collateralizable assets are those assets that can be pledged in favor of the creditor. They serve as a tool for mitigation of creditor's risk exposure since they are sold in favor of the debtholder if the debt is defaulting. Usually intangible assets (such as goodwill or licenses) are not easily collateralizable whereas tangible assets (such as inventory or premises) are collateralizable. Therefore ratio of the tangible assets (excluding financial fixed assets) to the total assets written as

$$\text{Collateralizable assets} = \frac{Tan}{TA} \quad [8] \tag{7}$$

usually serves as a proxy for collateralizable assets.
But this commonly used proxy also takes current assets into account; as the tangible assets comprise both current tangible assets (inventory) and fixed tangible assets (premises). We do not fully agree with this approach, as current tangible assets can be hardly employed for the collateralization of the long-term loans. The merchandise is going to be sold soon and the material is going to be processed into finished products and again further sold. Such loan would become uncollateralized later on. To take this into consideration, we employ an adjusted proxy for the collateralizable assets written as follows

$$\text{Collateralizable assets} = \frac{TanFA}{TA} \quad [9], \tag{8}$$

which considers the tangible fixed assets as the only collateralizable asset for the long-term debt.

[6] Where R are revenues

[7] Where TA are total assets

[8] Where Tan are tangible assets and TA are total assets

[9] Where TanFA are tangible fixed assets and TA are total assets

Leverage

Hypothesis 4: Firms with higher leverage have longer debt maturity structure.

The measure of the leverage can be twofold. First, this can be measured fully in the book values as a ratio of total debts to total assets

$$\text{Leverage} = \frac{TD}{TA} \quad [10] \tag{9}$$

or this can also be measured as a combination of book and market values as a ratio of total debts to total debts plus the market value of equity

$$\text{Leverage} = \frac{TD}{MV_E + TD} \quad [11]. \tag{10}$$

As the market values for the equity are available only for a very limited amount of firms in the Czech republic, the prior proxy is employed.

Maturity matching

Hypothesis 5: Firms with longer asset maturity have longer debt maturity structure.

The impact of maturity matching can also be measured twofold. The first measure considers the ratio of the long-term funded assets to the total assets

$$\text{Asset maturity} = \frac{FA}{TA} \quad [12]. \tag{11}$$

The second measure interprets the assets' maturity in terms of time

$$\text{Asset maturity} = \frac{PPE}{D} \quad [13]. \tag{12}$$

The fist measure takes into consideration the whole volume of funded assets but disregards its true particular maturities (some assets are utilized for longer time than others). The second measure on the other side takes into consideration the true particular maturity of the property, plant and equipment, but again, it disregards the impact of other fixed assets such as the intangible fixed assets (licenses) or financial fixed assets (subsidiaries) which are not depreciated but which are also said to be funded on a long-term basis.

We have already noted that the liquidity immunization of the balance sheet structure suggests funding of fixed assets on a long-term basis, e.g. by long-term liabilities and/or equity. Therefore the proposed determinant in equation (11), which is commonly used in papers on the corporate debt maturity structure (such as Heyman et al.; 2003), does not fully represent this claim, as it does not consider the volume of the equity in terms of fixed assets funding. Therefore, we employ an adjusted determinant for the impact of the maturity matching, which can be written as follows

$$\text{Asset maturity} = \frac{FA - Eq}{TA} \quad [14], \tag{13}$$

where only excess of the fixed assets over the equity is to be funded through the liabilities on a long-term basis.

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[10] Where TD is total debt and TA are total assets

[11] Where TD is total debt and MV_E is market value of equity

[12] Where FA are fixed assets and TA are total assets

[13] PPE is property, plant and equipment and D is annual depreciation

[14] Where FA are fixed assets, Eq is equity and TA are total assets

Taxes

Hypothesis 6: Firms with higher effective income tax rate have longer debt maturity structure.

The effective income tax rate is usually measured as a ratio of taxes paid to the pre-tax income

$$\text{Firm tax rate} = \frac{T}{PTI}\ ^{15}. \tag{14}$$

The taxes paid include both due taxes and deferred taxes; hence the impact of the deferred taxes is omitted. Deferred taxes have a strong impact on this variable by making it both very volatile and less dependant on the previous financial year, which makes the explanatory power of this determinant rather weak.

Firm level volatility

Hypothesis 7: Firms with less volatile asset returns have longer debt maturity structure.

The general proxy for the firm value volatility is taken as the earnings volatility. Usually the variance of the EBITDA[16] scaled by total assets is considered an appropriate variable

$$\text{Firm level volatility} = \frac{EBITDA_t - EBITDA_{t-1}}{TA_{t-1}}\ ^{17} \tag{15}$$

or alternatively a variance of the EBITDA scaled by the EBITDA is also employed

$$\text{Firm level volatility} = \frac{EBITDA_t - EBITDA_{t-1}}{EBITDA_{t-1}}\ ^{18}. \tag{16}$$

We employed both determinants separately in the computations and we have found their very similar explanatory power. Therefore only variable from equation (16) occurs in the regression results.

3.3. Regression equation

Based on the arguments in the theories of the debt maturity structure section and in the proxies for the debt maturity structure determinants section, the regression equation can be written in a following form

$$\begin{aligned} \frac{Dl}{TD} &= \alpha + \beta_1\left(\frac{D}{TA}\right) + \beta_2(\ln S) + \beta_3\left(\frac{TanFA}{TA}\right) + \\ &\beta_4\left(\frac{TD}{TA}\right) + \beta_5\left(\frac{FA-Eq}{TA}\right) + \beta_6\left(\frac{T}{PTI}\right) + \beta_7\left(\frac{EBITDA_t - EBITDA_{t-1}}{EBITDA_{t-1}}\right) + \varepsilon_i \end{aligned} \tag{17}$$

or can be also rewritten in the verbal form as

[15] Where T is tax expense and PTI is pre-tax income

[16] EBITDA – earnings before interests, taxes, depreciation and amortization

[17] Where EBITDA is earnings before interests, taxes, depreciation and amortization, TA is total assets and t is time

[18] Where EBITDA is earnings before interests, taxes, depreciation and amortization, TA is total assets and t is time

$$DMS = \alpha + \beta_1(Growth\_options) + \beta_2(Firm\_size) + \beta_3(Collateralizable\_assets) + \beta_4(Leverage) + \beta_5(Asset\_maturity) + \beta_6(Firm\_tax\_rate) + \beta_7(Firm\_level\_volatility) + \varepsilon_i \quad , \quad (18)$$

where DMS is the debt maturity structure,
where α as the intercept and β_i are the unknown parameters of interest and
where ε_i stands for the error term.
The major literature on the corporate debt maturity structure uses plain OLS method for the regression analysis (see Comparative analysis section below). In Ooi (1999) the significance of these plain OLS results is at least not worse than of other methods. However in our computations the plain OLS model did not show as the most proper one, as the Theta measure computed close to zero indicated that the panel data models are to be employed. Here, Baltagi (2001:65) suggests the Hausman's specification test for the decision-making mechanism between the fixed effects model and the random affects model. Based on this test the fixed effects model was indicated as the most proper one.

3.4. Sample of firms

Data was kindly provided by Čekia[19]. They included the financial statements (the balance sheet and the profit and loss account) for all the firms in the Čekia's database for years 2000-2004. The financial statements were provided with various detailed structures (in full wording or in limited wording with subtotals) for firms of differing state (active, in bankruptcy, liquidation, etc.) from different sectors (financial, manufacturing, services etc) for differing years (not all firms were covered for the whole time period). Naturally, this data set needed to be processed later on to enable the empirical analysis. Generally, the data processing was tackling two issues: the data structure (such as firms covered) and the data (in)consistency (such as illogical data entries).
First, the data structure was handled and the firms from inappropriate sectors (financial institutions), states (bankruptcy, liquidation), and legal statuses (municipalities, private entrepreneurs, etc.) were omitted. Second, the data (in)consistency was handled as the data set included some illogical data entries, which needed to be adjusted. Therefore, the following data entries were omitted: firms with negative assets (for some reasons, these firms exist), firms with very little detailed structure of financial statements (determinants of the debt maturity structure could not be computed), years with double data entries (some firms were reported more than once for particular year, mainly with differing detailed structure of financial statements), firms of unknown business sector, and some other inconsistent data entries.
This data set was further employed for the econometric analysis, which was computed in TSP software.

3.5. Descriptive statistics

Table 1 reports the descriptive statistics for the dependant and explanatory variables. The data set employed for the empirical evidence included balanced panel data of 793 firms, each firm was provided with financial statements for five years (2000-2004) making 3965 data entries in total.

[19] Česká kapitálová informační agentura – Czech capital information agency

Table 1: Descriptive statistics for dependant and explanatory variables

Descriptive statistics	Valid N	Mean	Std. dev.
Debt maturity structure	3965	0,35	0,4407
Growth options	3965	0,05	0,1858
Firm size	3965	7,90	5,6554
Collateralizable assets	3965	0,43	1,5038
Leverage	3965	0,09	0,2011
Asset maturity	3965	-0,04	0,4805
Firm tax rate	3965	0,15	3,9974
Firm level volatility	3965	6 987	328 820

Table 2 reports the correlations matrix for the dependant and explanatory variables. The correlations are generally in line with the expectations of the regression model. The coefficients of correlation of explanatory variables are generally low. However, there are some exceptions of stronger correlations. First, Growth options strongly positively correlate with Collateralizable assets. Since tangible fixed assets are largely depreciated (only land is not depreciated) and also as there are few other assets than tangible fixed assets (as software) that are depreciated, the volume of depreciation is highly dependent on the volume of tangible fixed assets. Therefore these two explanatory variables correlate strongly. Second, Growth options also positively correlate with Leverage. This might be due to the fact that indebted firms have higher share of depreciated assets (mainly tangible fixed assets) and vice versa. Third, Growth options further negatively correlate with Asset maturity. Here the intuitive explanation does not seem to be at hand, as the Asset maturity is computed as an interaction of both fixed assets and equity levels. Fourth, Collateralizable assets positively correlate with Leverage, which is similar to the correlation of Growth options and Leverage. It might be the case that firms with higher share of tangible assets are more heavily indebted and vice versa. Fifth, Collateralizable assets are also negatively correlated with Asset maturity. Again, the explanation is not straightforward similarly to the case of the correlation of Growth options and Asset maturity. The only simple explanation would be that firms with tangible assets tend to have an excess of equity over fixed assets (and thus less need of long-term funds).

Table 2: Correlation matrix for dependant and explanatory variables

Correlation matrix	Growth options	Firm size	Collateralizable assets	Leverage	Asset maturity	Firm tax rate	Firm level volatility	Debt maturity structure
Growth options	1	0,038	0,976	0,583	-0,466	0,001	-0,001	0,048
Firm size	0,038	1	0,042	0,287	0,051	0,038	0,034	0,142
Collateralizable assets	0,976	0,042	1	0,598	-0,447	0,003	0,002	0,074
Leverage	0,583	0,287	0,598	1	-0,007	0,009	0,029	0,275
Asset maturity	-0,466	0,051	-0,447	-0,007	1	0,007	0,018	0,164
Firm tax rate	0,001	0,038	0,003	0,009	0,007	1	0,001	0,005
Firm level volatility	-0,001	0,034	0,002	0,029	0,018	0,001	1	0,008
Debt maturity structure	0,048	0,142	0,074	0,275	0,164	0,005	0,008	1

3.6. Test of data set on macroeconomic environment

Table 3 provides comparison of the Čekia data set used for our empirical analysis with data set of Czech statistical office (CZSO) as representative of general macroeconomic environment. Both portfolios are divided into industries according to NACE. However the CZSO portfolio includes only firms having more than 100 employees whereas the Čekia portfolio does not differentiate according to employees amount. Here small differentiation arises but still this is fully acceptable for the first approximation of the test of our data set with general macroeconomic environment. In general, the difference in the firms portfolio of Čekia and CZSO is not strong. The Čekia data set includes less manufacturing firms that are outweighed by more utilities and trading firms (wholesale, retail and others). This shows our data set is not to be biased from the general macroeconomic environment and the regression results can be considered as plausible.

Table 3: Data sets of CZSO and Čekia

NACE	Industry name	Czech Statistical Office		Čekia	
A	Agriculture, hunting, forestry	7,7%		5,3%	
01	Agriculture, hunting, forestry and related activities		6,8%		4,4%
02	Forestry and related activities		1,0%		0,9%
B	Fishing	0,1%		0,3%	
C	Mining	0,9%		1,4%	
D	Manufacturing	55,2%		38,1%	
DA	Manufacture of food, drink and tobacco products		7,0%		5,5%
DB	Manufacture of textile and textile products		3,9%		2,5%
DC	Manufacture of leather and leather products		0,7%		0,0%
DD	Manufacture of wood products except for furniture		1,5%		0,8%
DE	Manufacture of pulp and paper		2,3%		1,5%
DF	Manufacture of oil and oil products		0,1%		0,4%
DG	Manufacture of chemical and pharmaceutical products		1,9%		2,8%
DH	Manufacture of rubber and rubber products		3,6%		1,8%
DI	Manufacture of other non-metal mineral products		3,6%		3,7%
DJ	Manufacture of basic metals and metal products		8,4%		4,9%
DK	Manufacture of machineries		8,1%		5,8%
DL	Manufacture of electrical and optical devices		7,1%		2,9%
DM	Manufacture of transportation vehicles		4,0%		4,0%
DN	Manufacture of other products		3,1%		1,5%
E	Utilities	2,7%		10,6%	
F	Construction	6,7%		7,9%	
G	Wholesale, retail and repair of conveyance and products for personal use	10,5%		17,3%	
H	Accommodation	1,8%		0,5%	
I	Transportation	5,1%		5,4%	
K	Real estate activities	9,2%		13,2%	

3.7. Regression results

Table 4 reports the regression results for the model one and the model two. We list the results for two models separately, for both models we provide fixed effects and plain OLS results. However as we already mentioned the fixed effects model (and not the plain OLS model) is to be considered as appropriate for our data (as the theta is 0,153). Therefore the commentary of results shall mention only fixed effects and plain OLS remains for informational purposes only. The model one includes full list of explanatory variables listed in the hypotheses section to be considered. Model two does not include variables Firm tax rate and Firm level volatility, that were not found as statistically significant in model one for both fixed effects and plain OLS.

The major explanatory variables have been found significant and more importantly also in line with the theoretical predictions (which are noted as an expected sign in the table). The Firm size has been found to have a statistically significant positive impact on the corporate debt maturity structure. Larger firms tend to have more long-term debt since they are said to have lower agency costs, better access to debtholders and stronger negotiation power. The Leverage has been found to have a statistically significant positive impact on the corporate debt maturity structure. More indebted firms tend to have more long-term debt and less indebted firms tend to have less long-term debt, which is a very intuitive result. The Asset maturity has been found to have a statistically significant positive impact on the corporate debt maturity structure. The firms have been found to conduct the maturity matching of their balance sheet following simple rule that fixed assets need to be funded by long-term funds (that is by the equity or by long-term debt). However remaining explanatory variables, namely Growth options, Collateralizable assets, Firm tax rate and Firm level volatility have not been found to have any statistically significant impact on the debt maturity structure. The Growth options and the Collateralizable assets have been found statistically significant in plain OLS computation, however this was not the case for the fixed effects approach.

Table 4: Regression results

		Model One		Model Two	
Explanatory variables	Expected sign	Fixed effects	Plain OLS model	Fixed effects	Plain OLS model
Growth options	-	-0,175	-0,617	-0,175	-0,617
		(-0,87)	(-3,51)*	(-0,87)	(-3,51)*
Firm size	+	0,037	0,012	0,036	0,012
		(2,23)**	(3,03)*	(2,21)**	(-3,03)*
Collateralizable assets	+	-0,648	0,039	-0,680	0,039
		(-0,04)	(2,67)*	(-0,04)	(-2,67)*
Leverage	+	0,425	0,066	0,424	0,655
		(8,49)*	(14,46)*	(-8,46)*	(-14,46)*
Asset maturity	+	0,538	0,124	0,053	0,124
		(2,32)**	(7,29)*	(-2,29)**	(7,29)*
Firm tax rate	-	-0,110	0,049		
		(-0,86)	(-0,03)		
Firm level volatility	-	-0,213	-0,617		
		(-1,38)	(-0,31)		
Number of observations		3965	3965	3965	3965
Adjusted R^2		0,6624	0,10989	0,6621	0,10986

* significant at 1% level, ** significant at 5% level, t-statistics in parenthesis

In addition to these results, other findings can also be presented at this place. The Growth options proxied by equation (3) and equation (4) have delivered the same insignificant results. The Size proxied by equation (5) and equation (6) has delivered the same results. Both proxies have been found to have a statistically significant positive impact on the debt maturity structure. In our final models one and two we employed equation (6) as our proxy for Size. Collateralizable assets were insignificant for both equations, in final models equation (7) was used.
The theoretical part also discusses the difference between equation (11) and (13) for proxying of Asset maturity variable. Our arguments in favor of equation (13) have been supported, as this variable has been found statistically significant with a positive impact on the corporate debt maturity structure; whereas the results of equation (11) were statistically at least mixed.
It is necessary to mention, that these presented results are not only fully in line with the theoretical expectations and that they are also in line with other empirics (see below). But most importantly they are in line with intuitive expectations of finance practitioners. Despite the fact that there is no thorough analysis of financial managers' opinions, they would probably name Firm leverage, Firm size, Firm's collateral and Asset maturity as the major driving forces of the corporate debt maturity structure decision making. Nevertheless Firm's collateral has been found as statistically significant for plain OLS only and not for fixed effects.

3.8. Comparative analysis

Table 5 reports the comparison of selected empirical analyses on the corporate debt maturity structure. These papers employed varying proxies for particular determinants (both dependant and explanatory) generally discussed above in section on variables. Results of our analysis are fully in line with the results of other papers.
A full consensus has been found in case of the explanatory variable Leverage and Asset maturity. Some consensus has been found in case of explanatory variables Firm size, Creditworthiness, Firm age, Liquidity, Firm level volatility, Interest rate term structure and Interest rate volatility. Whereas for the remaining explanatory variables Growth options, Collateralizable assets, Firm quality and Firm tax rate it has not been found any consensus.
As the empirical findings for the Czech firms are generally in line with findings of other empirical analysis papers, which were generally focused on standard advanced economies such as Germany, UK or U.S.A., we can state that transition economy firms seem to have a similar pattern in the debt maturity structure decision making as the standard economies firms.

Comparison of regression results

Regression model *	Exp. sign	Stohs and Maurer (1996) FE	Ozkan (2002) CSR	Ozkan (2000) GMM, OLS	Scherr and Hulgurt (2001) OLS	Heyman et al. (2003) OLS, Cross	Antoniou et al. (2003) OLS, GMM	Fan et al. (2003) OLS	Körner (forthcoming) FE
Growth options	-	**Significant positive**	**Significant negative**	**Significant negative**	Insignificant negative	Insignificant negative	**Significant positive for UK**	**Significant negative**	Insignificant negative
Firm size	+	**Significant positive**	**Significant positive**	**Significant positive**	**Significant negative**	**Significant negative**	**Significant positive for UK**	**Significant positive**	**Significant positive**
Collateralizable assets	+							**Significant positive**	Insignificant negative
Firm quality	-	**Significant negative**	Insignificant positive	Insignificant negative	**Significant negative**		Insignificant both positive and negative		
Creditworthiness	+	**Significant positive**				**Significant negative**			
Firm age	+				**Significant positive**				
Leverage	+	**Significant positive**				**Significant positive**	**Significant positive**		**Significant positive**
Liquidity							**Significant positive for Germany**		
Asset maturity	+	**Significant positive**	**Significant positive**	**Significant positive**	**Significant positive**	**Significant positive**	**Significant positive for UK**	**Significant positive**	**Significant positive**
Firm tax rate	-	**Significant negative**	Insignificant negative	Insignificant negative			**Significant positive for Germany**	**Significant both positive and negative**	Insignificant negative
Firm level volatility	-	**Significant negative**	**Significant negative**				**Significant negative for France**		Insignificant negative
I.r. term structure	+	**Significant positive**					**Significant positive for UK**		
I.r. volatility	+						**Significant negative for UK**		

* FE is Fixed effects, CSR is Cross sectional regression, GMM is Generalized method of moments, OLS is Ordinary least squares.

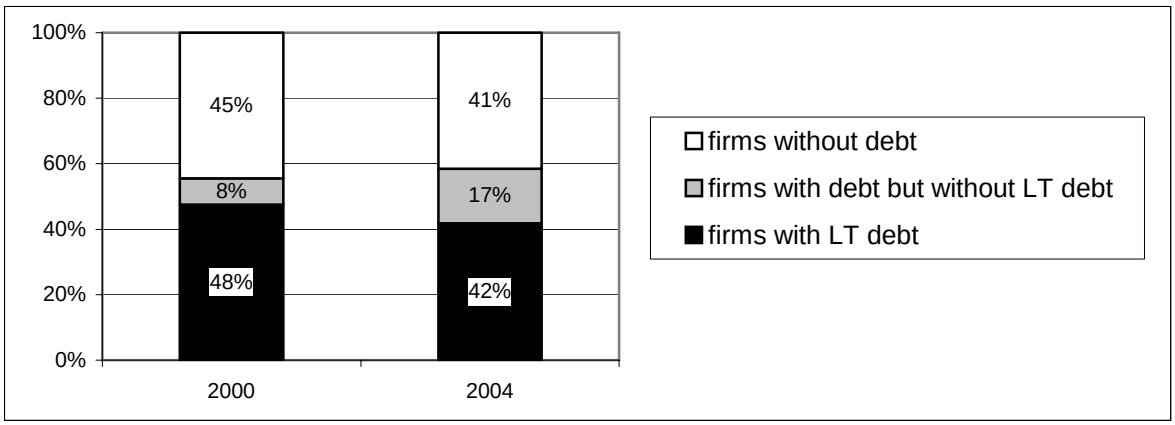
We need to mention to which extent these presented papers differ in their approach to the corporate debt maturity structure. In major cases, the plain OLS model is employed for the computations. The dependant variable is also employed in the form of equation (1). But this consensus cannot be found in explanatory variables.
First, the amount of determinants differs throughout the papers. As some determinants are always used (Growth options, Firm size, and Asset maturity), there are also some determinants used very rarely (such as Firm age). The major factor driving these differences is the data availability. It would definitely be interesting always to investigate the impact of

determinants such as Firm age or Creditworthiness, but as they are not easily accessible, we need to limit ourselves to fewer variables.
Second, even if the same determinants have been employed, the proxies for such determinants can differ. Only in case of the determinant Firm size there is a general consensus with the equation (5). In case of other variables the proxies differ. Growth options are proxied either by the market value in equation (2) and its modifications or by the balance sheet structure in equations (3) or (4). Interestingly, there is no consensus in the findings. Some find the market value approach as statistically significant and some not, the same holds for the latter approach with the balance sheet structure. More interestingly, in case of Firm size, where has been found a consensus with proxy and significance, there was not found the consensus with the sign of impact. Some papers found statistically significant positive impact on the corporate debt maturity structure; other papers found an opposite effect. On the other side the impact of Asset maturity has been always found as statistically significant with a positive sign despite the fact that the particular proxies vary.

4. Portfolio analysis

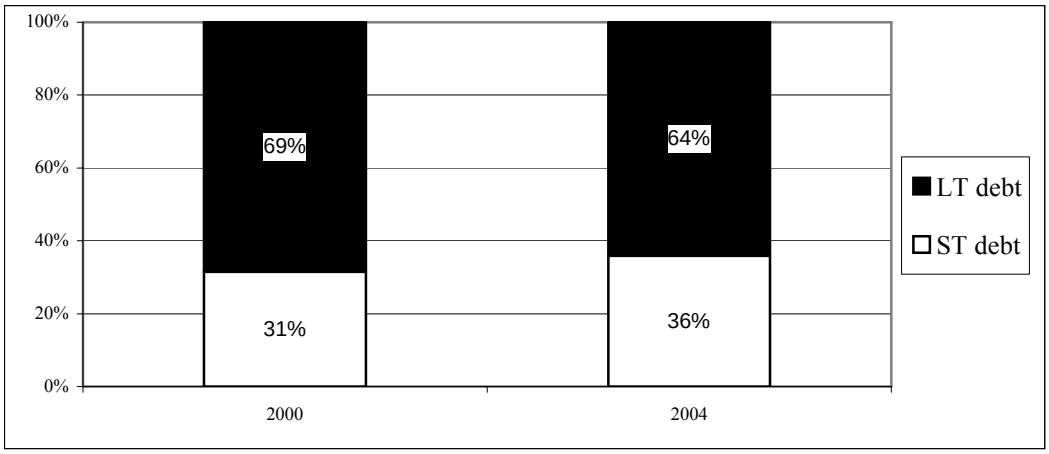
In this section we will focus on the portfolio analysis of the firms of the sample in order to bring some additional information to the regression results. First, the structure of the debt shall be considered, second the interaction of the debt and maturity matching principle shall be investigated. In both cases, we will consider the years 2000 and 2004 as the border times of our sample. Please notice that the same balanced sample of firms as in regression section is used.
Graph 1 provides a comparison of firms and their utilization of debt financing in the firm sample. This is measured as a ratio of the particular group of firms to the total volume of firms in the sample. Slightly below a half of the firms do not utilize any debt (the bank debt, the intra-group debt or other debts) and this ratio did not change much between 2000 and 2004. The pattern changed for the firms utilizing debt since the ratio of firms utilizing only a short-term debt (noted as the firms with a debt but without LT debt) has increased and on the contrary the ratio of firms utilizing both short-term and long-term debt has diminished. This is in line with findings of graph 2 where the ratio of long-term debt to the total debt has decreased.

Graph 1: Firms and debts for sample firms (2000, 2004)



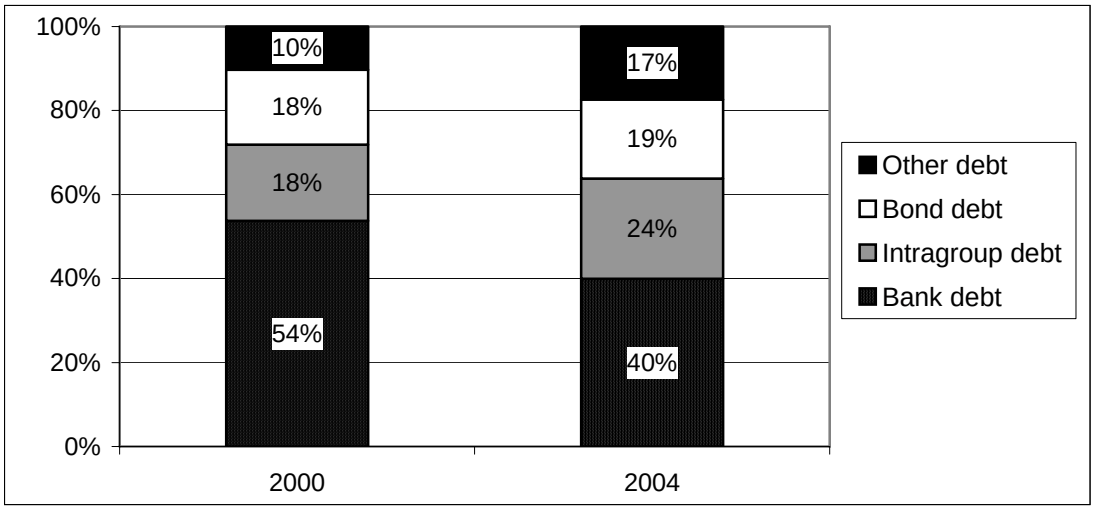
Graph 2 provides a comparison of the total debt in terms of relative importance of the short-term and long-term debt. This is measured as a ratio of the volume of particular debt to the volume of the total debt for all firms in our sample. As can be seen the ratio of the short debt to the total debt has slightly increased between years 2000 and 2004 for our sample firms.

Graph 2: Structure of total debt for sample firms – LT vs. ST (2000, 2004)



Graph 3 provides a comparison of the total debt in terms of the debtholder's counterparties. This is measured as a ratio of the volume of a particular debt to the volume of the total debt for all firms in our sample. The sample firms show an typical pattern of the bank-based financial system since bond financing is a secondary financing tool. Interestingly, the ratio of the bank financing to the total debt decreased to its half and has been replaced by other non-bank debts and intra-group debts. An intra-group debt is usually in a form of short-term financing (also in a form of a trade credit) serving to the funding of working capital needs (and thus replacing the necessity of short-term bank loans) or in a form of long-term financing serving to the funding of investment activities (such as a transfer of production capacities from countries with higher production costs). These loans are often on an at-sight basis despite the fact whether they are utilized for short-term or long-term financing. The financing counterparties for intra-group loans are usually the parent firms, the sister firms, the cousin firms or even the intra-group financial institutions (the Group banks).

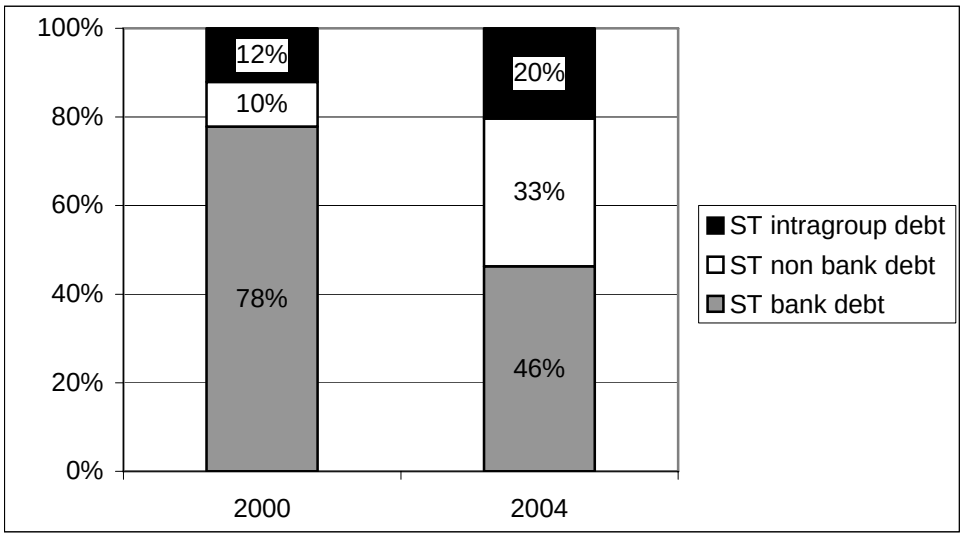
Graph 3: Structure of total debt for sample firms – counterparties (2000, 2004)



Graph 4 provides a comparison of the structure of a short-term debt in terms of the debtholder counterparties. This is measured as a ratio of the volume of a particular debt to the volume of the total debt for all firms in our sample. As can be seen, the importance of bank short-term funding has sharply decreased between 2000 and 2004 in favor of increased intra-group and other non-bank funding. The switch from bank funding to non-bank funding (loans from non-bank institutions such as third parties in form of private individuals) is surprising and does not

correspond to other indicators for financial sector, therefore it should be accounted to large extent to the accounting inaccuracy.

Graph 4: Structure of short-term debt for sample firms – counterparties (2000, 2004)

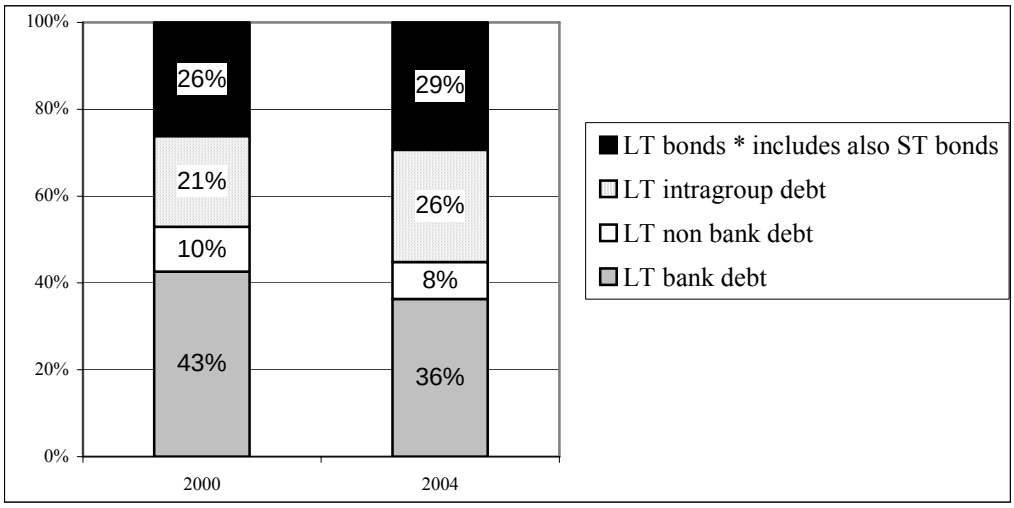


Graph 5 provides a comparison of the structure of a long-term debt in terms of the debtholder counterparties. This is measured as a ratio of the volume of a particular debt to the volume of the total debt for all firms in our sample. Similarly to the short-term debt structure, the pattern of the structure of a long-term financing slightly changed in followed firms sample. First, the ratio of the bank funds has decreased but still remains the major source of funds. Second, the ratio of the intra-group funds has significantly increased. Third, despite the fact that the amount of firms funded by bonds is very limited (below 5% of total firms in the sample) and even decreased between 2000 and 2004, the ratio of the long-term funds in the form of bonds has increased. This shows that the typical amount of a bond issue is much higher than the amount of other debt types issues. Please note, that as the accounting procedures in 2000 did not enable to distinguish CPLTD[20] for bonds, we included the CPLTD and the LPLTD[21] in long-term debts for all years.

[20] CPLTD – current portion of long-term debt

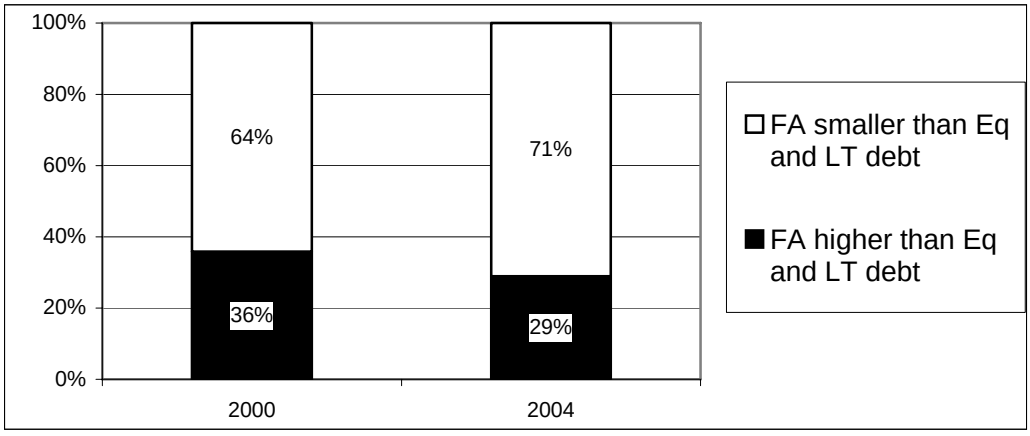
[21] LPLTD – long-term portion of long-term debt

Graph 5: Structure of long-term debt for sample firms – counterparties (2000, 2004)



Graph 6 provides a comparison of the firm's balance sheet structure according to the maturity matching principle. Based on this approach the fixed assets (FA) need to be funded either by the equity (Eq) and/or by long-term debts (LT debt). This is measured as a ratio of the particular group of firms to the total volume of firms in the sample. As can be seen, about 29% of the firms in 2004 had fixed assets higher than the sum of equity and long-term funds and thus did not meet the maturity matching principle. As this is a lower ratio than in 2000 we can state that firms from our sample became wiser and conducted the liquidity immunization of the balance sheet structure more actively. Knowing that firms, which do not meet the maturity principle, are candidates for a financial distress in the long-term perspective, this development can be considered as a very satisfactory fact for the stability of the sample firms (and naturally for the economy as a whole).

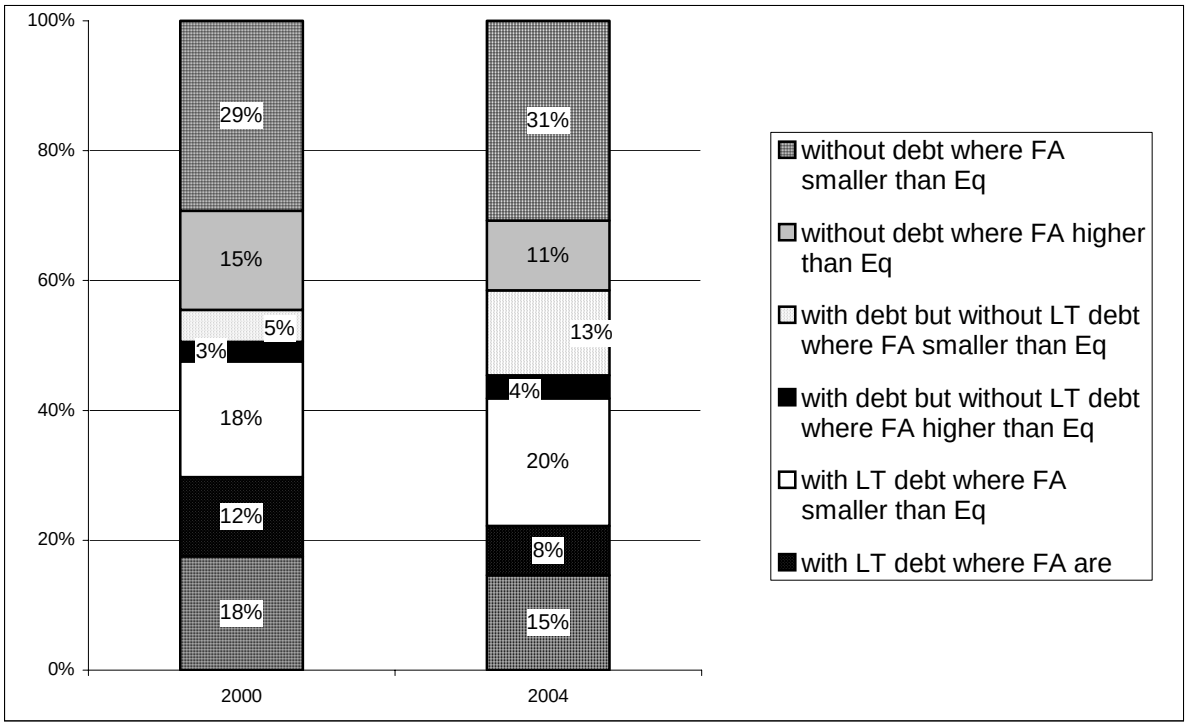
Graph 6: Balance sheet structure and maturity matching principle for sample firms (2000, 2004)



Graph 7 provides a comparison of more detailed distinction of the balance sheet structure according to the maturity matching principle. This is measured as a ratio of the particular group of firms to the total volume of firms in the sample. In the graph above we have seen that the maturity matching principle has become more utilized by the firms in the sample. Going more into detail, we can state, that firms not meeting the maturity matching principles can be categorized into three groups. In the first group there are firms without any debt where the equity (Eq) is not strong enough to fund the fixed assets (FA). In the second group there

are firms having only short-term debt where the equity is not strong enough to fund the fixed assets. In the third group there are firms having both a short-term and long-term debt but again the sum of the equity and long-term debt do not fully fund the fixed assets. As can be seen in graph 7 the maturity matching principle has been present more often in all groups of firms (without debt, with ST debt only, with both ST and LT debt) and the ratio of firms not immunizing the balance sheet structure has decreased for all three mentioned categories.

Graph 7: Debts and maturity matching principle (2000, 2004)



5. Limitations

Naturally, there are several areas of limitations of the presented empirical analysis. At this place we try to discuss at least three most important ones, namely the limited explanatory power of the data, the limited explanatory power of the variables, and the limited explanatory power of the determinants.

Data limitations

We need to be aware of the fact that the data employed for the empirical analysis (mainly financial ratios) have some limitations in evidence they provide. These mainly stem from the fact they are fully based on the accounting data. First, the majority of the financial statements is going through the process of window dressing in order to look better for shareholders and debtholders or in order to look worse for the tax authorities (depending on which incentive prevails). The discussion of this issue with endless list of names such as the window dressing, the book cooking or the creative accounting is not the subject of this paper. For us it is fully sufficient to state that financial statements can be 'cooked' in all items (assets, liabilities, revenues and costs) in all directions (changing statement structure, increasing or decreasing

some items or even swapping B/S and off-B/S status[22]) and that this all can be done using both legal and illegal tools.
Second, this collected data (still having in mind the book keeping limitations, the data structure, and data inconsistency adjustments mentioned in the data description paragraph) still reports some drawbacks. Surprisingly, the data does not fully meet the ex-ante expected range. There are firms with negative assets, a negative equity or even negative liabilities. These are states that should not be possible ex-definitione, but which are present and of which explanation is fairly simple (some firms book receivables as negative liabilities, some firms do not proceed according to bankruptcy law if having negative equity etc).
To sum up the data limitations, although the accounting entries are called hard data, we know that they need to be interpreted with some degrees of freedom. But despite all these facts (majority of them shall be understood as data drawbacks), we must be aware of the fact, that this data is the best available one and therefore it brings some value added.
Until now we have discussed the limitations of information that was included in the data. But we are also facing some limitations, which stem from the fact that our data does not include some useful information. First and most importantly we lack of information on market values. As the Czech corporate governance system is based on bank financing, the Czech capital market is very limited and therefore only a very limited amount of firms can report the market values for their equities. Thus we cannot investigate the impacts of the market value data on the debt maturity structure, which is usually employed for economies with a market based financing corporate governance system. This is especially missing in case of growth options assessments.
Secondly we lack of information on credit ratings. Some studies on the debt maturity structure also employ credit ratings (Stohs and Mauer, 1996) or some default measures (Scherr and Hulburt, 2001; Heyman et al., 2003) as proxies for the corporate quality as one of the determinant of the corporate debt maturity structure. But in the Czech environment only a very limited amount of firms can report a credit rating of international rating agencies (Moody's, Standard&Poor or Fitch), some of the firms can report credit rating of local rating agencies (CRA[23]), but the majority of the reported firms remain unrated. Therefore we were not able to proxy the firm quality by credit ratings but the utilization of a default measure for the Czech evidence might be a subject of future research.
Third, we lack of the flotation costs data, which is a very common fact for all economies as the transaction costs of a debt are very hard to assess. This would be useful information for purposes tackled in the tax hypothesis paragraph, but once again, as none of the empirical analyses on the corporate debt maturity structure include this proxy, this paper is not relatively worse in these terms.
Fourth, we lack of the age of the firms. Naturally the Czech register of firms provides this type of information. But the nature of our data set where the firm names were not disclosed made it not possible to match the Čekia data and the Czech firms register data in order gain the firm's age. This determinant would be definitely interesting to investigate. However as the firm's age is not very often utilized in the debt maturity structure investigations, this paper is again not relatively worse in these terms.

[22] B/S is balance sheet status, e.g. items booked on balance sheet, off-B/S is off-balance sheet status, e.g. items booked off-balance sheet.

[23] CRA – Czech Rating Agency, recently acquired by Moody's

Variables limitations

But not only the data as such does have limitations. We employ this data for computations of variables, which serve as proxies for the determinants of the corporate debt maturity structure. As was already discussed in the empirical analysis section, setting the formula for a variable that shall serve as a proxy for a particular determinant is not always a simple issue. Firstly, some determinants do not have very explicit name. One can imagine Growth options, Firm quality, Creditworthiness or Firm level volatility in very differing states, therefore sometime the first task stems in the interpretation of the determinant name. Thus the variable formulas naturally differ across the empirical analysis papers even though there is a main stream of proxies created by papers inspired by each other. Secondly, even if there is a general consensus with the determinant name interpretation such as Collateralizable assets, we face differing formulas for the variables stemming from differing opinions on the items that should or should not be included into the formula. Thirdly, in some cases we can be provided with equally good proxies for one determinant as it seems to be the case for Firm size and we need to employ some decision making mechanism on choosing the more appropriate one. And last but not least, we have some variables, which might be employed as proxies for differing determinants. Here should be mentioned at least the complementarity of formulas proxying theories Signaling quality and Liquidity risk (for relevant literature see Table 5), however these were not investigated in this paper.

Determinants limitations

And finally, there are some limitations of determinants as such, namely in terms of the determinants coverage. In our analysis we employed those determinants that were found crucial by theoretical papers, those that were already utilized in empirical papers, and also those where the Czech data necessary for the computations is available. From the third reason we needed to omit Creditworthiness and Firm age, impact of which would be definitely interesting to assess. But we also face some other determinants that have not been utilized in empirical papers yet. First, no determinant takes into account some sort of cash flow. And as we know, that 'cash is king' (McKinsey, 2005), the corporate debt maturity structure is to be expected being also affected by the fact whether a firm is cash rich or cash poor. In this term the proxies based on the EBITDA are to some extent close to the determinant of Cash flow, but one could imagine more precise proxy for such missing determinant. Second, we also miss an instrument that would incorporate the off-B/S[24] items important for the corporate debt maturity structure assessments. Leasing is the most important one. Despite some tax impact motivations there are mainly motivations in making the firm less indebted on on-B/S level that drives the utilization of leasing financing. And as the leasing as a sort of a long-term debt is not included in our computations, this makes our on-B/S long-term debt undervalued.
And there is one more thing that we miss. The determinants of the corporate debt maturity structure are employed equally in the empirical analysis. But there is no reason to believe that in reality they have the same importance. It would be interesting to investigate, which determinant is more important than the other one, when this is the case, and why. As this is not possible to achieve by our model, this might be a subject of future research.
To sum up this section, we have data that does not fully represent the variable formulas, we have variables (or proxies) that do not fully represent the determinants and we have determinants that need not to be necessarily the important ones for the corporate debt maturity

[24] off-B/S are off-balance-sheet items

structure. But despite all this the results are strong enough to improve our knowledge of true behavior of the firms in the debt maturity decision-making.

6. Conclusion

This paper was assembled in search of the determinants of the corporate debt maturity structure of Czech firms. In the theoretical section it has brought an overview of the points of departure for choosing the proper and important determinants for the corporate debt maturity structure. In the regression section it has shown, that a long-term debt increases with Firm size, Leverage and Asset maturity. The impact of Growth options, Collateralizable assets, Firm tax rate, and Firm level volatility has been found out as statistically insignificant. It was further shown that these results are generally in line with other papers on this topic covering other economies. In the portfolio analysis section this paper pointed out the bank-based system pattern of financing of Czech firms, increasing importance of intra-group financing and an increasing presence of the Maturity matching principle. Finally, the paper discussed the limitations of the results in the data, variables, and determinants field.

The paper has shown that Czech firms, as representatives of transition economies, follow similar pattern in the setting of the maturity of a debt as it is the case of standard advanced economies. It has also delivered a list of arguments for different definition of two generally used proxies for the determinants of the debt maturity, namely Collateralizable assets and Asset maturity.

In the introduction we promised to provide an additional stone into the mosaic of the empirical evidence on financing of Czech firms. The stone of the determinants of the debt maturity structure has been added, but the mosaic is not completely filled and there are still fields left for future research. As the CFO opinion survey of Dvořák (2004) was conducted in June 2000 we would appreciate a more recent in-depth view into the sentiments of financial decision makers. And as the Czech bankruptcy law is continuously changing, there is continuous need for evidence of financial distress of Czech firms.

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