



THEORIES OF OPTIMAL CAPITAL STRUCTURE: ASSESSMENT AND APPLICATION

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Abstract

The article studies theories of optimal capital structure – the traditional viewpoint, Modigliani-Miller theorem, pecking order theory, trade-off theory, agency theory and market timing theory. The author analyses and assesses the theories, evaluates their implementation and application possibilities in Latvian enterprises. Implementation of the trade-off theory and pecking order theory of capital structure is more likely to be observed in the larger enterprises of the respective industry. However, the loan market was hot-market from 2004 to 2008 and the management of the enterprises used the favourable situation and raised capital.

Introduction

Enterprise financing is one of the most studied topics in corporate finance, because an accurately estimated and selected equity and debt ratio can maximize the company value and minimize the cost of capital. In recent decades, several theories have been defined in corporate finance that determine the principles according to which enterprises choose their capital structure. In a sense, each of these theories concentrates on one or several factors that influence the capital structure, assuming other conditions remain constant. Although compliance tests have been made in various countries and various industries, there are still many unanswered questions and problems.

In the paper, several theories of optimal capital structure are reviewed, each of them has its supporters and critics; however none of them has established itself as a distinct leader: trade-off theory, pecking order theory, market timing theory, agency theory, free cash flow theory etc.

The **purpose of the paper** is to analyse and assess the theories of optimal capital structure, as well as to evaluate their implementation and application possibilities in Latvian enterprises.

The **object of the research** is the theories of capital structure.

The **tasks of the paper** are as follows:

- To analyse the theoretical points of view on theories of optimal capital structure;
- To overview the results of previous research made in this field;
- To evaluate the application of the theories in Latvian enterprises.



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The research methods used in the paper include the monographic method, analysis and synthesis of scientific literature, deduction and induction as well as the graphical method.

The paper uses mostly research papers that were published in scientific journals – both the fundamental papers (Modigliani and Miller, 1958 and 1963; Kraus and Litzenberger, 1973; Jensen, 1986; Baker and Jeffrey, 2002; Miller, 1977, Myers and Nicolas, 1984), as well as recent (empirical) research (De Medeiros and Daher, 2005, Sanchez-Vidal and Martin Ugedo, 2005, Frank and Goyal, 2003; Cotei and Farhat, 2009; Lopez-Gracia and Sogorb-Mira, 2008; Graham, 2002; Alti, 2006, and others). Statistical data from the Central Statistical Bureau of the Republic of Latvia, the Stock Exchange NASDAQ OMX Riga and the Financial and Capital Market Commission is used, as well.

The current financial crisis once again forces an overview of the capital structure theories, because many problems of the companies were caused by their capital structure policy and strategy. In finance literature, there are several capital structure theories, each of them has its supporters and critics; however none of them has established itself as a distinct leader: trade-off theory, pecking order theory, market timing theory, agency theory etc. In a sense, each of these theories concentrates on one or several factors that influence the capital structure, for example, the trade-off theory places emphasis on taxes, the pecking order theory – on information, etc.

The Traditional Viewpoint

The traditional viewpoint on capital structure emphasises the benefits of debt capital (it is relatively cheap compared to equity capital); therefore, the value of the firm increases with the increase in leverage up to a certain point (particular leverage). After this point, the weighted-average cost of capital (WACC) once again starts to increase and the value of the firm decreases.

The assumptions are [1, 288]:

1. No taxes, corporate or personal;
2. 100% dividend distribution;
3. A no-growth enterprise (i.e. a given investment strategy);
4. Only debt and equity used in the capital structure;
5. No transaction costs, including those involved with a default of the issued bonds (bankruptcy costs);
6. Constant business risk over time (i.e. the expected value and variance of EBIT is constant);
7. The increase/decrease in gearing occurs through the simultaneous issue and retirement of securities (i.e. an issue of equity is matched by a retirement of debt).

Starting from a 100% equity capital structure, there are three stages in the market reaction to the increase of leverage (Figure 1):

- Stage 1. The use of low-cost debt more than offsets the increase in the equity capitalization rate. The cost of equity rises because of the financial risk the leverage brings. The bond-holders, too, are unlikely to require an increase in their coupon rates for the modest increase in leverage and if it increases, it will do so only marginally. The overall effect then is that WACC will fall and the market value of the enterprise will rise;



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- Stage 2. The enterprise has now attained a degree of leverage, and as this increases further, the additional financial risk requires the cost of equity to rise, but now the bond-holders require additional compensation in the form of higher coupons and a discount on the issue of the bond. If the relative cheapness of the debt is still able to cancel out the additional financial risk, then we can have a constant WACC. However, this may not be the case and the WACC may have a unique minimum. In this latter case, stage 2 does not really exist and the enterprise moves from stage 1 to stage 3;
- Stage 3. Leverage increases even further, the WACC increases and the value of the enterprise decreases [1, 288-290].

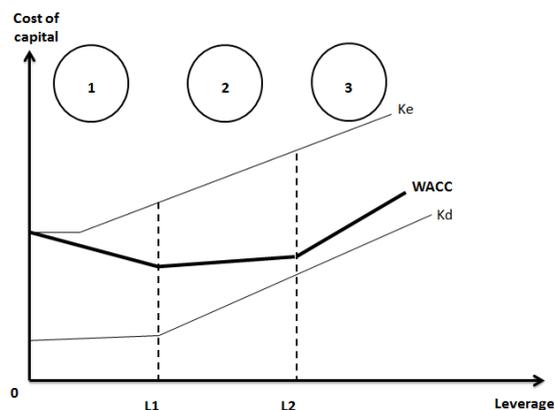


Figure 1. Traditional approach to capital structure; cost of capital of the enterprise for different levels of leverage [1, 289]

Modigliani-Miller Theorem

It is widely considered that the modern theory of capital structure began with the paper by Modigliani and Miller (1958) on the conditions of capital structure irrelevance. The Modigliani and Miller (MM) approach supported the view that in a perfect capital market the market value of any firm is independent of its capital structure [2].

Assumptions [2]:

- All investors are price-takers, i.e. no individual can influence market prices by the scale of his or her transactions;
- All market participants, firms and investors, can lend or borrow at the same risk-free rate;
- There are neither personal nor corporate income taxes;
- There are no brokerage or other transactions charges;
- Investors are all rational wealth-seekers;
- Firms can be grouped into „homogenous risk classes”, such that the market seeks the same return from all members (firms) in each group;
- Investors formulate similar expectations about future company earnings. These are described by a normal probability distribution;
- The assets of an insolvent firm can be sold at full market values.



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The MM approach was presented as three prepositions [2]:

Preposition I. The market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate k_e appropriate to its class. That is, the average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class.

Preposition II. The expected yield of a share of stock is equal to the appropriate capitalization rate r_e for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between k_e and k_d .

Preposition III. The cut-off point for investment in the firm will in all cases be k_e and will be completely unaffected by the type of security used to finance the investment.

In 1963, both authors included the corporate tax in their theorem [3]. Since interest payments on debt can be qualified as an expense, the use of debt reduces the amount of tax. The reduction in the tax lowers the cost of capital (Figure 2). Overall, this approach is similar to the traditional viewpoint (stage 1), however MM approach does not have an optimal point of leverage, where the WACC is minimized and the enterprise value is maximized.

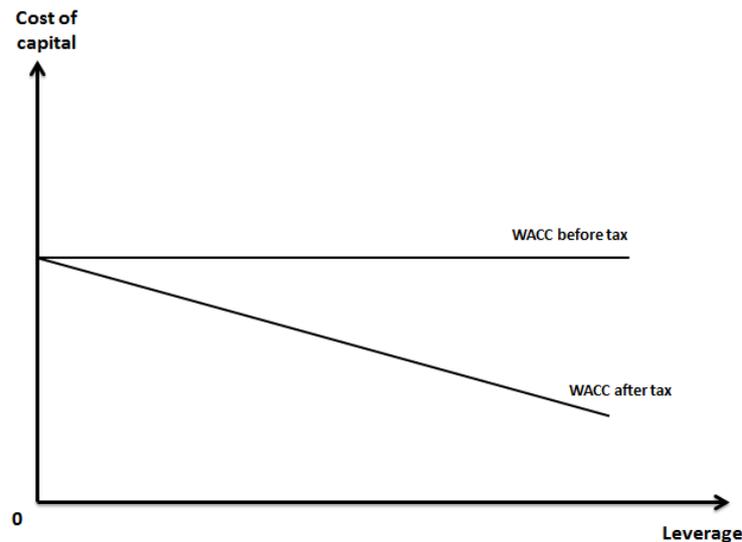


Figure 2. The MM approach before and after tax [1, 296]

One must take into account that this does not imply that the firm should rely completely on debt (since it is cheaper and gives tax shield). At a certain point the value of the enterprise starts to decrease because of the costs of financial distress (Figure 3). Costs of financial distress are the costs arising from bankruptcy or distorted business decisions before bankruptcy [4, 409]. Therefore, to sum up, the use of tax shield (tax benefits) increases the value of the enterprise, however as leverage increases, the enterprise faces the costs of financial distress and this in turn decreases the value of the enterprise. Overall, it can be concluded that an optimal capital structure is reached if the marginal benefit of tax shield equals the marginal cost of financial distress.

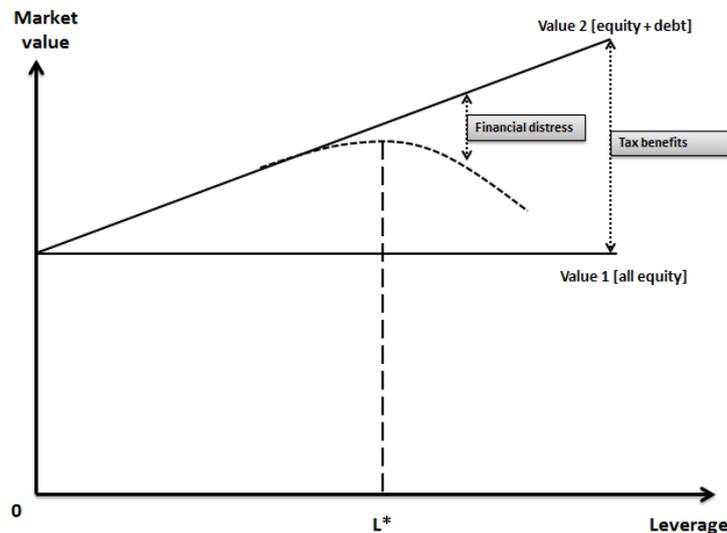


Figure 3. The MM approach after tax (but with bankruptcy costs) [1, 297]

It is the most common argument that „While the Modigliani-Miller theorem does not provide a realistic description of how firms finance their operations, it provides a means of finding reasons why financing may matter.” [5] Modigliani & Miller theorem also influenced the development of the pecking order theory and the trade-off theory.

Pecking Order Theory (Donaldson, 1961; modified by Myers and Majluf, 1984). The theory states that companies prioritize their sources of financing – at first they prefer to use internal funds, then to borrow, and at last to issue equity as a last resort [6].

The reason for this order is the information asymmetry – managers know more about the firm’s performance and prospects than outsiders. Managers are unlikely to issue company shares when they believe shares are „undervalued”, but more inclined to issue shares when they believe they are „overvalued”. Shareholders are aware of this likely managerial behaviour and thus regard equity issues with suspicion. For example, they may interpret a share issue as a signal that management think the shares are overvalued and mark them down accordingly – a very common occurrence – thereby increasing the cost of equity. Investors would expect managers to finance investment programmes, first, using internal resources, second, via borrowing up to an appropriate debt/equity combination, and finally through equity issues. [7, 505].

There is no clear target debt-equity mix. The pecking order explains why the most profitable firms generally borrow less; it is not because they have low target debt ratios but because they don’t need outside money. Less profitable firms issue debt because they do not have sufficient internal funds for their capital investment programme and because debt is first in the pecking order for external finance. The pecking order theory does not deny that taxes and financial distress can be important factors in the choice of capital structure. However, the theory says that these factors are less important than managers’ preference for internal over external funds and for debt financing over new issues of common stock [4, 415].



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The theory has been extensively tested. De Medeiros and Daher (2005) tested the pecking order theory of capital structure in Brazilian firms. It was concluded that in its weak form the theory is applicable to Brazilian firms, but not the strong form [8]. Sanchez-Vidal and Martin-Ugedo (2005) used a panel data analysis of 1 566 firms over the period of 1994-2000 in the Spanish market; the results show that the pecking order theory holds for most subsamples analyzed, particularly for the small and medium-sized enterprises and for the high-growth and highly leveraged companies [9]. Frank and Goyal (2003), on the other hand, concluded that internal financing is not sufficient to cover investment spending on average, external financing is heavily used and debt financing does not dominate equity financing in magnitude. Net equity issues track the financing deficit quite closely, while net debt does not do so. When narrower samples of firms are considered, the greatest support for the pecking order is found among large firms in earlier years (tested period 1971-1998). Over time, support for the pecking order declines [10].

Overall, it can be concluded that the pecking order theory most likely will be observed in large enterprises. There are two reasons for that: 1) large enterprises have more possibilities and a wider choice in raising funding compared to small and microenterprises; 2) the role of information asymmetry most likely will be more expressed in large enterprises. Since in Latvia, in 2010, only 0.3% (out of total number of enterprises) [11] were large enterprises¹, the author of the paper induces that the pecking order theory is unlikely to be applicable to Latvian enterprises, however if analyzed only large enterprises – they could support this theory.

The Trade-off Theory. The theory states that an enterprise chooses debt and equity mix by balancing the benefits and costs of debt. If the enterprise increases its leverage, the tax benefits of debt increase, as well. At the same time, the costs of debt also rise (both, the bankruptcy costs of debt and the non-bankruptcy costs of debt).

The original version of the trade-off theory grew out of the debate over the Modigliani-Miller theorem. When corporate income tax was added to the original irrelevance, this created a benefit for debt in that it served to shield earnings from taxes [5]. Kraus and Litzenberger (1973) formally introduced the tax advantage of debt and bankruptcy penalties into a state preference framework. Both authors stated that the market value of a levered firm equals the unlevered market value, plus the corporate tax rate times the market value of the firm's debt, less the complement of the corporate tax rate times the present value of bankruptcy costs [12].

Trade-off theory predicts that target debt ratios will vary from firm to firm. Companies with safe, tangible assets and plenty of taxable income to shield ought to have high target ratios. Unprofitable companies with risky, intangible assets ought to rely primarily on equity financing. The trade-off theory successfully explains many industry differences in capital structure. On the other hand, there are other things the trade-off theory cannot explain. It cannot explain why some of the most successful companies thrive with little debt. An odd fact about real-life capital structure: the most profitable companies generally borrow the least. Here the trade-off theory fails, for it predicts exactly the reverse [4, 414].

¹ In compliance with Recommendation No 361 of the European Commission dated 6 May 2003, the economically active market sector statistical unit's size group – large – is with the number of employees of 250 and more, or with annual net turnover above LVL 35.1 million, or with the balance-sheet total exceeding LVL 30.2 million.



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According to Myers (1984), a firm that follows the trade-off theory sets a target debt-to-value ratio and then gradually moves towards the target. The target is determined by balancing debt tax shields against costs of bankruptcy. Frank and Goyal (2007) break Myers' definition into two parts:

Definition 1 [the static trade-off theory] – A firm is said to follow the static trade-off theory if the firm's leverage is determined by a single period trade-off between the tax benefits of debt and the deadweight costs of bankruptcy.

Definition 2 [target adjustment behaviour] – A firm is said to exhibit target adjustment behaviour if the firm has a target level of leverage and if deviations from that target are gradually removed over time [13].

This theory also has been widely tested. Cotei and Farhat (2009) concluded that the pecking order theory and the trade-off theory are not mutually exclusive. For example, firms below their target leverage with high information asymmetry are most likely to issue debt, given that they have a high debt capacity, thus, accelerating their rate of adjustment. If these firms have a rising stock price, managers find themselves better off issuing equity, even though this decision leads to a temporary deviation from the target leverage [14]. Lopez-Gracia and Sogorb-Mira (2008) used panel data on a sample of 3 569 Spanish SMEs over a 10-year period from 1995 to 2004. Results obtained suggest that both theoretical models help to explain SME capital structure. Despite finding clear evidence that SMEs follow a funding source hierarchy, results reveal that greater trust is placed in SMEs that aim to reach target or optimum leverage [15]. Ju, Parrino, Poteshman and Weisbach (2005) develop a model of optimal capital structure in which the major forces affecting firm's financing decisions are corporate taxes and bankruptcy costs. The authors calculate closed-end solutions for important quantities in this model, calibrate it using recent market data, and solve for the optimal capital structure. In contrast to most of the literature, the authors find that the trade-off model does not predict that firms are underlevered. For a hypothetical firm, constructed to be typical of large, publicly traded companies, the model predicts a leverage ratio less than the actual sample median – the predicted ratio of debt to total capital is 15.29 % compared to a sample median of 22.62 % [16].

Once again, the author of the paper believes that it is unlikely that the trade-off theory works in Latvian SMEs. The key idea of the trade-off theory is the trade-off between the tax benefits and the costs of financial distress. Consequently, the effect of tax shield will be more felt in large enterprises with relatively large loans and interest payments. It is consistent with the survey done by Graham (2002), where as the most important factor that affects the decision to issue debt was stated the financial flexibility, and interest rate tax savings was only the 6th most important factor [17].

Agency Costs

Agency costs arise because the interests of the firm's financial managers and its shareholders are not aligned. Myers (2001) reviews two kinds of agency costs – agency costs can be triggered by conflicts between financial manager and shareholders and also between debt and equity investors. As Myers points out, conflicts between debt and equity investors only arise when there is a risk of default. Shareholders can gain at the expense of debt investors; the manager can transfer value from the firm's creditors to its stockholders. Conflicts between



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managers and stockholders originate because managers will act in their own interests (it can be redirected by several instruments, but perfect alignment still is not possible) [18].

The theory of agency costs (Jensen, 1986) explains the benefits of debt in reducing agency costs of free cash flows and how debt can substitute for dividends. Managers with substantial free cash flow can increase dividends or repurchase stock and thereby pay out current cash that would otherwise be invested in low-return projects or wasted. Debt creation, without retention of the proceeds of the issue, enables managers to effectively bond their promise to pay out future cash flows. Thus, debt can be an effective substitute for dividends. By issuing debt in exchange for stock, managers are bonding their promise to pay out future cash flows in a way that cannot be accomplished by simple dividend increases. Thus debt reduces the agency costs of free cash flow by reducing the cash flow available for spending at the discretion of managers. These control effects of debt are a potential determinant of capital structure. Increased leverage also has costs. As leverage increases, the usual agency costs of debt rise, including bankruptcy costs. The optimal debt-equity ratio is the point at which firm value is maximized, the point where the marginal costs of debt just offset the marginal benefits [19].

Childs and Mauer (2008) used a dynamic continuous-time model of investment risk choice and the model predicts that the agency costs of equity will be much larger than the agency costs of debt. It was also concluded that managerial risk-aversion sharply decreases the agency costs of equity and a positive relation between leverage and agency costs of equity is suggested as well [20].

The author of the paper agrees that financial manager plays a significant role in estimating the capital structure. The capital structure depends on manager's goals (are they aligned with owner's goals?), education and other characteristics. However, it can be very difficult to test this theory in practice. All in all, agency costs are an important factor in the determination of capital structure.

Market Timing Theory

Firms tend to issue equity instead of debt when the market value is high and repurchase equity when the market value is low. Baker and Jeffrey (2002) state that the capital structure depends strongly on past market valuations as measured by past market-to-book ratios. In other words, capital structure is the cumulative outcome of past financing decisions. Past financing decisions depend strongly on past market valuations. Therefore, capital structure depends strongly on past market valuations. They developed a theory of capital structure based on market timing. Managers issue equity when they believe it is overvalued and repurchase equity or issue debt when they believe it is undervalued. Since there is no optimal capital structure, managers do not need to reverse their decision in later periods when they believe that the firm is correctly valued. This means that temporary fluctuations in valuation have permanent effects on capital structure [21].

Alti (2006) found that hot-market IPO firms issue substantially more equity, and lower their leverage ratios by more than cold-market do. However, immediately after going public, hot-market firms increase their leverage ratios by issuing more debt and less equity relative to cold-market firms. At the end of the second year following the IPO, the impact of market timing on leverage completely vanishes [22]. Bougatenf and Chichti (2010) also find that Tunisian and



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French listed firms tend to issue equity when their market valuations are relatively higher than their book values and after improvement of the market performance. As a consequence, these firms become underleveraged in the short-term and this impact of equity market timing on capital structure persists beyond eight years [23]. De Bie and De Haan (2007) also support the theory – their research results yield evidence of market timing. However, in contrast to the existing evidence for US firms, they did not find persistent effects of market timing on capital structures of Dutch firms [24].

In Latvia, stock and securities markets are not very active. Since 2000, a persistent decrease of the number of listed companies, as well as the total turnover of stock markets has been observed, and also the total turnover of debt securities has been slowly but steadily decreasing since 2007 [25]. However, the loan market was hot-market from 2004 to 2008 (the amount of disbursed loans increased rapidly) [26]. The accession to the European Union, the rapid increase of lending, comparatively low interest rates and other factors facilitated the growth of the debt ratio in the enterprise capital structure. In other words, the loan market became hot and the management of enterprises used the favourable situation and raised capital.

Concluding Remarks

There are other theories, theorems, models and hypotheses that help to explain the capital structure and find the optimum. Frank and Goyal (2005) divide the theories into four groups [13]:

- A first kind of theories represent a point of view – a set of principles that guide the development of specific models and tests;
- A second kind of theories are illustrative – shows how a certain idea can be expressed in a coherent manner;
- A third kind of theory is a unifying model – presented as a means of tying together a variety of observations in a coherent manner;
- A fourth kind of theory is normative model – intended to offer advice to someone.

In this paper, the most common theories of capital structure found in finance literature were reviewed. However, there are other rather minor theories and hypotheses on capital structure, for example, Miller (1977) proposed the neutral mutation hypothesis that states that firms fall into different habit of financing which does not have an impact on the value [27].

Conclusions

The traditional viewpoint on capital structure emphasises the benefits of debt capital (it is relatively cheap compared to equity capital); therefore, the value of the firm increases with the increase in leverage up to a certain point (particular leverage). After this point, the weighted-average cost of capital (WACC) once again starts to increase and the value of the firm decreases.

It is widely considered that the modern theory of capital structure began with the paper by Modigliani and Miller (1958) on the conditions of capital structure irrelevance. The Modigliani and Miller (MM) approach supported the view that in a perfect capital market the market value



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of any firm is independent of its capital structure. Modigliani & Miller theorem also influenced the development of pecking order theory and trade-off theory.

Overall, it can be concluded that the pecking order theory most likely will be observed in large enterprises. There are two reasons for that: 1.) large enterprises have more possibilities and a wider choice in raising funding compared to small and microenterprises; 2.) the role of information asymmetry most likely will be more expressed in large enterprises. Since in Latvia, in 2010, only 0.3% (out of total number of enterprises) [11] were large enterprises, the author of the paper induces that the pecking order theory is unlikely to be applicable to Latvian enterprises, however if analyzed only large enterprises – they could support this theory. The trade-off theory is also unlikely to be supported in Latvian SMEs. The key idea of the trade-off theory is the trade-off between the tax benefits and the costs of financial distress. Consequently the effect of tax shield will be more felt in large enterprises with sizeable borrowing and interest payments. It is consistent with the survey done by Graham (2002), where as the most important factor that affected the decision to issue debt was financial flexibility, and interest rate tax savings was only the 6th most important factor.

Financial manager plays a significant role in estimating the capital structure. The capital structure depends on manager's goals (are they aligned with owner's goals?), education and other characteristics. However, it can be very difficult to test this theory in practice. All in all, agency costs are an important factor in the determination of capital structure.

In Latvia, stock and securities markets are not very active. However, the loan market was hot-market from 2004 to 2008 (the amount of disbursed loans increased rapidly). The accession to the European Union, the rapid increase of lending, comparatively low interest rates and other factors facilitated the growth of the debt ratio in the enterprise capital structure. In other words, the loan market became hot and the management of enterprises used the favourable situation and raised capital.

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