Capital Structure and Dividend Decisions Under Distributed Profit Taxation

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Declaration:

Hereby I declare that this doctoral thesis, my original investigation and achievement, submitted for the doctoral degree at Tallinn University of Technology has not been submitted for any academic degree.

Aaro Hazak,
29 November 2007

Kapitali struktuur ja dividendiotsused jaotatud kasumi maksustamise tingimustes

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CONTENTS

INTRODUCTION

Distributed profit taxation (DPT) denotes an uncommon taxation system, whereby corporate income tax is based on the amount of profit distributed to the company's owners. In this way DPT differs from the classical gross profit taxation (GPT) system under which corporate income tax is calculated on the basis of a company's profit earned. DPT is the corporate taxation regime of Estonia, experimentally introduced since 2000.

The impact of taxes on the capital structure and dividend decisions of companies has been an area of research for nearly half a century. Studies on the effects of taxes on capital structure start with the early tax-inclusive model presented by Modigliani and Miller (1963), while many later models tend to search for the combined impact of taxes as well as other micro and macro level factors on capital structure. Research on optimal dividend decisions in view of the different aspects of tax ranges from the Miller and Modigliani (1961) model to numerous recent interpretations. However, no consensus has been reached on either the optimal capital structure and dividend policy or on the effect of taxation on the financial decisions in companies. Moreover, the consequences of some important differences in taxation systems, including the specific features of DPT, have received very little attention in the literature so far.

This doctoral thesis seeks to provide a comparative theoretical analysis of the impacts of DPT on capital structure and dividend decisions in companies, compared to those of GPT. A company operating within an environment of uncertainty is modelled in a binomial framework, including company and investor level taxes and investor's different consumption levels. The main theoretical research questions are (a) what are the fundamental differences between the DPT and GPT regimes from the corporate financial economics perspective, (b) what is the impact of DPT on the use of debt and equity financing in companies, and (c) what is the optimal timing and amount of dividends from the investor's perspective under DPT. In addition, the thesis includes an empirical analysis of the effects of DPT on companies' financial decisions, testing the assumptions and hypothesis in the theoretical sections. The empirical study is based on a sample of 27 thousand company observations over a ten-year period in a broad range of industries. Panel data regression analysis considering company heterogeneity of variance in random effects and employing robust standard errors have been used as the methodology.

Though the analysis of economic policy implications remains outside the scope of this thesis, the results of the research may potentially lead to discussions of introducing a similar system in other jurisdictions or on modifying the corporate taxation principles in Estonia.

The thesis is based on three academic papers. The first paper is titled "Profit versus Distributed Profit Based Taxation and Companies' Capital Structure" (see Appendix 1) and deals with the impacts of DPT on capital structure from a theoretical viewpoint. The final version of the paper has been accepted for publication in the special issue of the International Journal of Entrepreneurship

and Innovation Management "Competitiveness and Foreign Direct Investments in the New Member States of the European Union" (Hazak 2007f). Preliminary versions of (parts of) the paper have been presented at the 2nd International Conference on Small and Medium Sized Enterprises, August 2005, Greece; the international scientific conference "Managing Global Trends and Challenges in a Turbulent Economy", October 2005, Greece; and the 1st Annual Conference of the Estonian Economic Association, January 2006, Estonia. Draft versions of the paper have been included in respective conference proceedings (Hazak 2006a, 2006b and 2006c). In addition, the paper has been discussed at the seminar of the Chair of Finance at Tallinn University of Technology, December 2005. A large part of the paper has been written during a research visit to the University of Athens in the 2005/06 autumn semester. Associate Professor Panagiotis E. Petrakis acted as a local adviser during this research visit.

The second paper is titled "Dividend Decision Under Distributed Profit Taxation: Investor's Perspective" (see Appendix 2), presenting a theoretical analysis of dividend decisions under the conditions of DPT. This paper was awarded the annual Urmas Sepp research prize by the Bank of Estonia in April 2007. The paper has been published in the International Research Journal of Finance and Economics (Hazak, 2007b). A draft version of the paper has been published in the Tallinn University of Technology Working Papers in Economics series (Hazak, 2007c). The paper has been presented at the open seminar of the Bank of Estonia, September 2007; the seminar of the International Fiscal Association Estonia branch, September 2007; the joint faculty doctoral seminar and research seminar of the Doctoral School in Economics of the University of Tartu and Tallinn University of Technology, February 2007; and the seminar of the Chair of Finance at Tallinn School of Economics and Business Administration, January 2007. The vast majority of the paper has been written during a research visit to Tel Aviv University in the autumn semester of 2006/07. Professor Simon Benninga was the local adviser for this research visit.

The third paper is titled "Companies' Financial Decisions Under the Distributed Profit Taxation Regime of Estonia" (see Appendix 3), comprising empirical analysis of the effects of DPT. This paper was awarded the Estonian Taxpayers Association doctoral research prize on the 2007 competition of research papers on taxation. The paper has been accepted for publication in the collection of articles (Hazak, 2007d; published by Berliner Wissenschafts-Verlag GmbH) from the 3rd international conference "Baltic Business and Socio-Economic Development", June 2007, Estonia, where the paper was presented at the plenary session. A draft version of the paper is included in the Tallinn University of Technology Working Papers in Economics series (Hazak, 2007a). A preliminary version of the paper has been presented at the 2007 Business & Economics Society International Conference, July 2007, France and was included in the conference proceedings (Hazak, 2007e).

The main part of the thesis is structured as follows. Section 1 outlines the DPT system employed in Estonia. A summary overview of key related literature

is provided in Section 2. Section 3 introduces the models for analysing the impacts of DPT on the capital structure and dividend decisions of companies from the theoretical perspective. Section 4 describes the data and methodology and presents the key results of the empirical analysis. The views expressed are those of the author and do not represent the official views of any organisations.

Acknowledgements

1. DISTRIBUTED PROFIT TAXATION

DPT has been the corporate taxation regime in Estonia since 2000. Although it is the first time that a distributed profit based taxation system has been introduced for corporate taxation in the modern era, the general concept of such taxation principles are, however, not new. Similarities can be found, for example, with the taxation principles of personal investment gains in many countries.

Until 1999, Estonia used the traditional GPT system. Starting from 2000, Estonia levies no corporate income tax on retained profits. All corporate income is tax exempt when earned, including both active (e.g. trading) and passive (e.g. dividends, interest, royalties) types of income, as well as capital gains from the sale of all types of assets (including securities and immovable property). Income tax is imposed on all distributions. In this way the moment of taxation is postponed until the profits are distributed as dividends or deemed profit, such as transfer pricing adjustments, expenses and payments that do not have a business purpose, fringe benefits, gifts, donations, etc.

From 2000 to 2004, profit distributed as dividends was taxed in Estonia at a flat rate of 26/74ths. For example, a company that had profits available of 100 units could distribute dividends of 74 units, on which it would have had to pay corporate income tax of 26 units. In 2005, income tax was lowered to 24%. In 2006, the tax rate was 23% and now in 2007, it is 22%. The current Estonian Income Tax Act is expected to reduce income tax rates to 20% (or 20/80ths on top of net dividends) by means of a 1% decrease in both 2008 and 2009.

As Estonia has no annual net basis taxation on corporate profits, entities are not subject to tax depreciation, investment tax credit or loss carry forward rules. Dividends can be paid out of the profit remaining after all losses from previous periods are covered. Distributable profits are assessed according to the Estonian accounting regulations (which are in all material aspects in line with the International Financial Reporting Standards). There are no special accounting rules for tax purposes.

Except for special cases that mainly relate to the taxation of foreign investors, the tax effects on different forms of payout (e.g. dividends or share repurchases) are in general equal under the Estonian DPT regime.

Under the European Union (EU) accession treaty, Estonia may apply its income tax on dividend distributions until 31 December 2008, after which the corporate tax system must fully comply with the EU Parent-Subsidiary Directive (which prohibits taxation of intra-group dividends). It is foreseeable that Estonia will continue to exempt retained earnings from corporate taxation until the end of 2008. The Estonian government has not decided yet about specific measures to align the tax system to the Parent-Subsidiary Directive.

2. RELATED LITERATURE

2.1. Taxes and capital structure

Several extensive literature analyses have been prepared on the topic of corporate taxation and capital structure, including that by Prasad et al. (2001), Myers (2001), Masulis (1988) and Graham (2006). These papers cover, besides the impact of taxation, also research results on other aspects of the financing decisions among companies.

In general, modern literature on the structure of capital starts from the non-tax model of Modigliani and Miller (1958). One of the key outcomes of this model is that the capital structure does not have any impact on the company's value and the cost of capital. The model assumes a perfect capital market and non-existence of corporate taxes. In addition, other idealisations are made.

In a later paper, Modigliani and Miller (1963) introduce corporate taxes to the previous model. Their updated model shows that as a result of taxes, debt becomes a more favourable source of financing than equity. The advantage of debt derives from a "tax shield". The interest costs that are related to debt decrease profits and hence corporate tax. Companies are therefore motivated to use debt to the extent possible and practicable.

Several subsequent papers take into account the combined impact of both company and investor level taxation. These studies include, for example, King (1974), Miller (1977), Auerbach and King (1983) and Lewellen and Mauer (1988). The implications of classical corporate taxation (where both profit and dividends are fully taxed at the company and investor level), double-tax avoiding or reducing systems and tax timing options are analysed in many papers in this category. In summary, these papers either seek to find a capital structure that would be optimal at the investor level or explore the impacts of investor level taxation on the financial decisions of companies.

Other literature deals with the impact of various adjustments to taxable profit on company capital structure. DeAngelo and Masulis (1980), for example, incorporate tax depreciation and investment tax credits in the analysis. They conclude that the larger the tax-reducing adjustments to profit (or non-debt "tax shields"), the lower the company's motivation to use debt for tax deduction purposes. Companies with relatively high non-debt "tax shields" are believed to have relatively less debt in total capital. However, some papers (e.g., Scott, 1977; Moore, 1986) support the opposite argument. Higher investments (pertaining to higher non-debt "tax shields") are believed to result in a company's improved ability and motivation to acquire secured debt (relating to higher debt "tax shields").

The impact of loss carry forward regulations on company capital structure has been addressed by Mayer (1986). He finds that companies having financial difficulties are not highly motivated to use debt for tax deduction purposes. These companies are likely to have a sufficient "tax shield" as a result of the loss carry forward rules.

The research on non-debt "tax shields" has been extended by adding the effects of bankruptcy costs (see for example Kim, 1978; Brennan and Schwartz, 1978; Altman, 1984). Overall, bankruptcy costs are believed to reduce a company's motivation to utilise debt financing, though some debate the quantitative importance of such costs (Prasad et al., 2001).

2.2. Other factors impacting capital structure

A vast amount of research literature explores various other factors besides taxes that are considered to have an impact on company choices between debt and equity finance. Detailed literature reviews include Harris and Raviv (1991), Prasad et al. (2001), Myers (2001) and Masulis (1988).

Ross (1973), Jensen and Meckling (1976), Fama (1980, 1990) and Green (1984), among others, have studied agency theory from the perspective of company financing decisions. The consequences of the conflict of interests between the providers of equity and debt financing have been tackled by Myers (1977), Galai and Masulis (1976) and others. Ross (1977) and Heinkel (1982), for example, have studied how market signalling relates to company capital structure. Myers and Majluf (1984), Narayanan (1988) and Heinkel and Zechner (1990) highlight the interaction between capital structure, investments and the asymmetric information between the capital market and the companies. The impact of various organisational and strategic aspects of company preferences for debt or equity has been addressed by Barton and Gordon (1987, 1988), Riahi-Belkaoui and Bannister (1994) and others. Wald (1999) has conducted research on the results of dividend restrictions on capital structure.

These examples of research literature are to illustrate that the formation of a company's capital structure is a complex issue, depending on various internal and external factors. So far no common theoretical understanding has been reached in the literature upon why certain companies at certain periods choose to utilise debt, while others use more equity. For these reasons, company preferences for either equity or debt have been regarded as an exogenous variable in the capital structure model presented in this thesis. The impact of the differences between DPT and GPT on company capital structure has been modelled for both cases; that is, for companies preferring equity and for companies that prefer debt.

Numerous empirical studies have been carried out to substantiate the existence and importance of the factors (including taxation) that influence company capital structure. These studies include Titman and Wessels (1988), MacKie-Mason (1990) and Welch (2004), among others. A comprehensive comparison of empirical research can be found in Prasad et al. (2001).

Similar to the theoretical literature, there is no consensus on the impact of corporate taxation and other factors on capital structure decisions among companies. The contradictions in the empirical results provide further support to the decision to regard company preferences for equity or debt financing as an exogenous variable in the model presented in this thesis.

2.3. Taxes and dividend decisions

Many comprehensive literature reviews have been prepared on dividend policy, including Lease et al. (1999), Frankfurter and Wood (2002), and Allen and Michaely (2003). Besides the impact of taxation, these papers cover research results on various other aspects of payout decisions.

Overall, the literature on dividend policy starts from the valuation model by Miller and Modigliani (1961). They divide investors into "tax clienteles" that are each taxed differently. One of their key results is that dividend policy does not have any impact on the company's value. The model assumes a perfect capital market and non-existence of taxes. In addition, other idealisations are made. A large part of the subsequent research focuses on the impact of taxes on payout policy.

One of the research areas has been the difference in the tax impacts on dividends compared to share repurchase. Farrar and Selwyn (1967) assume in their model that investors maximise their after-tax income, finding that share repurchase should be used to distribute earnings and no dividends should be paid. A similar conclusion is reached by Brennan (1970), who extends the Farrar and Selwyn (1967) model into a general equilibrium framework where investors maximise their expected utility of wealth.

Miller and Scholes (1978) show that in perfect capital markets taxes could be avoided as a result of using certain dynamic trading strategies. Stiglitz (1983) suggests several additional dynamic tax avoidance schemes. Several studies, including for example, Kalay (1982) and Michaely and Vila (1995), have discussed dynamic trading strategies around the ex-dividend day, showing that investors can change their trading patterns near this day to capture or avoid the upcoming dividend. If dividends are taxed more heavily than capital gains and investors are not able to use any dynamic trading strategies to avoid such higher taxation then minimising dividends is optimal. Constantinides (1984) introduces the "tax timing option" concept, demonstrating that investors should be willing to pay for the option to delay capital gains realisation.

Black (1976) gives rise to the "dividend puzzle" – though dividends generally seem to be a more costly payout source than share repurchase, in practice firms nevertheless persist in paying out cash as taxable dividends. In general, there is no common and empirically substantiated understanding on the impact of taxes on payout policy. More recent models on payout policy (see next section) tend to search for the combined impact of taxes and other factors.

2.4. Other factors impacting dividend decisions

Most of the other factors, besides taxes, that are considered to impact payout policy can be viewed as relaxing the idealisations made by Miller and Modigliani (1961).

The consequences of asymmetric information and the concept of signalling have been discussed by Bhattacharya (1979), Miller and Rock (1985), John and

Williams (1985), Allen et al. (2000), and Grullon et al. (2002), among others. Overall, the underlying idea is that if managers are better informed about the value of the company, dividends can be used to communicate that information to the market, despite the costs related to paying the dividends. On the other hand, dividends can be viewed as negative news, whereas the companies that pay dividends could be those that have no profitable projects in which to invest. Bechman and Raaballe (2006) examine a range of new signalling models that provide an explanation for the rationality of taxable cash dividends.

The results of relaxing the assumption of complete contracts have been addressed by Jensen and Meckling (1976), Grossman and Hart (1980), Jensen (1986) and many others. The basic concept is that shareholders may use dividends to restrict the financial liberties of managers if contracts are incomplete or are not fully enforceable.

The consequences of transaction costs as well as various indirect factors on dividend policy have been researched from different perspectives by Feldstein and Green (1983), Shefrin and Statman (1984), Marsh and Merton (1986) among many others. The basic argument is that dividend distribution may be optimal if dividend payments reduce transaction costs or provide other benefits to company shareholders.

The above-mentioned literature demonstrates that optimal dividend policy is not a straightforward matter, depending on many company and investor level factors. No common theoretical understanding has been reached so far upon why some companies choose to pay dividends or repurchase stocks at certain times, while others tend to retain the profits.

Several empirical studies have been conducted to validate the impact of the different factors (including corporate taxation) on dividend policy. These studies include the influential works by Black and Scholes (1974) and Litzenberger and Ramaswamy (1979) as well as the numerous recent studies like Yoon and Starks (1995), Michaely et al. (1995), Lie (2000), Fama and French (2001), Nissim and Ziv (2001), Grullon and Michaely (2002), DeAngelo et al. (2004), Trojanowski (2004), and Brav et al. (2005).

Overall, there is no consensus in either theoretical or empirical literature on optimal payout policy. Brealey and Myers (2005), for example, conclude that the "dividend puzzle" is still one of the ten unsolved problems in finance.

2.5. Consequences of distributed profit taxation

The consequences of distributed profit based corporate taxation have been addressed only in a limited number of scientific articles, including the following.

Funke (2002) has analysed the investment effects of the Estonian 2000 tax reform, using the dynamic model presented in his paper to consider the effects of both company and investor level taxation. He finds that the tax reform should encourage investment spending as well as stimulate growth and raise corporate productivity. However, strict assumptions have been made in respect of how

companies finance their investments. In this way the results of Funke (2002) and the outcome of the present thesis could serve as a basis for further studies on the effect of DPT on investment and financing decisions combined.

Staehr (2005) has studied the distributional aspects of corporate taxation, including the specifics of the Estonian tax system. In the paper by Funke and Strulik (2003), the expected impact of the Estonian taxation system on growth and welfare is explored. Sepp and Wrobel (2002) have addressed related tax competition issues. These articles focus mainly on the macroeconomic implications of the DPT system. Again, the results of these studies in combination with the present thesis could be a useful basis for future studies on economic policy under DPT.

Sander (2005) researched the tax advantage of debt within the conditions of the Estonian corporate tax system. In his article, a two period model is presented. He finds that the existence of a "tax shield" depends on the legal status of the company as well as its dividend policy. Overall, optimal dividend decisions and capital structure choices are regarded as exogenous in this paper.

None of the abovementioned papers however, has dealt with the impact of DPT on company capital structure and dividend decisions. The present thesis aims to fill this gap to the extent possible.

3. THEORETICAL MODELS

3.1. Distributed versus gross profit based corporate taxation

DPT denotes the taxation system whereby corporate income tax is based on the amount of profit distributed within the taxation period. In a DPT environment the dividend tax rate is generally defined as a percentage τ_d ($0 \leq \tau_d \leq 1$) of the gross profit distributed (*DIV*). Net distributed profit during any taxation period would equal $(1 - \tau_d)$ *DIV*. As no corporate income tax is charged on the profit earned as long as dividends are not paid, the after tax profit is equal to the profit before taxes.

GPT refers to the taxation system whereby corporate income tax is calculated on the basis of a company's profit (*PBT*) earned during the taxation period. In a GPT environment, after tax profit would equal $(1 - \tau_c)$ *PBT* where τ_c ($0 \leq \tau_c \leq 1$) is the corporate tax rate. In general, on the company level no corporate income tax is payable on gross distributed profit under GPT.

Some adjustments to the accounting profit may be required for taxation purposes under GPT. For example, statutory thin capitalisation rules, tax depreciation policies, investment tax credits and loss carry forward principles may increase or decrease the taxable profit in comparison with the accounting profit. The impact of such adjustments has been ignored in this thesis as the existence and nature of these adjustments is country and company specific and their inclusion would result in unnecessary complication of the model.

A general indicator to characterise the two systems' dissimilarities is the difference, ΔT, between the net present values (as at the start of a company's operations) of a company's total corporate tax payments, T, during the company's lifetime under GPT and DPT. It is assumed that taxes are payable at the end of every taxation period. So $\tilde{r}_t$ is defined as an expected rate of return on the investment in the company's shares in period t. For comparative purposes, τ_d and τ_c are assumed to be equal (τ).

$$\Delta T = \sum_{t=1}^{n} \frac{\tau_t PBT_t}{(1+\tilde{r}_t)^t} - \sum_{t=1}^{n} \frac{\tau_t DIV_t}{(1+\tilde{r}_t)^t} = \sum_{t=1}^{n} \frac{\tau_t (PBT_t - DIV_t)}{(1+\tilde{r}_t)^t} \qquad (1)$$

Assuming that profit cannot be distributed as dividends earlier than it is earned, ΔT would be positive (or, at least, equal to zero). The following observations can be made:

- *Postponed tax payments* – The tax payments in a distributed profit taxation system occur later (or, at least, not earlier) than in a profit based taxation system. In real terms, companies pay less taxes under DPT than under GPT, given the tax rates are similar. DPT as opposed to GPT is comparable to the government granting an interest free loan to companies. The government does not collect the corporate tax in the period when profit is earned, but gives a "tax credit" until the profit is distributed. A similar idea, though from a different perspective, has been mentioned by Staehr (2005).

– *Time lag between profits and dividends* – The longer the time between the earning and the distribution of profit, the larger ΔT and real terms tax savings are. It should be noted that the timing of dividend payments and thereby tax payments in a DPT system is at the discretion of the investors. The time of earning the profit and respective tax payments in a GPT system is determined by the (more or less) objective operating results. Therefore, companies and investors in a country with a DPT system can enjoy an additional liberty of determining the timing of tax payments. This may however, lead to emotional decisions by the investors to retain profits instead of paying them out as dividends in order to postpone tax payments, although retaining the profits may not be the optimal course of action from a financially rational perspective.

– *Size of profits* – The higher the total profits of the company, the larger ΔT and real terms tax savings are. Highly profitable firms therefore may enjoy more of the advantages that derive from the differences in the tax systems.

– *Tax rate* – The higher the tax rate, the larger the ΔT and vice versa. However, expected decreases in tax rates would motivate companies to retain more profits undistributed under DPT in order to pay taxes at a lower tax rate at the future time of distribution.

Under certain conditions some businesses or projects that would not generate sufficient returns under GPT might be accepted under DPT owing to the positive value effects of the postponed tax payments. However, the availability of such a potential is largely determined by the company's dividend policy. If profits are decided to be fully distributed when earned, the company value for the investor under DPT and GPT is equal.

3.2. Capital structure under distributed profit taxation

A simple financing model is introduced in this section in order to compare the impact of DPT and GPT on capital structure. The company's total capital employed, *C*, comprises equity, *E*, and debt, *F*. Equity consists of share capital, *S* (which is assumed to include any other contribution the owners make to equity, e.g., share premiums, as well as the negative impact of unemployed share capital, e.g., treasury shares); profit for the period, *PBT*, less taxes; and retained earnings, i.e., accumulated previous profits less the impact of any profit distribution and related taxes, inclusive of any statutory or voluntary reserves, *R*.

For simplicity, the following assumptions are made:

– *The size of equity finance is sufficient to efficiently use debt finance*. In other words, *E* and *F* correspond to adequate leverage. Consequently, the model may not be applicable for certain financially distressed companies.

– *No financing from owners is used other than share capital*. In case a company has received additional financing from its owners or from the

companies related to the owners, the applicability of the model will depend on the actual conditions of such financing.

Under both DPT and GPT, the company's after tax profit for the current period and accumulated profits plus reserves would be smaller than in a country with no corporate tax. The difference between these figures is equal to the total amount of taxes paid in the current as well as in the previous periods, measured in real terms, and the additional interest, η ($\eta \geq 0$), for utilising the additional financing needed to cover the tax expense in the current as well as in the previous periods, measured in real terms. Such interest cost is assumed to reduce the taxable profits of a company under GPT.

The aggregate decrease in the profit for the current period, accumulated profits and reserves as a result of taxes has to be compensated by either share capital or debt. As explained in Section 2, company preferences for equity or debt are regarded as an exogenous variable in this model.

We define α_E as a coefficient that measures a company's preference for equity capital (in general, reflecting the cost of equity capital), and α_F as a coefficient that measures its preference for debt (in general, reflecting the cost of debt). In case the company prefers debt to equity (i.e., $\alpha_E \geq \alpha_F$), the company is willing to pay out as much of the distributable equity as possible. Ideally it would retain only share capital, S, as equity, E. The company would utilise debt to compensate the tax expense. Additional debt would bring along additional interest expense, which would decrease total corporate tax costs under GPT.

However, some companies may prefer equity to debt finance. In this case, corporate income tax does not have (ceteris paribus) an impact on the demand for debt. Instead, the company would use equity capital to cover the tax cost.

An important indicator in the analysis of capital structure implications is the difference, ΔF, in the demand for debt, F, by similar companies under the DPT and GPT systems. ΔF for a period m would be equal to:

$$\Delta F_m = \begin{cases} \sum_{t=1}^{m} \left[\tau_t (PBT_t - \eta_{t_{GPT}} - DIV_t) + (\eta_{t_{GPT}} - \eta_{t_{DPT}}) \right](1+\tilde{r}_t)^{m-t} & if \quad \alpha_E \geq \alpha_F \\ 0 & if \quad \alpha_E < \alpha_F \end{cases} \quad (2)$$

To measure the difference in equity financing, we can use a similar approach. The difference, ΔS_A, between similar companies under the DPT and GPT systems in the extent to which they utilise share capital would equal:

$$\Delta S_m = \begin{cases} 0 & if \quad \alpha_E \geq \alpha_F \\ \sum_{t=1}^{m} \tau_t (PBT_t - DIV_t)(1+\tilde{r}_t)^{m-t} & if \quad \alpha_E < \alpha_F \end{cases} \quad (3)$$

As it was explained in Section 3.2., ΔT tends to be positive (or, at least, equal to zero). This implies that if $\alpha_E \geq \alpha_F$, ΔF is also positive (or, at least, equal to zero). For the companies that inherently prefer debt to equity, the demand for debt is lower in a country with a DPT system in comparison to a jurisdiction with a

GPT system. The lower demand for debt is due to the later timing of tax payments and thereby lower need for finance to cover the tax expense.

So far, we have considered the company's operating profit and investments to be the same under the DPT and GPT systems. It may, however, be argued in view of the analysis presented in Section 3.1. that under DPT, some companies may make additional investments instead of repaying debt or distributing more dividends. In this case, there would evidently be no decrease in the demand for debt (if $\alpha_E \geq \alpha_F$) or equity (if $\alpha_E < \alpha_F$). On the contrary, demand for debt or equity finance, respectively, may be increased, depending on the nature, amount and volume of the investments (e.g. through leverage). Detailed theoretical and empirical analysis of investment decisions under DPT would be a challenging area for future research but remains outside the scope of this thesis. It is therefore difficult to assess here what, if any, is the impact of DPT on investment decisions. In general, additional profitable investments would further increase the overall positive impact of DPT on the value of a company.

3.3. Dividend decisions under distributed profit taxation

In this section a company operating under uncertainty is modelled in a binomial framework. Both DPT and GPT systems are considered. The model includes company and investor level taxes and investor's different consumption levels. Optimal dividend policy is defined as the one that maximises the investor's wealth. As companies may have investors with different consumption levels, the actual dividend policy could not be optimal for all of them. In this respect the model helps to understand how far from optimum the dividend amount is.

The model has been constructed to reflect the fundamental characteristics of distributed profit taxation and gross profit taxation. The many exceptions to the general rules and special cases (e.g. the consequences of double tax treaties and the tax treatment of certain specific revenues, expenses, investments and payouts at both the company and investor level) have been omitted in order to avoid unnecessary complication of the model. Inclusion of these special cases into the analysis would be a challenging area for further research.

3.3.1. Binomial framework

The model comprises two periods, where period 0 is the present period and period 1 is the following and final period of the company's existence. The stream of cash flows (net dividends) that a company generates to the owners is uncertain. The evolution of these cash flows is modelled in a binominal framework. If period 0 profits are *PBT*, then period 1 profits will be either *u*PBT* or *d*PBT*, where $u > 0 > d$. These states, *u* and *d*, are called the "up state" and the "down state", respectively. The "up state" denotes a period when the company generates a profit, while in the "down state" the company makes a loss. As opposed to a standard binomial model (regarding options), the

occurrence of a loss is needed in one of the states to model the differences in tax effects.

It is assumed that the risk free rate of return, r ($r > 0$), remains constant and is equally available to all investors so that the same rate is used by all agents to discount risk free cash flows. To value risky cash flows, a state price framework is employed, in which the company is valued based on one price for the "up state" and another for the "down state". The state prices are denoted p_u ($p_u \geq 0$) and p_d ($p_d \geq 0$), respectively. These state prices are assumed to be given (i.e. exogenous to the current model). It is also assumed that the state prices are independent of the corporate tax regime. Since all the agents can invest in the risk free asset, the aggregate of the state prices equals:

$$p_u + p_d = \frac{1}{1+r} \tag{4}$$

The state prices therefore combine both the probability of the state and the discount factor (risk free interest rate).

3.3.2. Debt and investments

In order to address the capital structure implications, it is assumed that debt interest cost, $DEC*r$, may exist in both periods. Such interest cost is corporate tax deductible. In order to focus exclusively on the differences of the taxation systems and abstract from the investment decisions, it is assumed that the company will undertake the same investments and generate the same operating profits regardless of taxation.

In both taxation systems, the company has a chance to distribute its period 0 profits fully or partially either at the end of period 0 (i.e. time 0) or, together with period 1 profits at the end of period 1 (i.e. time 1). This part of period 0 profits that remains undistributed is denoted with UND. The company is assumed to invest the undistributed part of profits in a risk free asset for period 1 (whereas no additional business related investments would be made).

3.3.3. Investor level consumption and taxation

The investor is assumed to use the dividends received at the end of period 0 partially or fully for consumption, C ($C \geq 0$), and to invest the rest of the dividends in a risk free asset for period 1. If dividends are lower than consumption C, it is assumed that the investor would use debt finance with interest cost r to cover the exceeding part. The interest cost on this debt is assumed to be a non-tax-deductible cost for the investor.

In order to include investor level taxation in the model, it is assumed that personal interest income is taxed at a percentage τ_p ($0 \leq \tau_p < 1$) upon receipt by the investor.

3.3.4. The value of the company for the investor

The company related cash flows to the investor are composed of the following:

- *Net dividends received in period 0:* $\left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)$.
  This notation supports both the case of distributed profit taxation (DPT) and gross profit taxation (GPT). In the DPT case, there is no corporate income tax, so that $\tau_c = 0$. On the other hand there is a tax on distributed profits, so that $\tau_d > 0$. In the case of GPT, $\tau_c > 0$ and $\tau_d = 0$.

- *The consequences of the difference in the amount of dividends and consumption.* At time 0 the investor consumes C. If $\left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C$ is positive, the investor has a surplus which he invests in the risk-free security, and if this expression is negative, the investor borrows at time 0 to support his consumption. In the first case, he collects interest r on which he pays personal tax τ_p, and in the second case he pays interest, which is not considered an expense for tax purposes. Writing this in one expression and discounting to time 0 gives:

$$\begin{cases} \left\{\left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C\right\}\left(-1+\dfrac{1+r\left(1-\tau_p\right)}{1+r}\right) & \text{if } \left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C>0 \\[3mm] \left\{C-\left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)\right\}\left(1-\dfrac{1+r}{1+r}\right) & \text{if } \left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C\leq0 \end{cases}$$

Simplifying, this gives:

$$\begin{cases} \left\{\left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C\right\}\dfrac{-r\tau_p}{1+r} & \text{if } \left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C>0 \\[3mm] 0 & \text{if } \left[\left(PBT-DECr\right)\left(1-\tau_c\right)-UND\right]\left(1-\tau_d\right)-C\leq0 \end{cases}$$

- *Discounted net dividends received in period 1* (state price adjusted for both the "upper state" and "lower state"):

$$p_u\left\{\left(uPBT-DECr\right)\left(1-\tau_c\right)\left(1-\tau_d\right)+UND\left[1+r\left(1-\tau_c\right)\right]\left(1-\tau_d\right)\right\}+$$
$$+p_d\left\langle Max\left\{\left(dPBT-DECr\right)\left(1-\tau_c\right)\left(1-\tau_d\right)+UND\left[1+r\left(1-\tau_c\right)\right]\left(1-\tau_d\right),0\right\}\right\rangle$$

The aggregate of the above components would be:

$$V^{Investor} = \left[(PBT - DECr)(1-\tau_c) - UND \right](1-\tau_d) -$$
$$- \frac{\left\langle Max\left\{ \left[(PBT - DECr)(1-\tau_c) - UND \right](1-\tau_d) - C, 0 \right\} \right\rangle r\tau_p}{1+r} +$$
$$+ p_u \left\{ (uPBT - DECr)(1-\tau_c)(1-\tau_d) + UND\left[1 + r(1-\tau_c) \right](1-\tau_d) \right\} +$$
$$+ p_d \left\langle Max\left\{ (dPBT - DECr)(1-\tau_c)(1-\tau_d) + UND\left[1 + r(1-\tau_c) \right](1-\tau_d), 0 \right\} \right\rangle$$

(5)

Equation (5) will serve as the basis for the discussion in the following section.

3.3.5. Dividend decisions

The following propositions help to understand the underlying conditions for dividend decisions under DPT. Proofs of the propositions can be found in the full text of the underlying article (see Appendix 2).

Proposition 1. If profits are fully distributed when earned and the corporate tax rate (τ_c) equals the dividend tax rate (τ_d), company value for the investor under DPT and GPT is equal.

The largest differences between the two taxation regimes emerge if the timing of dividends and thereby tax payments is different from the period of earning the underlying profits. As a consequence, the underlying conditions for deciding upon the timing of dividends are different under these systems. These are addressed in the following propositions.

Proposition 2. Company value for the investor under DPT is independent of the dividend policy, as long as the dividends received remain below the investor's consumption level and if the probability of losses is zero.

As losses are not possible, the undistributed profits earn the risk free interest *r* at the company level, making no difference whether the profit is distributed at time 0 or time 1. At the investor level, there are no revenues subject to taxation and neither are there any tax-deductible expenses. The dividend policy has therefore no impact on the company value for the investor as long as dividends do not exceed the investor's consumption level and if the probability of losses is zero.

Proposition 3. If the probability of losses is zero, it is optimal under DPT to distribute dividends at time 0 equally to or less than the investor's consumption level.

Retaining the profit undistributed and earning interest revenue on the pre-tax profit at the company level is preferable to distributing the dividends and earning interest revenue on the after-tax profit at the investor level. Starting from the point where there are no savings to be invested (i.e. the consumption level exceeds the dividends), the company value is independent of the dividend amount.

Proposition 4. If losses in period 1 are possible and if the investor's consumption level exceeds the dividends received, then (a) for these

undistributed profit amounts that remain below the discounted amount of potential losses, the higher the period 0 dividends, the higher the company value for the investor under DPT, and (b) for these undistributed profit amounts that are above the discounted amount of potential losses, dividend policy would not impact the company value for the investor under DPT.

If the investor's consumption exceeds the dividends received, the company value for the investor increases as time 0 dividends increase. If not distributed, the profits of period 0 could be lost for the investor due to the need to cover the potential losses in period 1. As far as the period 0 dividends remain below the investor's consumption, then starting from the point when the undistributed profits exceed period 1 discounted losses, the dividend amount does not impact the company value any more, while the "unharmed" portion of period 0 profits could be distributed at time 1. The latter situation is similar to the case with no losses described in proposition (2), but the company value for the investor is lower by the state price adjusted losses in period 1 that have to be covered by the undistributed profits of period 0.

Proposition 5. *If losses are possible in period 1 and if the investor's consumption level remains below the dividends received, there exists a unique breakpoint level of p_u that determines optimal dividend amount under DPT. Above this breakpoint, the larger the undistributed profit, the higher the company value for the investor. Below this breakpoint, for these undistributed profit amounts that remain below the discounted amount of potential losses, the higher the period 0 dividends, the higher the company value for the investor under DPT. For these undistributed profit amounts that are above the discounted amount of potential losses, the larger the undistributed profits, the higher the company value for the investor.*

If period 0 dividends exceed investor's consumption, there exists a breakpoint value of p_u that determines optimal dividend policy under DPT. If p_u is above this breakpoint (i.e. the probability of losses is low), then retaining the profit undistributed and earning interest revenue on the pre-tax profit at the company level is preferable to distributing the dividends and earning interest revenue on the after-tax profit at the investor level. This is similar to the situation with no losses as described in proposition (3), but the company value for the investor is lower due to the potential losses in period 1 that have to be covered by the undistributed profits of period 0.

Starting from the point when the undistributed profits exceed potential period 1 discounted losses, the "unharmed" portion of period 0 profits could fully earn additional interest revenue. In this case, the tax benefits of keeping cash in the company, compared to the adverse impact of potential losses, are higher than in the previous case.

If p_u is below the breakpoint (i.e. the probability of losses is not low), then for these values of time 0 dividends when the undistributed profits remain below the potential period 1 discounted losses, the adverse impact of the losses exceeds the advantages of keeping the profit undistributed. In this case, the higher the distribution in period 0 the better. If not distributed, the profits of

period 0 could be lost for the investor due to the need to cover the potential losses in period 1.

However, starting from the point when the undistributed profits exceed potential period 1 discounted losses, the larger the undistributed profits the better. In this case, the "unharmed" portion of period 0 profits could earn additional interest revenue. The tax benefits of keeping cash in the company exceed the adverse impact of potential losses in this case.

To summarise the above propositions, the following table can be constructed as a corollary of optimal dividend policy under DPT.

Table 1. Optimal dividend policy under DPT

	Losses in period 1 are not possible	Losses in period 1 are possible			
		$p_u > \dfrac{1+r\left(1-\tau_p\right)}{\left(1+r\right)^2}$		$p_u > \dfrac{1+r\left(1-\tau_p\right)}{\left(1+r\right)^2}$	
		Any *UND*, when consumption is above the dividends received, exceeds $-\dfrac{d\,PBT - DECr}{(1+r)}$	All other cases	Any *UND*, when consumption is above the dividends received, exceeds $-\dfrac{d\,PBT - DECr}{(1+r)}$	All other cases
Optimal dividend policy	Dividends should not exceed the investor's consumption level	Dividends should not exceed the investor's consumption level	Dividends should be equal to the investor's consumption level	Dividends should not exceed the investor's consumption level, unless distributing fully at time 0 gives higher company value	Dividends should be distributed fully at time 0

Analogous propositions can be constructed and proved for the GPT regime. These propositions can be found in the full text of the underlying paper (see Appendix 2). It can be noted that the dividend decisions under GPT are significantly different from these under DPT. Therefore, the existing theoretical models on payout policy as well as companies' financial decisions in general may not be applicable under the circumstances of DPT. As a result, the financial behaviour of companies and investors, including investment decisions under this tax regime, represent interesting and yet relatively unexplored areas for further research.

4. EMPIRICAL ANALYSIS

4.1. Data and methodology

The empirical information has been extracted from the Estonian Commercial Registry's database for the period of 1995 to 2004. This database includes the financial information of nearly all the companies that have been incorporated in Estonia. For every company, the data are included in the sample for these years for which the following criteria were met: (a) the company has been in no other status than "active" during the entire period of 1995 to 2004; (b) the company's financial information was available at a sufficient level of detail; (c) all components of assets and liabilities were non-negative; and (d) total assets did not differ more than 10% from the total of liabilities and equity, in order to exclude observations with insufficient or evidently inappropriate data.

The following financial leverage and liquidity ratios are employed in this study for the purposes of characterising company financial decisions:

− *LIABCAP* is calculated as total liabilities divided by total capital as at the end of a given financial year. Total capital is defined as the aggregate of the book values of liabilities and equity, being equal to the book value of total assets. In this way, LIABCAP includes the impact of all kinds of external finance (financial services, trade creditors, etc) as well as both short- and long-term liabilities.

− *LOANCAP* is computed as loan liabilities divided by total capital. The difference between LIABCAP and LOANCAP is that the latter reflects the use of financial services.

− *CASHCAP* or cash ratio is cash divided by total capital. CASHCAP measures the company's ability to cover its liabilities by using the available cash balance only. In the context of this study, CASHCAP is an indicator of how much of the company's capital is kept as cash (as opposed to being used in the business operations).

− *RETECAP* is a ratio of retained earnings to total assets. RETECAP is a combined indicator of past profitability and dividend policy, showing the magnitude of the share of undistributed earnings (and any other equity items besides share capital) in total capital employed.

It has to be noted that the above indicators are based on book values instead of market values. Liabilities as presented in the balance sheet might include a significant amount of accrued non-cash liabilities, thus distorting the capital structure analysis. Also, the balance sheet information does not reflect the maturity structure of assets and liabilities and consequent value implications. Moreover, there tend to be significant differences between companies' book and market values of equity. Market values of debt and equity were, however, not available for the companies in the sample.

For the purposes of excluding noisy observations from the sample, the following additional inclusion criteria have been used in respect of each observation:
- $0 \le$ LIABCAP < 100,
- $0 \le$ LOANCAP < 100,
- $0 \le$ LTLICAP < 100,
- $0 \le$ CASHCAP ≤ 1, and
- $-100 <$ RETECAP ≤ 1.

The sample includes companies from all the main industries, but excludes the financial sector entities, sectors with the significant involvement of state financing, like defence, education and healthcare, as well as some exceptional business activities.

As the financial variables are in the form of ratios, the number of employees (EMPL) has been used as a rough control variable of company size in the study. Total revenues and total assets may be considered to be more popular company size indicators in previous studies, but cannot be used due to endogeneity.

In order to capture the specifics of company financial behaviour during different stages of development, the company age variable (AGE) has been included as a control variable. AGE measures the number of years from incorporation to the observation.

Also, a company legal type indicator as a binary control variable has been incorporated into the analysis. Type A stands for stock corporations ("*aktsiaselts*") and type B stands for limited liability companies ("*osaühing*"). This grouping seeks to capture the significant differences in statutory minimum share capital requirements, which may have a direct impact on capital structure. This control variable also distinguishes companies that have positioned themselves as large from those that have chosen the (usually procedurally easier) legal form aimed at smaller companies. Companies of all other legal forms than type A and B (e.g. agricultural unions, non-profit organisations, and private entrepreneurs) have been excluded from the analysis.

After employing all the above inclusion criteria, the sample used for the empirical analysis covers 27 thousand observations. In order to mitigate endogeneity and multicolinearity problems, company profitability indicators as potentially meaningful control variables had to be excluded from the model.

Macro level control variables used in this research are real GDP growth (GDPGRO) and annual change in the share of private credit in GDP (dCREGDP). The latter is an indicator of the speed of financial deepening and is used in the study in order to roughly exclude the consequences of rapid lending growth in Estonia during the years under review. The macro variables have been extracted from the IMF International Financial Statistics Yearbook (2006).

In order to test certain hypotheses and assumptions from Section 3, descriptive statistics and panel data regression analysis considering company heterogeneity of variance in random effects and employing robust standard errors have been used as the methodology for the research.

4.2. Results

First, a comparative analysis of the sample companies' mean average RETECAP as an indicator of dividend policy for the observations under GPT compared to those under DPT was performed. The top left panel in Figure 1 illustrates the results.
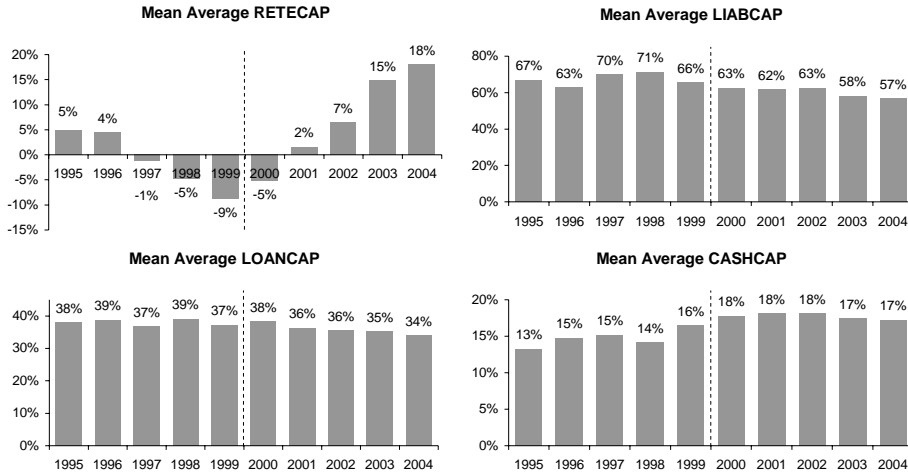
Figure 1. Mean average financial indicators (*Author's illustration*)

It can be noted that the average share of retained earnings in total capital exhibited a monotonously decreasing trend under GPT, but turned into a monotonous increase starting from 2000. The results are robust for different industries. Such findings indicate clearly that under DPT companies retain more profits undistributed than they would under GPT.

Second, an analysis of the sample companies' mean average leverage indicators (LIABCAP and LOANCAP) in the observations from 1995 to 1999 (i.e. under the GPT system) compared to those in the observations from 2000 to 2004 (i.e. under DPT) was performed. The results in respect of LIABCAP are illustrated in the top right panel of Figure 1.

In the conditions of DPT, as opposed to the years under GPT, there has been a decreasing trend in the share of liabilities in total capital. This trend is robust on a cross-industry basis. Based on the theoretical argument in Section 3, the decrease in the share of external financing may be explained by the tax costs associated with dividend payment having led companies to retain more profits undistributed under DPT, thus providing an alternative to external liabilities as a source of financing.

The bottom left panel of Figure 1 illustrates the trend in the sample companies' use of debt. Mean average LOANCAP in the observations exhibits a monotonously decreasing trend under DPT, in contrast to the GPT period until 1999. The increase in average LOANCAP in the first periods may be explained

by economic growth, rapid financial deepening and decreased interest rates having a positive impact on the use of debt financing (and external financing in general). The following decrease may be due to the adverse impact of DPT on the use of debt financing, whereas companies started to retain more profits under DPT. However, there are cross-industry variances in the dynamics of average LOANCAP.

As an initial result, the above descriptive statistical analysis gives some support to the hypothesis that the use of external finance is relatively lower under the DPT system in comparison to the GPT system; however, this necessitates substantiating the results using a multi-variate panel regression analysis, as presented below.

Third, a comparative analysis of sample companies' mean average CASHCAP under GPT and DPT was performed. The bottom right panel of Figure 1 illustrates the results that profits retained in the company due to the effects of DPT do not lead to additional strategic investments, but in the accumulation of liquid assets (risk free investments) is an assumption used in the model presented in Section 3.3. CASHCAP is one of the indicators capturing these relations. It appears that the average share of cash in total assets in the sample companies increased under DPT from 2000 to 2004, as opposed to the decreasing trend under GPT from 1995 to 1999. The outcome is robust for all industries concerned and supports the model presented in Section 3.3. The results may be explained by the higher retained profits under DPT, leaving cash in the companies, and the unavailability of acceptable additional investment opportunities in the business, whereas the profitable investments have been made anyway by using either equity or external finance.

In order to substantiate the results of descriptive statistics, regression analysis models incorporating several important control variables were constructed. Outputs of the regression models are summarised in Table 2.

RETECAP, LIABCAP, LOANCAP and CASHCAP are introduced as dependent variables into respective four regression models. Tax system (DPT versus GPT) is employed as the key independent variable. The control variables used are legal type of the company, the company's age, number of employees, annual GDP growth and annual change in the share of private credit in GDP, as well as the industry and year dummies. In this way, the impact of these micro and macro level variables is excluded and the impact of the change in the tax system from GPT to DPT can be identified with a higher level of precision.

It can be noted that the number of observations in the LOANCAP regression model is significantly lower than that of the other three models. This is due to the fact that a large number of companies do not utilise any loan capital. These companies have been excluded from the model.

Table 2. Regression models

Variable	RETECAP	LIABCAP	LOANCAP	CASHCAP
Tax system	3.437 ***	-5.146 ***	-3.340 ***	1.345 ***
DPT = 1, GPT = 0	(6.7)	(-8.5)	(-4.4)	(3.8)
Company legal type	-0.728	-5.428 ***	-5.213 ***	-5.836 ***
A = 1, B = 0	(-1.4)	(-8.8)	(-7.5)	(-17.9)
AGE	1.425 ***	-1.631 ***	-1.414 ***	-0.205 ***
	(21.5)	(-19.6)	(-15.2)	(-4.2)
EMPL	0.012 ***	0.001	-0.013 ***	-0.008 ***
	(3.1)	(0.5)	(-4.6)	(-4.7)
GDPGRO	-0.267 *	0.084 ***	0.191 **	-0.017 ***
	(-4.9)	(1.3)	(2.4)	(-0.4)
dCREGDP	1.625 ***	-1.102 ***	-0.756 ***	0.270 ***
	(21.1)	(-12.4)	(-6.9)	(5.0)
Constant	-8.378 ***	81.717 ***	59.624 ***	18.679 ***
	(-8.5)	(77.7)	(48.1)	(25.6)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Model statistics:				
Chi square	2,721	1,774	1,279	953
R square	0.098	0.093	0.148	0.066
No of observations	24,041	26,610	12,462	26,590

*Note: Statistical significance levels marked as *** (α < 0.01), ** (α < 0.05) and*
* (α < 0.1); t-statistic in brackets

Outputs of the regression models show that there is a significant impact of DPT on company dividend decisions. The change in the taxation system from GPT to DPT has brought an increase of 3.4 percentage points in the share of retained earnings in the sample companies' total capital employed. The result is statistically significant. The tax costs associated with dividend payment appear to have led companies to keep more profits undistributed under DPT.

The regression models show that company use of external financing tends to be relatively lower under DPT in comparison to the GPT system. The change in the taxation system to DPT appears to have caused a decrease of 5.1 percentage points in the share of liabilities in the sample companies' total capital. The share of loan liabilities in total capital of the sample companies appears to have decreased by 3.3 percentage points as a result of introducing the DPT system. These results exhibit strong statistical significance and give direct support to the

hypothesis that companies use less external finance in their total capital under DPT than they would do under GPT. The relatively smaller effect of DPT on debt financing (LOANCAP) in comparison to the impact of the change in the tax system on total external financing (LIABCAP) may be explained by differences in company preferences for debt and equity financing. As theoretically argued in Section 3.2, only those companies that normally prefer debt to equity (due to its lower cost) are expected to use less debt under DPT, while those companies that prefer equity to debt, do not demonstrate the decrease in debt financing as they would use as little debt as possible regardless of whether the tax system is DPT or GPT. Therefore, the empirical finding that LOANCAP is less affected by the change in the tax system than LIABCAP is consistent with the theory presented in Section 3.2. Also, early termination of loans might be associated with costs that exceed the motivating effects of DPT.

As regards CASHCAP, the regression model demonstrates that the average share of cash in total assets for the sample companies appears to have increased by 1.3 percentage points as a result of changing the tax system from GPT to DPT. This relationship appears to be statistically strongly significant. Such a finding supports the assumption made in Section 3.3 that profits retained in the company due to the effects of DPT lead to the accumulation of risk free assets. The higher undistributed profits and the unavailability of profitable investment opportunities may be among the reasons why companies leave more cash in the companies under DPT. In this way DPT appears to have a positive impact on company liquidity, whereas the drawback is the allocation of available funds in inefficiently large cash balances.

CONCLUSIONS

The most important difference between the distributed profit taxation (DPT) and the classical gross profit taxation (GPT) systems is the timing of tax payments, while in essence the tax base under both taxation systems is gross profit. Tax payments under DPT occur later (or, at least, not earlier) in comparison to a GPT system. DPT as opposed to GPT is comparable to the government granting an interest free loan to companies. The government does not collect the corporate tax in the period when profit is earned, but gives a "tax credit" until the profit is distributed. The larger the profit, the tax rate and the time lag between earning and distributing profit, the larger the "interest free loan" and its positive value impact.

If tax rates are similar, companies may have a comparative advantage for developing under DPT in comparison to GPT. Under certain conditions some businesses or projects that would not generate sufficient returns under GPT might be accepted under DPT owing to the positive value effects of the postponed tax payments. However, the availability of such a potential is largely determined by the company's dividend policy. Namely, if companies decide to distribute profits fully when earned, the company value for the investor under DPT and GPT is equal.

The underlying conditions for deciding upon the optimal timing of dividends are different under the two systems. Based on the theoretical model of a company operating under uncertainty in a binomial framework, including both company and investor level taxes and investor's different consumption levels, the following remarks can be made on the impact of taxes on dividend policy under DPT.

If the probability of future losses is zero, it is optimal under DPT to distribute profit when earned equal to or less than the investor's consumption level. Retaining the profit undistributed and earning interest revenue on the pre-tax profit at company level is preferable to distributing the dividends and earning interest revenue on the after-tax profit at the investor level. Starting from the point where there are no savings to be invested (i.e. the investor's consumption level exceeds the dividends), the company value for the investor is independent of the dividend amount.

In general, if the probability of losses is noticeable, the company value for the investor is maximised if profit is fully distributed when earned. However, the following exceptional case has to be considered. If any undistributed profit amount – when the investor's consumption level exceeds the dividends received – remains above the discounted amount of potential losses, the company value for the investor could be maximised if dividend distribution does not exceed the investor's consumption.

One of the aims of introducing DPT in Estonia was motivating companies to reinvest the profits earned instead of paying them out as dividends. Although in general DPT appears to motivate companies to retain more profits than they would under GPT, interestingly, the theoretical analysis shows that retaining all

the profits in the company is never the only optimal payout policy. Rather, the dividend decision appears to be strongly focused on the investor's consumption preferences as well as on the probability and extent of future losses.

An important feature of the distributed profit taxation system is that the timing of dividend payments and thereby tax payments is at the discretion of the investors. This gives additional flexibility to investors, but may lead to emotional decisions by the investors to retain profits instead of paying them out as dividends in order to postpone tax payments, although retaining the profits may not be the optimal course of action from a financially rational perspective.

The empirical analysis of the effects of DPT on financial decisions in companies presented in this paper is based on a sample of 27 thousand observations of Estonian companies over the period of 1995 to 2004. Results of the regression analysis with the incorporation of various micro and macro level control variables indicate that the change of the taxation system from GPT to DPT has brought an increase of 3.4 percentage points in the share of retained earnings in the sample companies' total capital employed. The tax costs associated with dividend payment appear to have led companies to keep more profits undistributed, an expected result in view of the theoretical argument.

Profits retained in the company due to the effects of DPT appear not necessarily to lead to additional strategic investments, but to the repayment of liabilities and the accumulation of liquid assets instead. The study finds that company use of external financing tends to be relatively lower under a DPT system in comparison to a GPT system, supporting the theoretical results of the thesis. The change of the taxation system to DPT appears to have caused a decrease of 5.1 percentage points in the share of liabilities in the sample companies' total capital. The share of loan liabilities in total capital of the sample companies decreased by 3.3 percentage points as a result of introducing the DPT system.

The average share of cash in total assets in the sample companies appears to have increased by 1.3 percentage points as a result of changing the tax system from GPT to DPT. These results may be explained by the higher retained profits under DPT, leaving cash in the companies, and the unavailability of acceptable additional opportunities to invest in the business, although profitable investments have been made anyway using either equity or external finance.

Overall, as a result of higher cash balances and lower exposure to risks related to the excessive use of loans and other external financing facilities, DPT appears to have a positive impact on companies' liquidity and sustainability. However, the downside effect of this taxation system appears to be the allocation of some of the available funds in cash as a potentially inefficient way of investment.

Detailed analysis of optimal investment decisions under DPT, the macroeconomic consequences of the DPT system as well as related economic policy implications remain outside the scope of this thesis but represent challenging areas for future research.

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Appendix 1

PROFIT VERSUS DISTRIBUTED PROFIT BASED TAXATION AND COMPANIES' CAPITAL STRUCTURE

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Hazak, A., *Profit Versus Distributed Profit Based Corporate Taxation, Thin Capitalisation Rules and Companies' Capital Structure*. Oral presentation at the 1st Annual Conference of the Estonian Economic Association, 20–22 January 2006, Pärnu, Estonia

Hazak, A., *Corporate Tax Systems, Thin Capitalisation Rules and Companies' Demand for Financial Services*. Oral presentation at the international scientific conference "Managing Global Trends and Challenges in a Turbulent Economy", 13–15 October 2005, Chios, Greece

Hazak, A., *The Impact of the Differences in Corporate Tax Systems on Companies' Demand for Financial Services*. Oral presentation at the 2nd International Conference on Small and Medium Sized Enterprises, 28–31 August 2005, Lefkada, Greece

Appendix 2

DIVIDEND DECISION UNDER DISTRIBUTED PROFIT TAXATION: INVESTOR'S PERSPECTIVE

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Hazak, A., *Financial Decisions Under Distributed Profit Taxation.* Oral presentation at the seminar of the International Fiscal Association Estonia branch, 19 September 2007, Tallinn, Estonia

Hazak, A., *Dividend Decision Under Distributed Profit Taxation.* Oral presentation at the open seminar of the Bank of Estonia, 6 September 2007, Tallinn, Estonia

Hazak, A., *Dividend Policy Under Distributed Profit Taxation.* Oral presentation at the joint faculty doctoral seminar and research seminar of the Doctoral School in Economics of the University of Tartu and Tallinn University of Technology, 5 February 2007, Tallinn, Estonia

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Dividend Decision Under Distributed Profit Taxation: Investor's Perspective

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Abstract

Distributed profit taxation is the corporate taxation regime of Estonia. A theoretical model on dividend policy under this tax system, compared to traditional gross profit taxation, is presented in this paper. The paper seeks to model a company operating under uncertainty in a binomial framework, including company and investor level taxes and investor's different consumption levels. Overall, the tax effects on different forms of payout (e.g. dividends or share repurchases) are equal under this tax regime and the main question is deciding upon the timing of dividends. There appear to be different optimums for the timing, depending on the investor's consumption as well as the probability of losses, tax rates and interest rates. Though one of the aims of the Estonian corporate tax system is to motivate companies to reinvest the profits earned instead of paying them out, the theoretical analysis in this paper shows that from the investor's perspective retaining of all profits in the company may not be the optimal payout policy in many cases. The study helps to understand the characteristics of this unusual tax regime and may potentially lead to discussions on introducing a similar system in other jurisdictions or on modifying the corporate taxation principles in Estonia.

Keywords: dividend policy, corporate taxation, distributed profit taxation
JEL Classifications: G35, K34

1. Introduction

Optimal dividend policy has been an area of research for nearly half a century, starting from Miller and Modigliani (1961) to the numerous recent interpretations. However, agreement has been reached neither on the optimal payout policy nor on the effect of taxation on companies' payout decisions. Moreover, there are significant cross-country differences in the corporate tax systems that have received little attention in the literature so far. This paper seeks to provide a theoretical analysis of the impacts of distributed profit taxation on dividend policy, compared to these of gross profit taxation.

The practical reason for undertaking the research is to understand and demonstrate the financial consequences of the distributed profit taxation regime of Estonia, experimentally introduced in 2000. Estonia levies no corporate income tax on retained profits. Income tax is imposed on all distributions (both actual and deemed), including dividends and other profit distributions, fringe benefits, gifts, donations etc. All corporate income is tax exempt when earned, including both active (e.g. trading) and passive (e.g. dividends, interest, royalties) types of income, as well as capital gains from the sale of all types of assets (including securities and immovable property).

From 2000 to 2004 profit distributed as dividends was taxed in Estonia at a flat rate of 26/74[ths]. For example, a company that had profits available of 100 units could distribute dividends of 74 units on which it would have had to pay deferred corporate tax of 26 units. In 2005, the income tax was lowered to 24%. In 2006 the tax rate was 23% and it is 22% in 2007. The current Estonian Income Tax Act is expected to reduce income tax rates to 20% (or 20/80[ths] on top of net dividends) by means of a 1% decrease in both 2008 and 2009.

As Estonia has no annual net-basis taxation of corporate profits, entities are not subject to tax depreciation, investment tax credit or losses carry forward rules. Dividends can be paid out from the profit which remains after all losses from previous periods are covered. Distributable profits are assessed according to the Estonian accounting regulations (which are in all material aspects in line with the International Financial Reporting Standards). There are no special accounting rules for tax purposes.

Except for special cases that mainly relate to the taxation of foreign investors, the tax effects on different forms of payout (e.g. dividends or share repurchases) are in general equal under the Estonian distributed profit taxation regime. Therefore the main issue in establishing the optimal payout policy is the timing of dividends (or other form of payout, though procedurally dividends tend to be the easiest way out).

Under the EU accession treaty, Estonia may apply its income tax on dividend distributions until 31 December 2008, after which the corporate tax system must fully comply with the EU Parent-Subsidiary Directive, which prohibits taxation of intra-group dividends. It is expected that Estonia will continue to exempt retained earnings from corporate taxation until the end of 2008. The Estonian government has not decided yet about specific measures to align the tax system to the Parent-Subsidiary Directive.

The general concept of this taxation regime is however not new. Similarities can be found, for example, with the investment tax credit system in the United States, as well as with the taxation principles of personal investment gains in many countries.

The distributed profit taxation system has already received attention in the literature. However, the topic of the present paper has not been covered. The paper constitutes a small part of a larger effort to study the impacts of distributed profit taxation compared to these of gross profit taxation.

The remainder of this article is structured as follows. Overview of key related literature is provided in section 2. Section 3 introduces the model. Section 4 concludes.

2. Related Literature
2.1. Taxes and dividend policy

Several extensive literature analyses have been written about dividend policy, including Lease *et al* (1999), Frankfurter and Wood (2002), and Allen and Michaely (2003). These papers cover, besides the impact of taxation, research results on various other aspects of payout policy.

In general, modern literature on payout policy starts from the valuation model of Miller and Modigliani (1961). They divide investors into "tax clienteles" that are taxed differently. One of their key results is that dividend policy does not have any impact on the company's value. The model assumes a perfect capital market and non-existence of taxes. In addition, other idealisations are made. Large part of the subsequent research focuses on the impact of taxes on payout policy.

One of the research areas has been the difference in the tax impacts on dividends compared to share repurchase. Farrar and Selwyn (1967) assume in their model that investors maximise their after-tax income, finding that share repurchase should be used to distribute earnings and no dividends should be paid. A similar conclusion is reached by Brennan (1970), who extends the Farrar and Selwyn (1967) model into a general equilibrium framework where investors maximise their expected utility of wealth.

Miller and Scholes (1978) show that in perfect capital markets taxes could be avoided as a result of using certain dynamic trading strategies. Stiglitz (1983) suggests several additional dynamic tax avoidance schemes. Several studies, including for example Kalay (1982) and Michaely and Vila (1995), have discussed dynamic trading strategies around the ex-dividend day, showing that investors can change their trading patterns near this day to capture or avoid the upcoming dividend. If dividends are taxed more heavily than capital gains and investors are not able to use any dynamic trading strategies to avoid such higher taxation then minimising dividends is optimal. Constantinides (1984) introduces the "tax timing option" concept, demonstrating that investors should be willing to pay for the option to delay capital gains realisation.

Black (1976) gives rise to the "dividend puzzle" – though dividends generally seem to be a more costly payout source than share repurchase, in practice firms nevertheless persist in paying out cash as taxable dividends. In general, there is no common and empirically substantiated understanding on the impact of taxes on payout policy. More recent models on payout policy tend to search for the combined impact of taxes and other factors.

2.2. Other factors impacting dividend policy

Most of the other factors, besides taxes, that are considered to impact payout policy can be viewed as relaxing the idealisations made by Miller and Modigliani (1961).

The consequences of asymmetric information and the concept of signalling have been discussed by Bhattacharya (1979), Miller and Rock (1985), John and Williams (1985), Allen, Bernardo, and Welch (2000), and Grullon, Michaely, and Swaminathan (2002), among others. Overall, the underlying idea is that if managers are better informed about the value of the company, dividends can be used to communicate that information to the market, despite the costs related to paying the dividends. On the other hand, dividends can be viewed as negative news, whereas the companies that pay dividends could be the ones that have no profitable projects in which to invest. Bechman and Raaballe (2006) examine a range of new signalling models that provide an explanation for the rationality of taxable cash dividends.

The results of relaxing the assumption of complete contracts have been addressed by Jensen and Meckling (1976), Grossman and Hart (1980), Jensen (1986) and many others. The basic concept is that shareholders may use dividends to restrict the financial liberties of managers if contracts are incomplete or are not fully enforceable.

The consequences of transaction costs as well as various indirect factors on dividend policy have been researched from different perspectives by Feldstein and Green (1983), Shefrin and Statman (1984), Marsh and Merton (1986) among many others. The basic argument is that dividend distribution may be optimal if dividend payments reduce transaction costs or provide other benefits to company shareholders.

These examples of research literature are to illustrate that dividend policy is a complex issue, depending on various internal and external factors. So far no common theoretical understanding has been reached in literature upon why certain companies at certain periods of time choose to pay dividends or repurchase stocks, while others tend to retain the profits.

Numerous empirical studies have been carried out to substantiate the existence and importance of the factors (including corporate taxation) that influence dividend policy. These studies include the influential works by Black and Scholes (1974) and Litzenberger and Ramaswamy (1979) as well as numerous recent studies like Yoon and Starks (1995), Michaely, Thaler, and Womack (1995), Lie (2000), Fama and French (2001), Nissim and Ziv (2001), Grullon and Michaely (2002), DeAngelo, DeAngelo and Skinner (2004), Trojanowski (2004), and Brav et al. (2005).

Overall, there is no consent in either theoretical or empirical literature on optimal payout policy. Brealey and Myers (2005), for example, conclude that the "dividend puzzle" is still one of the ten unsolved problems in finance.

2.3. Consequences of distributed profit taxation

The consequences of distributed profit based corporate taxation have been addressed only in a limited number of scientific articles, including the following.

Staehr (2005) has studied the distributional aspects of corporate taxation, including the specifics of the Estonian tax system. Funke (2002) has analysed the investment effects of the Estonian 2000 tax reform. In the paper by Funke and Strulik (2003) the expected impact of the Estonian taxation system on growth and welfare is explored. Sepp and Wrobel (2002) have addressed the related tax competition issues. These articles focus mainly on the macroeconomic implications of the distributed profit based taxation system.

Sander (2005) has researched on the tax advantage of debt within the conditions of the Estonian corporate tax system. In his article a two period model is presented. He finds the existence of a "tax shield" to depend on the legal status of the company, mentioning also the impact of dividend policy.

None of the papers has however dealt with the impact of distributed profit taxation on dividend policy. The present article aims to fill this gap to the extent possible.

3. Model

In this section I model a company operating under uncertainty in a binomial framework. I consider two tax regimes: gross profit taxation and distributed profit taxation. The model includes both company and investor level taxes and investor's different consumption levels. Optimal dividend policy is defined as the one that maximises the wealth of the investor. As companies may have investors with different consumption levels, the actual dividend policy will possibly not be optimal for all of them. In this respect the model helps to understand how far from optimum the dividend amount is.

The model has been constructed to reflect the fundamental characteristics of distributed profit taxation and gross profit taxation. The many exceptions to the general rules and special cases (e.g. consequences of double tax treaties and tax treatment of certain specific revenues, expenses, investments and payouts on both the company and investor level) have been omitted in order to avoid unnecessary complication of the model. Inclusion of these special cases into the analysis would be a challenging area for further research.

3.1 Gross profit taxation and distributed profit taxation

Gross profit taxation (GPT) refers to the taxation system whereby corporate income tax is calculated on the basis of a company's profit *(PBT)* earned during the taxation period. In a GPT environment, after tax profit would equal $(1-\tau_c)PBT$, where τ_c $(0 \leq \tau_c \leq 1)$ is the corporate tax rate.

Distributed profit taxation (DPT) denotes the taxation system, whereby corporate income tax is based on the amount of profit distributed within the taxation period. In a DPT environment the dividend tax rate is, generally, defined as a percentage τ_d $(0 \leq \tau_d \leq 1)$ of the gross profit distributed *(DIV)*. Net distributed profit during any taxation period would equal $(1-\tau_d)DIV$. As no corporate income tax is charged on the profit earned as long as dividends are not paid, the after tax profit is equal to the profit before taxes.

3.2. Binomial framework

Consider a two period model. Period 0 is the present period and period 1 is the following and final period of the company's existence. The stream of cash flows (net dividends) that a company generates to the owners is uncertain. The evolution of these cash flows is modelled in a binominal framework. If period 0 profits are *PBT*, then period 1 profits will be either *u*PBT* or *d*PBT*, where $u > 0 > d$. These states, *u* and *d*, are called the "up state" and the "down state", respectively. The "up state" denotes a

period when the company generates a profit, while in the "down state" the company makes a loss. As opposed to a standard binomial model (e.g. regarding options), occurrence of a loss is needed in one of the states to model the differences in tax effects.

It is assumed that the risk free rate of return, r ($r > 0$), remains constant and is equally available to all investors so that the same rate is used by all agents to discount risk free cash flows. To value risky cash flows, a state price framework is employed, in which the company is valued based on one price for the "up state" and another for the "down state". The state prices are denoted p_u ($p_u \geq 0$) and p_d ($p_d \geq 0$), respectively. These state prices are assumed to be given (i.e. exogenous to the current model). It is also assumed that the state prices are independent of the corporate tax regime. Since all the agents can invest in the risk free asset, aggregate of the state prices equals:

$$p_u + p_d = \frac{1}{1+r} \qquad (1)$$

The state prices therefore combine both the probability of the state and the discount factor (risk free interest rate).

3.3. Debt and investments

In order to address the capital structure implications, it is assumed that debt interest cost, $DEC*r$, may exist in both periods. Such interest cost is corporate tax deductible. In order to focus exclusively on the differences of the taxation systems and abstract from the investment decisions, it is assumed that the company will undertake the same investments and generate the same operating profits regardless of taxation.

In both taxation systems the company has a chance to distribute its period 0 profits fully or partially either at the end of period 0 (i.e. time 0) or, together with period 1 profits at the end of period 1 (i.e. time 1). This part of period 0 profits that remains undistributed is denoted by *UND*. The company is assumed to invest the undistributed part of profits in a risk free asset for period 1 (whereas no additional business related investments would be made).

3.4. Investor level consumption and taxation

The investor is assumed to use the dividends received at the end of period 0 partially or fully for consumption, C ($C \geq 0$), and to invest the rest of the dividends in a risk free asset for period 1. If dividends are lower than consumption C, it is assumed that the investor would use debt finance with interest cost r to cover the exceeding part. Interest cost on this debt is assumed to be a non-tax-deductible cost for the investor.

In order to include investor level taxation in the model, suppose that personal interest income is taxed at a percentage τ_p ($0 \leq \tau_p < 1$) upon receipt by the investor.

3.5. The value of the company for the investor

The company related cash flows to the investor are composed of the following:

- *Net dividends received in period* 0: $\left[\left(PBT - DECr\right)\left(1 - \tau_c\right) - UND\right]\left(1 - \tau_d\right)$. This notation supports both the case of distributed profit taxation (DPT) and gross profit taxation (GPT). In the DPT case, there is no corporate income tax, so that $\tau_c = 0$. On the other hand, there is a tax on distributed profits, so that $\tau_d > 0$. In the case of GPT, $\tau_c > 0$ and $\tau_d = 0$.
- *The consequences of the difference in the amount of dividends and consumption.* At time 0 the investor consumes C. If $\left[\left(PBT - DECr\right)\left(1 - \tau_c\right) - UND\right]\left(1 - \tau_d\right) - C$ is positive, the investor has a surplus which he invests in the risk-free security, and if this expression is negative, the investor borrows at time 0 to support his consumption. In the first case, he collects interest r on which he pays the personal tax τ_p, and in the second case he pays interest which is not

considered an expense for tax purposes. Writing this in one expression and discounting to time 0 gives:

$$\begin{cases} \left\{\left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C\right\}\left(-1+\dfrac{1+r\left(1-\tau_p\right)}{1+r}\right) & if \left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C>0 \\[4mm] \left\{C-\left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)\right\}\left(1-\dfrac{1+r}{1+r}\right) & if \left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C\le 0 \end{cases}$$

Simplifying, this gives:

$$\begin{cases} \left\{\left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C\right\}\dfrac{-r\tau_p}{1+r} & if \left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C>0 \\[4mm] 0 & if \left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C\le 0 \end{cases}$$

- *Discounted net dividends received in period 1* (state price adjusted for both the "upper state" and "lower state"):

$$p_u\left\{(uPBT-DECr)(1-\tau_c)(1-\tau_d)+UND\left[1+r(1-\tau_c)\right](1-\tau_d)\right\}+$$
$$+p_d\left\langle Max\left\{(dPBT-DECr)(1-\tau_c)(1-\tau_d)+UND\left[1+r(1-\tau_c)\right](1-\tau_d),0\right\}\right\rangle$$

Aggregate of the above components would be:

$$
\begin{aligned}
V^{Investor} =& \left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)- \\
& -\frac{\left\langle Max\left\{\left[(PBT-DECr)(1-\tau_c)-UND\right](1-\tau_d)-C,0\right\}\right\rangle r\tau_p}{1+r}+ \\
& +p_u\left\{(uPBT-DECr)(1-\tau_c)(1-\tau_d)+UND\left[1+r(1-\tau_c)\right](1-\tau_d)\right\}+ \\
& +p_d\left\langle Max\left\{(dPBT-DECr)(1-\tau_c)(1-\tau_d)+UND\left[1+r(1-\tau_c)\right](1-\tau_d),0\right\}\right\rangle
\end{aligned}
\tag{2}
$$

Equation (2) will serve as the basis for discussing the properties of the two taxation systems in the following propositions.

3.6. Distributed profit taxation and the dividend decision

Proposition 1. *If profits are fully distributed when earned and the corporate tax rate (τ_c) equals the dividend tax rate (τ_d), company value for the investor under DPT and GPT is equal.*
Proof. If dividends are fully distributed when earned, then $UND = 0$. For a company operating under GPT, τ_d equals 0, and equation (2) would take the form of:

$$
\begin{aligned}
V_{GPT}^{Investor} =& (PBT-DECr)(1-\tau_c)- \\
& -\frac{\left\langle Max\left\{(PBT-DECr)(1-\tau_c)-C,0\right\}\right\rangle r\tau_p}{1+r}+ \\
& +p_u(uPBT-DECr)(1-\tau_c)+ \\
& +p_d\left\langle Max\left\{(dPBT-DECr)(1-\tau_c),0\right\}\right\rangle
\end{aligned}
\tag{3}
$$

For a company that operates under DPT, τc equals 0. Equation (2) would take the form of:

$$
\begin{aligned}
V_{DPT}^{Investor} =& (PBT-DECr)(1-\tau_d)- \\
& -\frac{\left\langle Max\left\{(PBT-DECr)(1-\tau_d)-C,0\right\}\right\rangle r\tau_p}{1+r}+ \\
& +p_u(uPBT-DECr)(1-\tau_d)+ \\
& +p_d\left\langle Max\left\{(dPBT-DECr)(1-\tau_d),0\right\}\right\rangle
\end{aligned}
\tag{4}
$$

In case τ_c equals τ_d, equations (3) and (4) are equal, which proves the proposition.
The largest difference between the two taxation regimes is the timing of tax payments, as a result of which the underlying conditions for deciding upon the timing of dividends are different

under these systems. The consequences of the timing differences are addressed in the following propositions.

Proposition 2. *Company value for the investor under DPT is independent of the dividend policy, as far as the dividends received remain below the investor's consumption level and if the probability of losses is zero.*

Proof. τ_c equals 0 under DPT. If the probability of "down state" is zero, consumption by the investor exceeds dividends received and certain amount of profit remains undistributed (i.e. *UND* > 0), equation (2) would take the form of:

$$V_{DPT}^{Investor} = (PBT - DECr - UND)(1 - \tau_d) + \\ + \frac{(uPBT - DECr)(1 - \tau_d) + UND(1 + r)(1 - \tau_d)}{1 + r} \tag{5}$$

Assuming the same as in the previous equation, except that profit is entirely distributed as dividends when earned (i.e. *UND* = 0):

$$V_{DPT}^{Investor} = (PBT - DECr)(1 - \tau_d) + \\ + \frac{(uPBT - DECr)(1 - \tau_d)}{1 + r} \tag{6}$$

Difference between the company values as presented in the previous two equations would be equal to:

$$\Delta V_{DPT}^{Investor} = -UND(1 - \tau_d) + \frac{UND(1 + r)(1 - \tau_d)}{1 + r} = 0 \tag{7}$$

As can be noted from the previous equation, whatever the amount of undistributed period 0 profits is, the company value for the investor remains unchanged. This proves the proposition.

As losses are not possible, the undistributed profits earn the risk free interest r on the company level, making no difference whether the profit is distributed at time 0 or time 1. On the investor level, there are no revenues subject to taxation and neither are there any tax deductible expenses. The dividend policy has therefore no impact on the company value for the investor as far as dividends do not exceed the investor's consumption level and if the probability of losses is zero.

Proposition 3. *If the probability of losses is zero, it is optimal under DPT to distribute dividends at time 0 equally to or less than the investor's consumption level.*

Proof. If the probability of "down state" is zero and if consumption by the investor does not exceed dividends received and if a certain amount of profit remains undistributed
(i.e. *UND* > 0), the value of the company under DPT would equal:

$$V_{DPT}^{Investor} = (PBT - DECr - UND)(1 - \tau_d) - \\ - \frac{\left[(PBT - DECr - UND)(1 - \tau_d) - C\right]r\tau_p}{1 + r} + \\ + \frac{(uPBT - DECr)(1 - \tau_d) + UND(1 + r)(1 - \tau_d)}{1 + r} \tag{8}$$

Assuming the same as in the previous equation, except that profit is entirely distributed as dividends when earned (i.e. *UND* = 0):

$$V_{DPT}^{Investor} = (PBT - DECr)(1 - \tau_d) - \\ - \frac{\left[(PBT - DECr)(1 - \tau_d) - C\right]r\tau_p}{1 + r} + \\ + \frac{(uPBT - DECr)(1 - \tau_d)}{1 + r} \tag{9}$$

Difference between the company values in the previous two equations would equal:

$$\Delta V_{DPT}^{Investor} = -UND(1 - \tau_d) + \frac{UND(1 - \tau_d)r\tau_p}{1 + r} + \frac{UND(1 + r)(1 - \tau_d)}{1 + r} = \\ = \frac{UND(1 - \tau_d)r\tau_p}{1 + r} \tag{10}$$

The above difference between the company values equals to the discounted personal tax on the interest that is earned on the after-dividend-tax undistributed profits in period 0. The value of this difference is evidently non-negative. The higher the undistributed profits are, the larger the difference in the company value between the above two cases is. Consequently, the later the dividends were distributed, the higher the company value for the investor would be. This statement is true as far as the investor's consumption level remains below the dividends received. As proved in proposition 2, if the consumption level exceeds the dividends received, the dividend decision does not impact the company value on the investor level. This proves the proposition.

Retaining the profit undistributed and earning interest revenue on the pre-tax profit on the company level is preferable to distributing the dividends and earning interest revenue on the after-tax profit on the investor level. Starting from the point where there are no savings to be invested (i.e. the consumption level exceeds the dividends), the company value is independent of the dividend amount. The outcome of propositions 2 and 3 is illustrated on Figure 1 in the Appendix.

Proposition 4. *If losses in period 1 are possible and if the investor's consumption level exceeds the dividends received, then (a) for these undistributed profit amounts that remain below the discounted amount of potential losses, the higher the period 0 dividends are, the higher the company value for the investor under DPT would be, and (b) for these undistributed profit amounts that are above the discounted amount of potential losses, dividend policy would not impact the company value for the investor under DPT.*

Proof. τ_c equals 0 under DPT. If the investor's consumption exceeded the dividends received, equation (2) would take the form of:

$$
\begin{aligned}
V_{DPT}^{Investor} = &\left(PBT - DECr - UND\right)\left(1-\tau_d\right) + \\
&+ p_u\left\{\left(uPBT - DECr\right)\left(1-\tau_d\right) + UND\left(1+r\right)\left(1-\tau_d\right)\right\} + \\
&+ p_d\left\langle Max\left\{\left(dPBT - DECr\right)\left(1-\tau_d\right) + UND\left(1+r\right)\left(1-\tau_d\right), 0\right\}\right\rangle
\end{aligned}
\tag{11}
$$

Assuming the same as in the previous equation, except that profits are entirely distributed when earned, i.e. $UND = 0$ (it should be noted that as $d < 0$, then $\left(dPBT - DECr\right)\left(1-\tau_d\right) < 0$):

$$
\begin{aligned}
V_{DPT}^{Investor} = &\left(PBT - DECr\right)\left(1-\tau_d\right) + \\
&+ p_u\left(uPBT - DECr\right)\left(1-\tau_d\right)
\end{aligned}
\tag{12}
$$

Difference between the company values as presented in the previous two equations would be equal to the following:

$$
\begin{aligned}
\Delta V_{DPT}^{Investor} = &UND\left(1-\tau_d\right)\left[p_u\left(1+r\right)-1\right] + \\
&+ p_d\left\langle Max\left\{\left(dPBT - DECr\right)\left(1-\tau_d\right) + UND\left(1+r\right)\left(1-\tau_d\right), 0\right\}\right\rangle
\end{aligned}
\tag{13}
$$

First, consider the case when $\left[\left(dPBT - DECr\right)\left(1-\tau_d\right) + UND\left(1+r\right)\left(1-\tau_d\right)\right] < 0$. This condition means that the undistributed profit amounts remain below the discounted amount of potential losses:

$$
\begin{aligned}
&\left(dPBT - DECr\right)\left(1-\tau_d\right) + UND\left(1+r\right)\left(1-\tau_d\right) < 0 \rightarrow \\
&UND\left(1+r\right) < DECr - dPBT \rightarrow \\
&UND < -\frac{dPBT - DECr}{\left(1+r\right)}
\end{aligned}
\tag{14}
$$

If the above condition is met, equation (13) would take the following form:

$$
\Delta V_{DPT}^{Investor} = UND\left(1-\tau_d\right)\left[p_u\left(1+r\right)-1\right]
\tag{15}
$$

Distributing period 0 profits in period 1 would therefore be justified if:

$$UND(1-\tau_d)\big[\,p_u(1+r)-1\big]>0\rightarrow$$

$$p_u(1+r)-1>0\rightarrow$$

$$p_u>\frac{1}{1+r}\rightarrow \tag{16}$$

$$p_d<0$$

This condition does never hold, as it would contradict equation (1). Therefore the company value would decrease if period 0 profits remained (even partially) undistributed. Consequently, the more dividends were distributed at time 0, the higher the company value would be. This statement is valid if $UND<-\dfrac{dPBT-DECr}{(1+r)}$ and if the investor's consumption level exceeded the dividends received. The overall optimal dividend distribution amount may however be found under other conditions, which are addressed in the following paragraphs.

Secondly, when $[(dPBT-DECr)(1-\tau_d)+UND(1+r)(1-\tau_d)]>0$, equation (13) would take the following form:

$$
\begin{aligned}
\Delta V_{DPT}^{Investor} &= UND(1-\tau_d)\big[\,p_u(1+r)-1\big]+ \\
&\quad + p_d\big[(dPBT-DECr)(1-\tau_d)+UND(1+r)(1-\tau_d)\big]= \\
&= UND(1-\tau_d)\big[(p_u+p_d)(1+r)-1\big]+ \\
&\quad + p_d(dPBT-DECr)(1-\tau_d) \\
&= p_d(dPBT-DECr)(1-\tau_d)
\end{aligned}
\tag{17}
$$

It can be noted that in the above case, compared to the situation where all the profit was distributed when earned, the company value for the investor is constantly lower by the state price adjusted losses in period 1. However, the company value is independent of the amount of *UND*. This proves the proposition.

If the investor's consumption exceeds the dividends received, the company value for the investor increases as time 0 dividends increase. If not distributed, the profits of period 0 could be lost for the investor due to the need to cover the potential losses in period 1. As far as the period 0 dividends remain below the investor's consumption, then starting from the point, when the undistributed profits exceed period 1 discounted losses, the dividend amount does not impact the company value any more, while the "unharmed" portion of period 0 profits could be distributed at time 1. The latter situation is similar to the case with no losses described in proposition (2), but the company value for the investor is lower by the state price adjusted losses in period 1 that have to be covered by the undistributed profits of period 0.

Proposition 5. *If losses are possible in period 1 and if the investor's consumption level remains below the dividends received, there exists a unique breakpoint level of pu that determines the optimal dividend amount under DPT. Above this breakpoint, the larger the undistributed profit, the higher the company value for the investor would be. Below this breakpoint, for these undistributed profit amounts that remain below the discounted amount of potential losses, the higher the period 0 dividends are, the higher the company value for the investor under DPT would be. For these undistributed profit amounts that are above the discounted amount of potential losses, the larger the undistributed profits, the higher the company value for the investor would be.*

Proof. τ_c equals 0 under DPT. If consumption by the investor did not exceed dividends received, equation (2) would take the following form:

$$V_{DPT}^{Investor} = (PBT - DECr - UND)(1-\tau_d) -$$
$$- \frac{\left[(PBT - DECr - UND)(1-\tau_d) - C\right]r\tau_p}{1+r} +$$
$$+ p_u \{(uPBT - DECr)(1-\tau_d) + UND(1+r)(1-\tau_d)\} +$$
$$+ p_d \left\langle Max\{(dPBT - DECr)(1-\tau_d) + UND(1+r)(1-\tau_d), 0\}\right\rangle = \qquad (18)$$
$$= (PBT - DECr - UND)(1-\tau_d)\frac{1+r(1-\tau_p)}{1+r} - \frac{Cr\tau_p}{1+r} +$$
$$+ p_u \{(uPBT - DECr)(1-\tau_d) + UND(1+r)(1-\tau_d)\} +$$
$$+ p_d \left\langle Max\{(dPBT - DECr)(1-\tau_d) + UND(1+r)(1-\tau_d), 0\}\right\rangle$$

Assuming the same as in the previous equation, except that profit is entirely distributed when earned (note that as $d < 0$, then $(dPBT - DECr)(1-\tau_d) < 0$):

$$V_{DPT}^{Investor} = (PBT - DECr)(1-\tau_d)\frac{1+r(1-\tau_p)}{1+r} - \frac{Cr\tau_p}{1+r} + \qquad (19)$$
$$+ p_u (uPBT - DECr)(1-\tau_d)$$

The difference between company values as presented in the previous two equations would be equal to:

$$\Delta V_{DPT}^{Investor} = UND(1-\tau_d)\left[p_u(1+r) - \frac{1+r(1-\tau_p)}{1+r}\right] + \qquad (20)$$
$$+ p_d \left\langle Max\{(dPBT - DECr)(1-\tau_d) + UND(1+r)(1-\tau_d), 0\}\right\rangle$$

First, consider the case where $[(dPBT - DECr)(1-\tau_d) + UND(1+r)(1-\tau_d)] < 0$ (i.e. similar to condition (14)). In this case the above equation would take the following form:

$$\Delta V_{DPT}^{Investor} = UND(1-\tau_d)\left[p_u(1+r) - \frac{1+r(1-\tau_p)}{1+r}\right] \qquad (21)$$

Distributing period 0 profits in period 1 would therefore be justified if:

$$UND(1-\tau_d)\left[p_u(1+r) - \frac{1+r(1-\tau_p)}{1+r}\right] > 0 \rightarrow$$
$$p_u(1+r) - \frac{1+r(1-\tau_p)}{1+r} > 0 \rightarrow \qquad (22)$$
$$p_u > \frac{1+r(1-\tau_p)}{(1+r)^2}$$

If this condition does not hold, the more dividends were distributed at time 0, the higher the company value would be, provided $UND < -\dfrac{dPBT - DECr}{(1+r)}$ and consumption by the investor does not exceed the dividends received. If the previous condition holds, the higher the undistributed profits are, the larger the contribution to the company value is, provided $UND < -\dfrac{dPBT - DECr}{(1+r)}$ and consumption by the investor does not exceed the dividends received.

Evidently, the overall optimum amount of period 0 profit distributions depends on whether the company value would decrease, increase or remain unchanged after crossing the mentioned breakpoint for *UND* (which is addressed in the following case) as well as on whether consumption by the investor exceeded the dividends received (the case discussed in proposition 4) or not.

Secondly, consider the case when [] > 0. In this case equation (20) would take the following form:

$$\Delta V_{DPT}^{Investor} = UND\left(1-\tau_d\right)\left[p_u\left(1+r\right)-\frac{1+r\left(1-\tau_p\right)}{1+r}\right]+$$
$$+ p_d\left(d\,PBT-DECr\right)\left(1-\tau_d\right)+UND\left(1+r\right)\left(1-\tau_d\right)=$$
$$= UND\left(1-\tau_d\right)\left[\left(p_u+1\right)\left(1+r\right)-\frac{1+r}{1+r}+\frac{r\,\tau_p}{1+r}\right]+ \qquad (23)$$
$$+ p_d\left(d\,PBT-DECr\right)\left(1-\tau_d\right)=$$
$$= UND\left(1-\tau_d\right)\left[\frac{r\,\tau_p}{1+r}-p_d\left(1+r\right)\right]+$$
$$+ p_d\left(d\,PBT-DECr\right)\left(1-\tau_d\right)$$

Distributing period 0 profits in period 1 would thus be justified if:

$$UND\left(1-\tau_d\right)\left[\frac{r\,\tau_p}{1+r}-p_d\left(1+r\right)\right]+p_d\left(d\,PBT-DECr\right)\left(1-\tau_d\right)>0 \rightarrow$$
$$UND > -\frac{p_d\left(d\,PBT-DECr\right)}{\dfrac{r\,\tau_p}{1+r}-p_d\left(1+r\right)} \rightarrow \qquad (24)$$
$$UND > -\frac{\left(d\,PBT-DECr\right)\left(1+r\right)}{p_d\left[r\,\tau_p-\left(1+r\right)^2\right]}$$

UND is always non-negative. As *d* is always negative, *PBT* is always positive and *DEC* and *r* are non-negative, the nominator of the above fraction is always negative. As p_d is always non-negative, and both *r* and t_p are non-negative but lower than 1, then the denominator of the fraction is always non-positive. The fraction would therefore always be non-positive. Consequently any value of *UND* would meet the criteria. It can be seen from equation (23) that the higher the *UND* is, the higher the company value for the investor would be, provided $UND > -\dfrac{d\,PBT-DECr}{\left(1+r\right)}$ and consumption by the investor does not exceed the dividends received. The proposition is proved.

If period 0 dividends exceed investor's consumption, there exists a breakpoint value of p_u that determines optimal dividend policy under DPT. If p_u is above this breakpoint (i.e. the probability of losses is low), then retaining the profit undistributed and earning interest revenue on the pre-tax profit on the company level is preferable to distributing the dividends and earning interest revenue on the after-tax profit on the investor level. This is similar to the situation with no losses as described in proposition 3, but the company value for the investor is lower due to the potential losses in period 1 that have to be covered by the undistributed profits of period 0.

Starting from the point where the undistributed profits exceed potential period 1 discounted losses, the "unharmed" portion of period 0 profits could fully earn additional interest revenue. In this case, the tax benefits of keeping cash in the company, compared to the adverse impact of potential losses, are higher than in the previous case.

If p_u is below the breakpoint (i.e. the probability of losses is not low), then for these values of time 0 dividends in case of which the undistributed profits remain below the potential period 1 discounted losses, the adverse impact of the losses exceeds the advantages of keeping the profit undistributed. In this case, the higher the distribution in period 0 is, the better. If not distributed, the profits of period 0 could be lost for the investor due to the need to cover the potential losses in period 1.

However, starting from the point where the undistributed profits exceed potential period 1 discounted losses, the larger the undistributed profits are, the better. In this case, the "unharmed"

portion of period 0 profits could earn additional interest revenue. The tax benefits of keeping cash in the company exceed the adverse impact of potential losses in this case.

In summary of propositions (4) and (5), and incorporating proposition (3), the following table as a corollary on optimal dividend policy under DPT can be drawn. Respective scenarios are illustrated on Figures (2) to (6) in the Appendix.

Table 1: Optimal dividend policy under DPT

	Losses in period 1 are not possible	Losses in period 1 are possible			
		$p_u > \dfrac{1+r\left(1-\tau_p\right)}{\left(1+r\right)^2}$		$p_u > \dfrac{1+r\left(1-\tau_p\right)}{\left(1+r\right)^2}$	
		Any *UND*, in case of which consumption is above the dividends received, exceeds $-\dfrac{d\,PBT - DECr}{\left(1+r\right)}$	All other cases	Any *UND*, in case of which consumption is above the dividends received, exceeds $-\dfrac{d\,PBT - DECr}{\left(1+r\right)}$	All other cases
Optimal dividend policy	Dividends should not exceed the investor's consumption level	Dividends should not exceed the investor's consumption level	Dividends should be equal to the investor's consumption level	Dividends should not exceed the investor's consumption level, unless distributing fully at time 0 gives higher company value	Dividends should be distributed fully at time 0
Illust-ration	Figure 1	Figure 2	Figure 3	Figures 4 and 5	Figure 6

Empirical testing of the above results in consideration of realistic dividend tax, personal tax and interest rates would be an interesting area for extending the research.

3.7. Gross profit taxation and the dividend decision

Similar propositions can be constructed and proved for the GPT regime. A huge amount of previous research exists on this topic, including much more complex models than the one presented in this paper. Still, with the purpose of demonstrating the differences in the tax effects under GPT and DPT in the context of this model, the propositions regarding GPT are summarised in the following paragraphs, however without presenting the proof.

Proposition 6. *If the probability of losses is zero, the company value for the investor under GPT is maximised when profits are distributed in period 0, as far as the dividends received remain below the investor's consumption level.*

Due to corporate taxes, retaining the profit in the company and earning interest revenue on the company level is more costly than distributing the dividends and using them for consumption by the investor (irrespective of the investor's consumption level as far as it exceeds the dividends received). The company value for the investor would be maximised if all the profits were distributed when earned.

Proposition 7. *If the probability of losses is zero and if consumption by the investor does not exceed dividends received and if $\tau_c > \tau_p$, the company value for the investor under GPT is maximised when profits are distributed in period 0. If the probability of losses is zero and if consumption by the investor does not exceed dividends received and if $\tau_c < \tau_p$, the company value for the investor under GPT is maximised when profits are distributed in period 1.*

The difference between company values for the investor in case profit was distributed compared to the situation where profits are retained equals to the discounted difference between personal and corporate tax cost on the interest that is earned on the undistributed profits of period 0. The value of this difference is negative, when the corporate tax rate exceeds the personal tax rate, and positive on the opposite case. The higher the undistributed profits are, the larger the difference in company value between these two cases is. Consequently, if $\tau_c > \tau_p$ the company value for the investor would be maximised if all the profits were distributed when earned, and if $\tau_c < \tau_p$ the company value for the investor would be maximised if all the profits were distributed as late as possible.

Proposition 8. *If losses are possible in period 1 and if the dividends received remain below the investor's consumption level, the company value for the investor under GPT is maximised when profit is fully distributed at time 0.*

If the investor is anyway willing to consume all the dividends, the distributing of period 0 profits in period 1 would never be justified in case losses are possible. This situation is an example of the "bird in the hand" principle, often employed in the "dividend puzzle" analysis.

Proposition 9. *If losses are possible in period 1 and if consumption by the investor does not exceed dividends received, there exists a unique breakpoint level of p_u, below which the company value for the investor under GPT is maximised when profits are distributed as dividends in period 0. Above this breakpoint level, the company value for the investor is maximised if period 0 profits are fully distributed in period 1.*

If the investor is willing to consume some of the dividends, the distributing of period 0 profits in period 1 would be justified in case losses are possible. This case constitutes finding an optimal solution in the tradeoffs between the tax costs on the interest earned on unconsumed dividends and the adverse impact of potential losses on future dividends.

It can be noted that the dividend decisions under GPT are significantly different from these under DPT. Therefore the existing theoretical models on payout policy as well as companies' financial decisions in general may not be applicable in the circumstances of distributed profit taxation. As a result, companies' and investor's financial behaviour under this tax regime represents an interesting and yet unexplored area for research.

4. Conclusions

Based on the theoretical model of a company operating under uncertainty in a binomial framework, including both company and investor level taxes and investor's different consumption levels, the following remarks can be made on the impact of taxes on dividend policy under distributed profit taxation (DPT) compared to gross profit taxation (GPT).

If profits are fully distributed when earned and if the corporate tax rate equals the dividend tax rate, the company value for the investor under DPT and GPT is equal. While basically the tax base under both taxation systems is gross profit, the key difference between the systems is the timing of tax payments. As a consequence, the underlying conditions for deciding upon the timing of dividends are different under the two systems.

If the probability of losses is zero, it is optimal under DPT to distribute profit when earned equally to or less than the investor's consumption level. Retaining the profit undistributed and earning interest revenue on the pre-tax profit on the company level is preferable to distributing the dividends and earning interest revenue on the after-tax profit on the investor level. Starting from the point where there are no savings to be invested (i.e. the investor's consumption level exceeds the dividends), the company value for the investor is independent of the dividend amount.

In general, if the probability of losses is noticeable, the company value for the investor is maximised if profit is fully distributed when earned. However, the following exceptional case has to be considered. If any undistributed profit amount, in case of which the investor's consumption level exceeds the dividends received, remains above the discounted amount of potential losses, the

company value for the investor could be maximised if dividend distribution does not exceed the investor's consumption.

One of the aims of introducing DPT in Estonia was to motivate companies to reinvest the profits earned instead of paying them out as dividends. Interestingly, the theoretical analysis in this paper shows that retaining all the profits in the company is never the only optimal payout policy. Rather, the dividend decision appears to be strongly focused on the investor's consumption level.

The theoretical analysis demonstrates that tax considerations in respect of dividend policy are substantially different under DPT and GPT. Empirical testing would be a challenging area for developing further the research on the consequences of distributed profit taxation.

Acknowledgement

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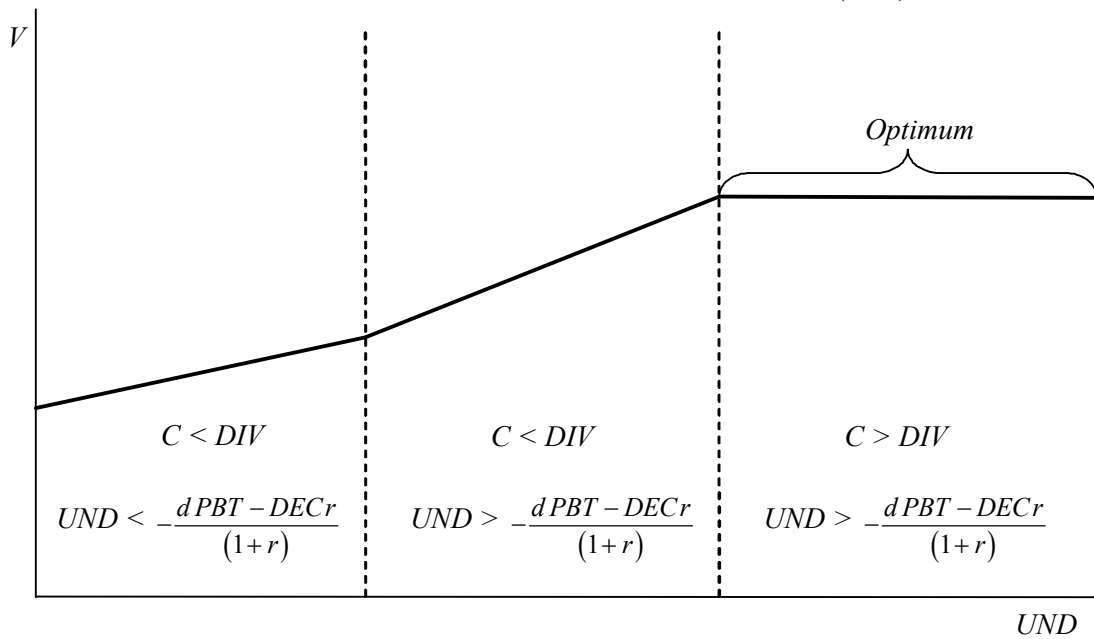
Appendix
Illustration of optimal dividend policy under DPT

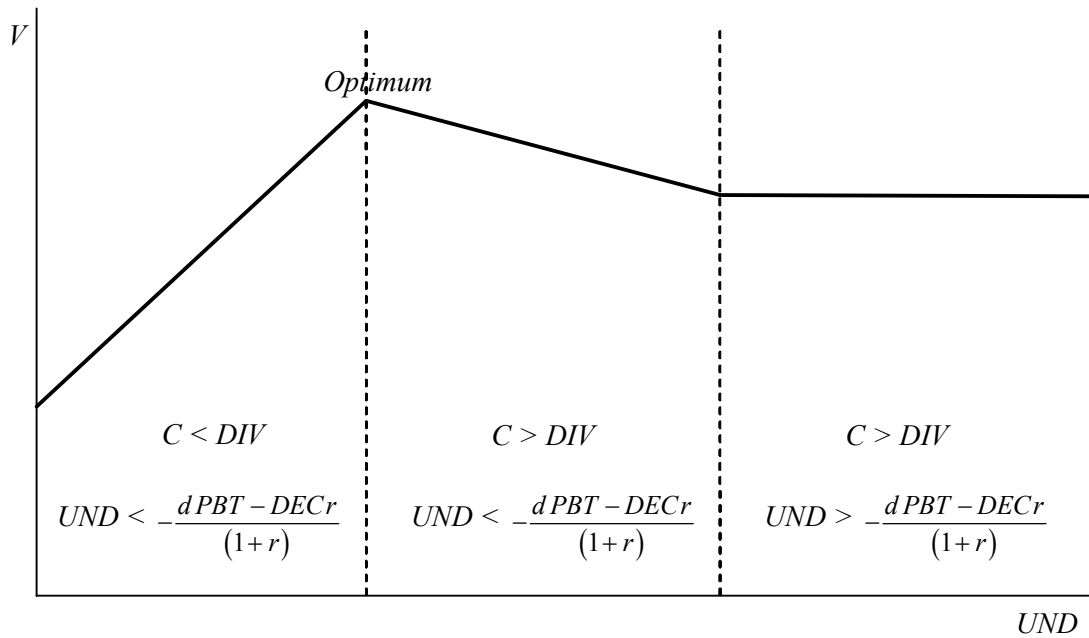**Figure 1**: Optimal dividend policy under DPT with no losses
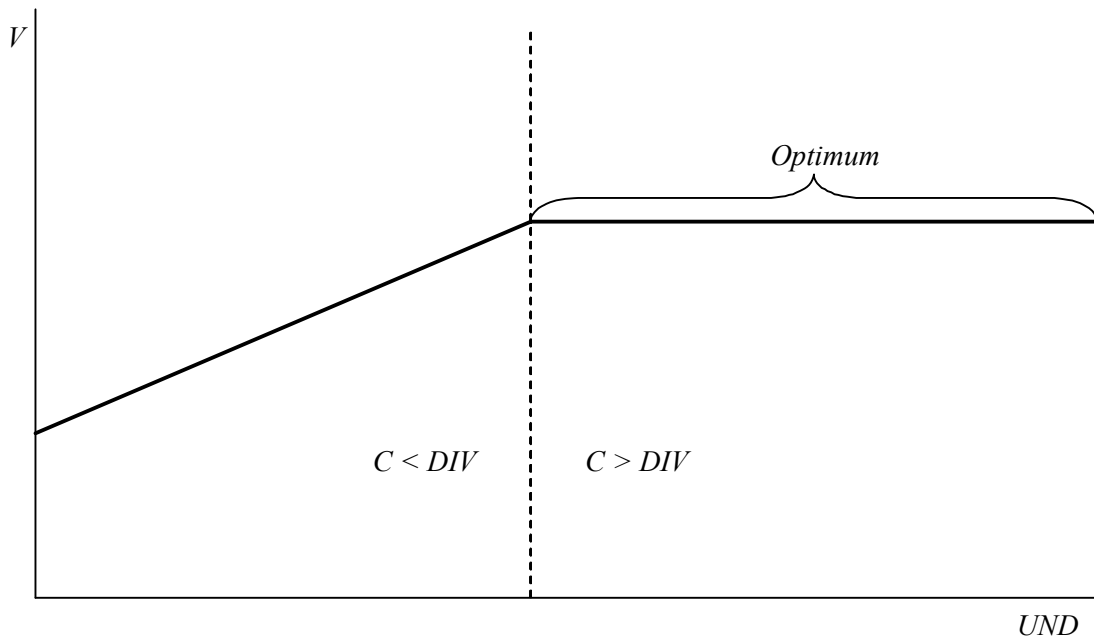
Author's illustration

Figure 2: Optimal dividend policy under DPT with losses; $p_u > \dfrac{1 + r\left(1 - \tau_p\right)}{\left(1+r\right)^2}$; case 1

Author's illustration

Figure 3: Optimal dividend policy under DPT with losses; $p_u > \dfrac{1+r\left(1-\tau_p\right)}{\left(1+r\right)^2}$; case 2

Author's illustration

Figure 4: Optimal dividend policy under DPT with losses; $p_u < \dfrac{1+r\left(1-\tau_p\right)}{\left(1+r\right)^2}$; case 1
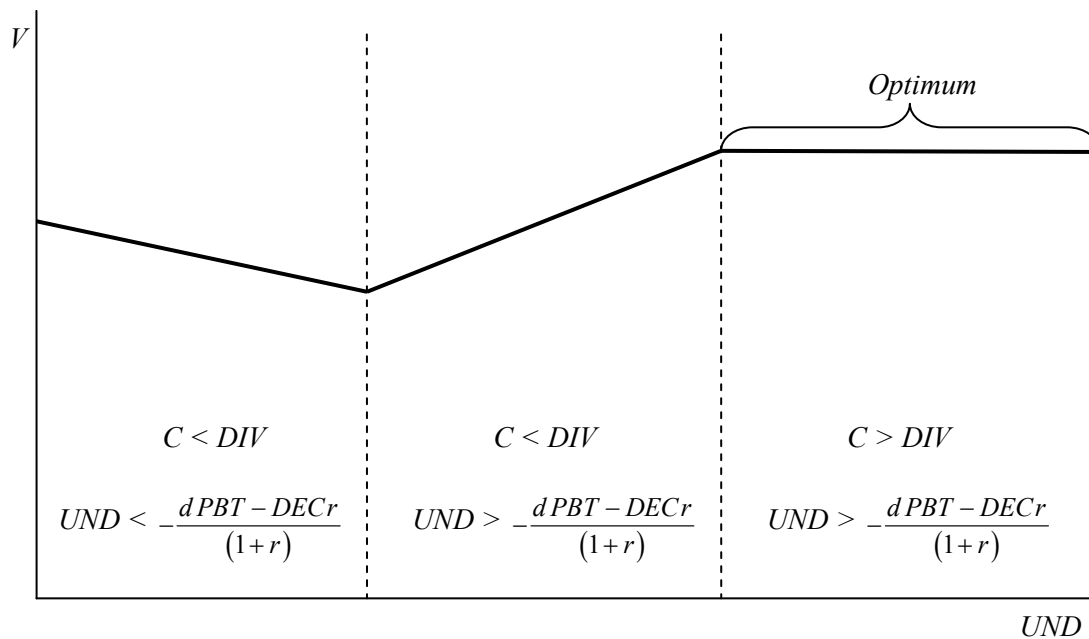
Author's illustration

Figure 5: Optimal dividend policy under DPT with losses; $p_u < \dfrac{1 + r\left(1 - \tau_p\right)}{\left(1 + r\right)^2}$; case 2

V | Optimum

$C < DIV$

$UND < -\dfrac{d\,PBT - DECr}{\left(1 + r\right)}$

$C < DIV$

$UND > -\dfrac{d\,PBT - DECr}{\left(1 + r\right)}$

$C > DIV$

$UND > -\dfrac{d\,PBT - DECr}{\left(1 + r\right)}$

UND
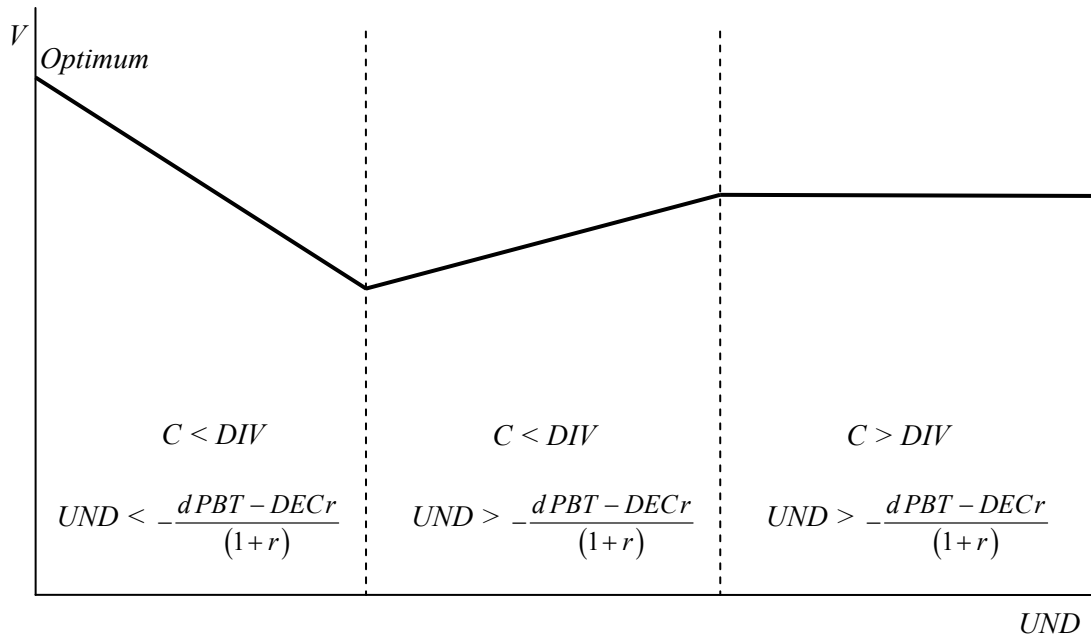
Author's illustration

Figure 6: Optimal dividend policy under DPT with losses; $p_u < \dfrac{1 + r\left(1 - \tau_p\right)}{\left(1 + r\right)^2}$ case 3
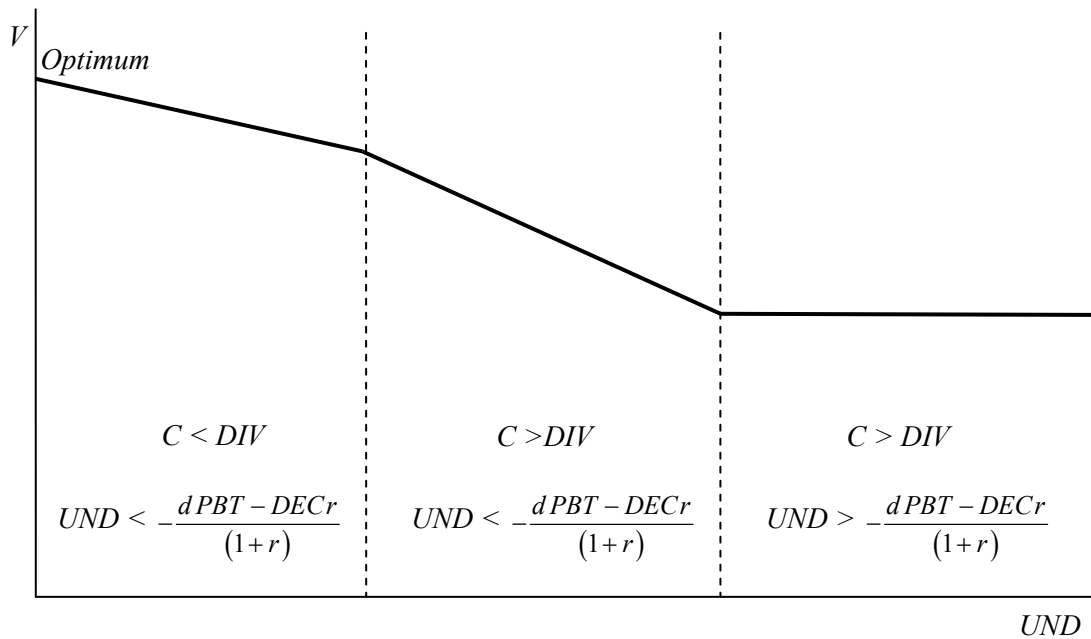
V | Optimum

$C < DIV$

$UND < -\dfrac{d\,PBT - DECr}{\left(1 + r\right)}$

$C > DIV$

$UND < -\dfrac{d\,PBT - DECr}{\left(1 + r\right)}$

$C > DIV$

$UND > -\dfrac{d\,PBT - DECr}{\left(1 + r\right)}$

UND

Author's illustration

Appendix 3

COMPANIES' FINANCIAL DECISIONS UNDER THE DISTRIBUTED PROFIT TAXATION REGIME OF ESTONIA

Publication:

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Presentations:

Hazak, A., *Financial Decisions Under Distributed Profit Taxation*. Oral presentation at the 2007 Business & Economics Society International Conference, 16–20 July, 2007, Antibes, France

Hazak, A., *Empirical Analysis of Capital Structure and Dividend Decisions Under Distributed Profit Taxation*. Oral presentation at the plenary session of the 3rd international conference "Baltic Business and Socio-Economic Development", 18–19 June, 2007, Tallinn, Estonia

Hazak, A., *Financial Decisions Under Distributed Profit Taxation.* Oral presentation at the seminar of the International Fiscal Association Estonia branch, 19 September 2007, Tallinn, Estonia

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Empirical analysis of capital structure and dividend decisions under the distributed profit taxation regime of Estonia

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Abstract

This paper presents an empirical analysis of companies' capital structure and dividend decisions under distributed profit taxation (DPT), the corporate taxation regime of Estonia since 2000. The sample covers 27 thousand observations of Estonian companies over 1995 to 2004. The results show that the DPT system has led companies to pay less dividends and retain more profits. Simultaneously, the importance of external financing in companies' total capital has decreased. The undistributed profits appear to be partially retained as surplus cash, instead of being reinvested into long-term productive assets. DPT seems to support companies' liquidity and sustainability, however, the downside being the potentially inefficient allocation of funds.

Acknowledgements

1. Introduction

Distributed profit taxation (DPT) denotes an uncommon taxation system, whereby corporate income tax is based on the amount of profit distributed (as dividends or any indirect distributions) to the company's owners during the taxation period. In this way DPT differs from the classical gross profit taxation (GPT) system under which corporate income tax is calculated on the basis of a company's profit earned during the taxation period.

This paper seeks to provide an empirical analysis of the impacts of DPT on companies' capital structure and dividend decisions, testing the assumptions and hypothesis in the theoretical papers on the effects of DPT by Hazak (2007a and 2007b). The results of the study may potentially lead to discussions on introducing a similar system in other jurisdictions or on modifying the corporate taxation principles in Estonia.

The research is based on a sample of 27 thousand observations over a ten-year period in a broad range of industries. This sample covers a large part of existing Estonian companies.

The remainder of this paper is structured as follows. Section 2 outlines the DPT system employed in Estonia. Summary overview of key related literature is provided in Section 3. Section 4 describes the data and methodology used for the

study and Section 5 presents the key results of the analysis. Section 6 concludes the paper.

2. Distributed Profit Taxation in Estonia

Until 1999, Estonia used the traditional GPT system. Starting from 2000, Estonia levies no corporate income tax on retained profits. All corporate income is tax exempt when earned, including both active (e.g. trading) and passive (e.g. dividends, interest, royalties) types of income, as well as capital gains from the sale of all types of assets (including securities and immovable property). Income tax is imposed on all distributions. In this way the moment of taxation is postponed until the profits are distributed as dividends or deemed profit, such as transfer pricing adjustments, expenses and payments that do not have a business purpose, fringe benefits, gifts, donations etc.

From 2000 to 2004, profit distributed as dividends was taxed in Estonia at a flat rate of 26/74ths. For example, a company that had profits available of 100 units could distribute dividends of 74 units, on which it would have had to pay corporate income tax of 26 units. In 2005, the income tax was lowered to 24%. In 2006, the tax rate was 23% and it is 22% in 2007. The current Estonian Income Tax Act is expected to reduce income tax rates to 20% (or 20/80ths on top of net dividends) by means of a 1% decrease in both 2008 and 2009.

As Estonia has no annual net basis taxation of corporate profits, entities are not subject to tax depreciation, investment tax credit or losses carry forward rules. Dividends can be paid out of the profit which remains after all losses from previous periods are covered. Distributable profits are assessed according to the Estonian accounting regulations (which are in all material aspects in line with the International Financial Reporting Standards). There are no special accounting rules for tax purposes.

Except for special cases that mainly relate to the taxation of foreign investors, the tax effects on different forms of payout (e.g. dividends or share repurchases) are in general equal under the Estonian DPT regime.

Under the European Union (EU) accession treaty, Estonia may apply its income tax on dividend distributions until 31 December 2008, after which the corporate tax system must fully comply with the EU Parent-Subsidiary Directive (which prohibits taxation of intra-group dividends). It is foreseeable that Estonia will continue to exempt retained earnings from corporate taxation until the end of 2008. The Estonian government has not decided yet about specific measures to align the tax system to the Parent-Subsidiary Directive.

3. Key Related Literature

The impact of taxation on companies' capital structure and dividend decisions has been an area of extensive research for nearly half a century. Studies on the effects of taxes on capital structure start with the early tax-inclusive model of Modigliani and Miller (1963), while many recent models tend to search for the combined impact of taxes as well as other micro and macro level factors on capital structure. Detailed literature reviews include Graham (2007), Prasad, Green and Murinde (2001), Myers (2001), and Masulis (1988). Research on optimal dividend policy in view of different tax aspects spans from the Miller and Modigliani (1961) model to the numerous recent interpretations. Several extensive literature analyses have been written about

dividend policy, including Allen and Michaely (2003), Frankfurter and Wood (2002), and Lease *et al*. (1999). Overall, agreement has been reached neither on the effect of taxation on companies' payout decisions nor on capital structure.

The consequences of distributed profit based corporate taxation have been addressed only in a limited number of academic papers, including the following.

Sander (2005) has researched on the tax advantage of debt in the conditions of the Estonian corporate tax system. In his paper a two period model is presented. He finds the existence of a "tax shield" to depend on the legal status of the company, mentioning also the impact of dividend policy.

Staehr (2005) has studied the distributional aspects of corporate taxation, including the specifics of the Estonian tax system. Funke (2002) has analysed the investment effects of the Estonian 2000 tax reform. In the paper by Funke and Strulik (2003) the expected impact of the Estonian taxation system on growth and welfare is explored. Sepp and Wrobel (2002) have addressed the related tax competition issues.

Hazak (2007a) has studied companies' capital structure under DPT from theoretical perspective. The paper demonstrates that the most important difference between the GPT and DPT systems is the timing of tax payments, whereas in essence the tax base under both taxation regimes is profit earned. DPT as opposed to GPT is comparable to the granting by the government of an interest free loan to companies. The government does not collect the corporate tax in the period when the profit is earned, but gives a "tax credit" until the profit is distributed. An important feature of the DPT system is that the timing of dividend payments and thereby tax payments is at the discretion of the investors. The theoretical analysis by Hazak (2007a) shows that for the companies that would normally prefer debt to equity, differences in the taxation systems contribute to a relatively lower use of external finance under a DPT system in comparison to that under GPT.

Hazak (2007b) presents a theoretical model on dividend policy under DPT. The paper models a company operating under uncertainty in a binomial framework, including both company and investor level taxes and investor's different consumption levels. Hazak (2007b) shows that company value for the investor under DPT equals to that under GPT, if profits are fully distributed when earned and if tax rates are similar. If not, there deem to be different optimums for the timing of dividends, depending on the investor's consumption as well as the probability of losses, tax rates and interest rates. In general, it appears that DPT may lead to higher retained earnings than GPT. However, a key outcome of the theoretical analysis in this paper is that though one of the aims of the Estonian corporate tax system is to motivate companies to reinvest the profits earned instead of paying them out, retaining of all the profits in the company may not be the optimal payout policy in many cases. One of the important assumptions used in Hazak (2007b) is that companies invest the undistributed part of profits in a risk free asset, whereas no additional strategic investments would be made. The argument is that companies have already made all the desired profitable investments as they have had no constraints on using other sources of financing than the additional equity that is retained as a result of the effects of DPT.

None of the papers has, however, presented an empirical analysis of the impacts of DPT on companies' financial decisions. The present paper aims to fill this gap to the extent possible.

4. Data and Methodology

The empirical information has been extracted from the Estonian Commercial Registry's database for the period of 1995 to 2004. For every company, the data are included in the sample for these years for which the following criteria were met: (a) the company has been in no other status than "active" during the entire period of 1995 to 2004; (b) the company's financial information was available in sufficient level of detail; (c) all components of assets and liabilities were non-negative; and (d) the total of assets did not differ more than 10% from the total of liabilities and equity, in order to exclude observations with insufficient or evidently inappropriate data.

The following financial leverage and liquidity ratios are employed in this study for the purposes of characterising companies' financial decisions:

- LIABCAP is calculated as total liabilities divided by total capital as at the end of a given financial year. Total capital is defined as the aggregate of the book values of liabilities and equity, being equal to the book value of total assets. In this way, LIABCAP includes the impact of all kinds of external finance (financial services, trade creditors, etc) as well as both short- and long-term liabilities.
- LOANCAP is computed as loan liabilities divided by total capital. The difference between LIABCAP and LOANCAP is that the latter reflects the use of financial services.
- CASHCAP or cash ratio is cash divided by total capital. CASHCAP measures the company's ability to cover its liabilities by using the available cash balance only. In the context of this study, CASHCAP is an indicator of how much of the company's capital is kept as cash (as opposed to being used in the business operations).
- RETECAP is a ratio of retained earnings to total assets. RETECAP is a combined indicator of past profitability and dividend policy, showing how large is the share of undistributed earnings (and any other equity items besides share capital) in total capital employed.

It has to be noted that the above indicators are based on book values instead of market values. Liabilities as presented in the balance sheet might include a significant amount of accrued non-cash liabilities, thus distorting the capital structure analysis. Also, the balance sheet information does not reflect the maturity structure of assets and liabilities and consequent value implications. Moreover, there tend to be significant differences between companies' book and market values of equity. Market values of debt and equity were, however, not available for the companies in the sample.

For the purposes of excluding noisy observations from the sample, the following additional inclusion criteria have been used in respect of each observation:
- $0 \le LIABCAP < 100$,
- $0 \le LOANCAP < 100$,
- $0 \le LTLICAP < 100$,
- $0 \le CASHCAP \le 1$, and
- $-100 < RETECAP \le 1$.

The sample includes companies from all the main industries, but excludes the financial sector entities, sectors with significant involvement of state financing, like defence, education and healthcare, as well as some exceptional business activities.

As the financial variables are in the form of ratios, the number of employees (EMPL) has been used as a rough control variable of company size in the study. In order to capture the specifics in companies' financial behaviour during different

stages of development, company age variable (AGE) has been included as a control variable. AGE measures the number of years from incorporation to the observation. Also, a company legal type indicator as a binary control variable has been incorporated into the analysis. Type A stands for stock corporations ("*aktsiaselts*") and type B stands for limited liability companies ("*osaühing*"). This grouping seeks to distinguish companies that have positioned themselves as large from those that have chosen the (usually procedurally easier) legal form aimed at smaller companies. Companies of all other legal forms than type A and B (e.g. agricultural unions, non-profit organisations, and private entrepreneurs) have been excluded from the analysis.

After employing all the above inclusion criteria, the sample used for the empirical analysis covers 27 thousand observations.

Macro level control variables used in this research are real GDP growth (GDPGRO) and annual change in the share of private credit in GDP (dCREGDP). The latter is an indicator of the speed of financial deepening and is used in the study in order to roughly exclude the consequences of rapid lending growth in Estonia during the years under review. The macro variables have been extracted from the International Financial Statistics Yearbook (2006) by IMF.

In order to test the hypothesis and assumptions by Hazak (2007a,b), descriptive statistics and panel data regression analysis with consideration of companies' heterogeneity of variance in random effects and employing robust standard errors have been used as the methodology for the research.

5. Results

First, a comparative analysis of sample companies' mean average RETECAP as an indicator of dividend policy for the observations under GPT compared to those under DPT was performed. Figure 1 illustrates the results.

Figure 1. Mean Average RETECAP
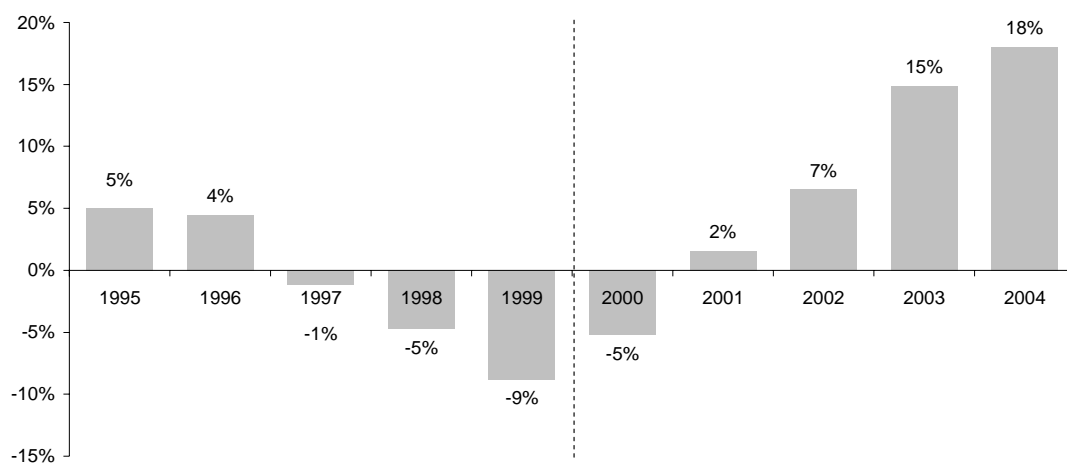
Author's illustration

It can be noted that the average share of retained earnings in total capital exhibited a monotonously decreasing trend under GPT, but turned into a monotonous increase starting from 2000. The results are robust for different industries. Such

findings indicate clearly that under DPT companies retain more profits undistributed than they would do under GPT.

Second, an analysis of the sample companies' mean average leverage indicators (LIABCAP and LOANCAP) of the observations from 1995 to 1999 (i.e. under the GPT system) compared to those of the observations from 2000 to 2004 (i.e. under DPT) was performed. The results in respect of LIABCAP are illustrated on Figure 2.

**Figure 2. Mean Average LIABCAP**
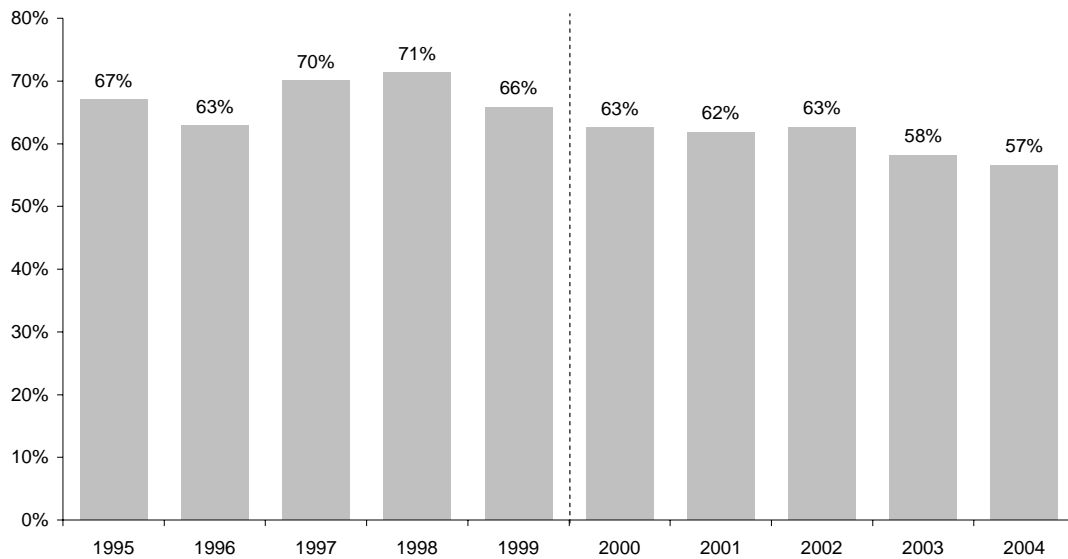
Author's illustration

In the conditions of DPT, as opposed to the years under GPT, there has been a decreasing trend in the share of liabilities in total capital. This trend is robust on cross-industry basis. The decrease in the share of external financing may be explained by the tax costs associated with dividend payment having led companies to retain more profits undistributed under DPT, thus providing an alternative to external liabilities as a source of financing.

Figure 3 illustrates the trend in the sample companies' use of debt. Mean average LOANCAP of the observations exhibits a monotonously decreasing trend under DPT, in contrast to the GPT period until 1999. The increase in average LOANCAP in the first periods may be explained by economic growth, rapid financial deepening and decreased interest rates having a positive impact on the use of debt financing (and external financing in general). The following decrease may be due to the adverse impact of DPT on the use of debt financing, whereas companies started to retain more profits under DPT. However, there are cross-industry variances in the dynamics of average LOANCAP.

6

Figure 3. Mean Average LOANCAP
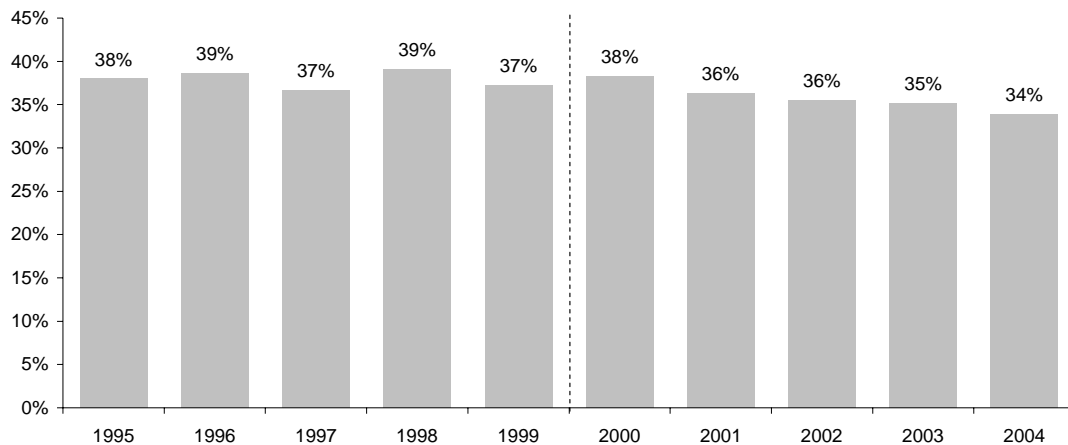
Author's illustration

As an initial result, the above descriptive statistical analysis gives some support to the hypothesis by Hazak (2007a) that the use of external finance is relatively lower under the DPT system in comparison to the GPT system, however, drawing to the need to substantiate the results with multi-variate panel regression analysis, as presented below.

Figure 4. Mean Average CASHCAP
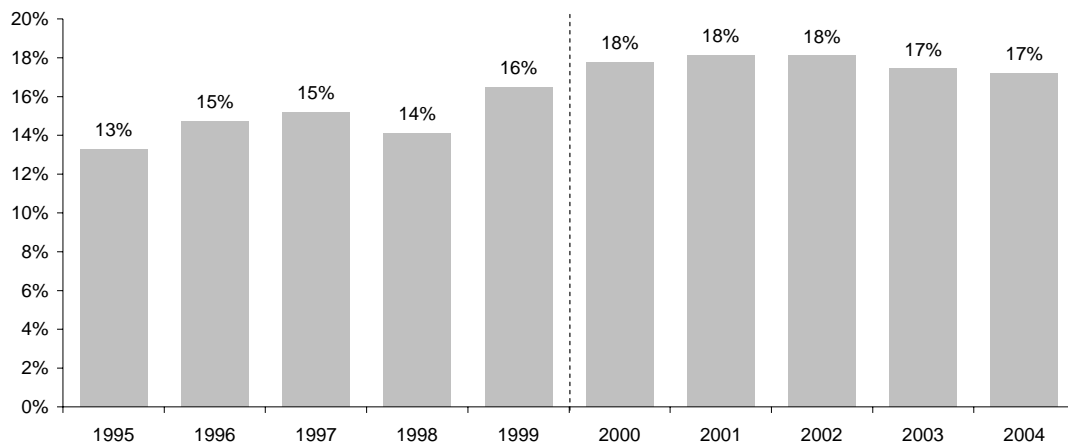
Author's illustration

Third, a comparative analysis of sample companies' mean average CASHCAP under GPT and DPT was performed. Figure 4 illustrates the results. That profits retained in the company due to the effects of DPT do not lead to additional strategic investments but in the accumulation of liquid assets (risk free investments) is an assumption by Hazak (2007b). CASHCAP is one of the indicators capturing these relations. It appears that the average share of cash in total assets of the sample companies increased under DPT from 2000 to 2004, as opposed to the decreasing trend under GPT over 1995 to 1999. The outcome is robust for all the industries concerned and supports the Hazak (2007b) model. The results may be explained by the higher retained profits under DPT, leaving cash into the companies, and the

unavailability of acceptable additional investment opportunities into the business, whereas the profitable investments have been made anyway by using either equity or external finance.

In order to substantiate the results of descriptive statistics, regression analysis models incorporating several important control variables were constructed. Outputs of the regression models are summarised in Table 1.

Table 1. Regression Models

Variable	RETECAP	LIABCAP	LOANCAP	CASHCAP
Tax system DPT = 1, GPT = 0	3.437 *** (6.7)	-5.146 *** (-8.5)	-3.340 *** (-4.4)	1.345 *** (3.8)
Company legal type A = 1, B = 0	-0.728 (-1.4)	-5.428 *** (-8.8)	-5.213 *** (-7.5)	-5.836 *** (-17.9)
AGE	1.425 *** (21.5)	-1.631 *** (-19.6)	-1.414 *** (-15.2)	-0.205 *** (-4.2)
EMPL	0.012 *** (3.1)	0.001 (0.5)	-0.013 *** (-4.6)	-0.008 *** (-4.7)
GDPGRO	-0.267 * (-4.9)	0.084 *** (1.3)	0.191 ** (2.4)	-0.017 *** (-0.4)
dCREGDP	1.625 *** (21.1)	-1.102 *** (-12.4)	-0.756 *** (-6.9)	0.270 *** (5.0)
Constant	-8.378 *** (-8.5)	81.717 *** (77.7)	59.624 *** (48.1)	18.679 *** (25.6)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Model statistics:				
Chi square	2,721	1,774	1,279	953
R square	0.098	0.093	0.148	0.066
No of observations	24,041	26,610	12,462	26,590

*Note: Statistical significance levels marked as *** ($\alpha < 0.01$), ** ($\alpha < 0.05$) and * ($\alpha < 0.1$); t-statistic in brackets*

RETECAP, LIABCAP, LOANCAP and CASHCAP are introduced as dependent variables into respective four regression models. Tax system (DPT versus GPT) is employed as the key independent variable. The control variables used are legal type of the company, the company's age, number of employees, annual GDP growth and annual change in the share of private credit in GDP, as well as the industry and year dummies. In this way, the impact of these micro and macro level variables is excluded and the impact of the change in the tax system from GPT to DPT can be identified with a higher level of precision.

Outputs of the regression models show that there is a significant impact of DPT on companies' dividend decisions. The change of the taxation system from GPT to DPT has brought along an increase of 3.4 percentage points in the share of retained earnings in the sample companies' total capital employed. The result is statistically significant. The tax costs associated with dividend payment appear to have led companies to keep more profits undistributed under DPT.

The regression models show that companies' use of external financing tends to be relatively lower under DPT in comparison to the GPT system. The change of the taxation system to DPT appears to have caused a decrease of 5.1 percentage points in the share of liabilities in the sample companies' total capital. The share of loan liabilities in total capital of the sample companies appears to have decreased by 3.3 percentage points as a result of introducing the DPT system. These results exhibit strong statistical significance and give direct support to the hypothesis by Hazak (2007a) that companies use less external finance in their total capital under DPT than they would do under GPT. The relatively smaller effect of DPT on debt financing (LOANCAP) in comparison to the impact of the change in the tax system on total external financing (LIABCAP) may be explained by differences in companies' preference for debt and equity financing. As theoretically argued in Hazak (2007a), only these companies that normally prefer debt to equity (due to its lower cost) are expected to use less debt under DPT, while these companies that prefer equity to debt, do not demonstrate the decrease in debt financing as they would use as little debt as possible regardless of the tax system being DPT or GPT. Therefore the empirical finding that LOANCAP is less affected by the change in the tax system than LIABCAP is consistent with the theory by Hazak (2007a). Also, early termination of loans might be associated with costs that exceed the motivating effects of DPT.

As regards CASHCAP, the regression model demonstrates that the average share of cash in total assets of the sample companies appears to have increased by 1.3 percentage points as a result of changing the tax system from GPT to DPT. This relation appears to be statistically strongly significant. Such a finding supports the assumption by Hazak (2007b) that profits retained in the company due to the effects of DPT lead to the accumulation of risk free assets. The higher undistributed profits and the unavailability of profitable investment opportunities may be among the reasons why companies leave more cash into the companies under DPT. In this way DPT appears to have a positive impact on companies' liquidity, whereas the drawback is the allocation of available funds into inefficiently large cash balances.

6. Conclusions

Estonia employed a traditional gross profit based taxation (GPT) system until 1999 and has experimentally used a distributed profit taxation (DPT) regime since 2000. The empirical analysis of the effects of DPT on companies' financial decisions presented in this paper is based on a sample of 27 thousand observations of Estonian companies over the period of 1995 to 2004.

Results of the regression analysis with the incorporation of various micro and macro level control variables indicate that the change of the taxation system from GPT to DPT has brought along an increase of 3.4 percentage points in the share of retained earnings in the sample companies' total capital employed. The tax costs associated with dividend payment appear to have led companies to keep more profits undistributed under DPT.

Profits retained in the company due to the effects of DPT appear not necessarily to lead to additional strategic investments, but to the repayment of liabilities and accumulation of liquid assets instead. The study finds that companies' use of external financing tends to be relatively lower under a DPT system in comparison to the GPT system. The change of the taxation system to DPT appears to have caused a decrease of 5.1 percentage points in the share of liabilities in the sample companies' total capital. The share of loan liabilities in total capital of the sample companies decreased by 3.3 percentage points as a result of introducing the DPT system.

Average share of cash in total assets of the sample companies appears to have increased by 1.3 percentage points as a result of changing the tax system from GPT to DPT. The results may be explained by the higher retained profits under DPT, leaving cash into the companies, and the unavailability of acceptable additional investment opportunities into the business, whereas the profitable investments have been made anyway by using either equity or external finance.

Overall, as a result of higher cash balances and lower exposure to risks related to excessive use of loans and other external financing facilities, DPT appears to have a positive impact on companies' liquidity and sustainability. However, the downside effect of this taxation system appears to be the allocation of some of the available funds into cash as a potentially inefficient way of investment.

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Appendix 4

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Hariduskäik:

Alates 2003   Tallinna Tehnikaülikool
               Majandusteaduskond
               Doktoriõpe finantsökonoomika erialal

2000–2002   Tallinna Tehnikaülikool
               Majandusteaduskond
               Majandusteaduste magistri kraad rahvamajanduse erialal

1996–2000   Tallinna Tehnikaülikool
               Majandusteaduskond
               Sotsiaalteaduste bakalaureuse kraad rahvamajanduse erialal
               (cum laude)

Teenistuskäik:

Alates 1998   AS PricewaterhouseCoopers Advisors

               Ametikoht: *Transactions & Crisis Management* valdkonna
               juhtivkonsultant (alates 2005), vanemkonsultant (2003 – 2005),
               konsultant (2000 – 2003), assistent (1998 – 2000)

Alates 2005   TTÜ Majandusuuringute Teaduskeskus

               Ametikoht: erakorraline teadur (osalise koormusega)

Teadustegevus:

2007   Eesti Pank, Majandusuuringute osakond

               Külalisuurija; uurimisteema „Ettevõtete jätkusuutlikkust
               mõjutavad tegurid: empiiriline uuring Euroopa Liidu andmetel"

Sügis 2006	Tel Aviv'i Ülikool
	Uurimistöö „Dividendiotsused jaotatud kasumi maksustamise tingimustes investori seisukohalt", juhendaja prof. S. Benninga
Sügis 2005	Ateena Ülikool
	Uurimistöö „Jaotatud ja jaotamata kasumi maksustamine ning ettevõtete kapitali struktuur", juhendaja dr P. E. Petrakis
Alates 2006	Magistritööde juhendamine:
	Mari Mäe, majandusteaduste magistri kraad, 2006, „Ettevõtte kapitali struktuur seadusandlike piirangute tingimustes (Euroopa Liidu riikide andmete põhjal)", Tallinna Tehnikaülikool, Majandusteaduskond
	Andi Binsol, majandusteaduste magistri kraad, 2007, „Ettevõtete jätkusuutlikkuse hindamise mudelite rakendatavusest Eesti krediidiasutustes", Tallinna Tehnikaülikool, Majandusteaduskond
	Merle Rannala, majandusteaduste magistri kraad, juhendamisel, "Klasteranalüüsi rakendusi ettevõtete jätkusuutlikkuse hindamisel", Tallinna Tehnikaülikool, Majandusteaduskond

Täiendusõpe (valikuliselt):

1998–2007	Maksunduse, rahanduse, arvestuse ja majandusõiguse alased koolitused, PricewaterhouseCoopers (Eesti, Suurbritannia)
2007	*Company Valuation* CEMFI (Hispaania)
2006	*Economics of European Integration* TÜ ja TTÜ Majandusteaduse alane doktorikool (Eesti)
2005	*Understanding Exchange Rate Fluctuations* Stockholmi Kõrgem Majanduskool (Rootsi)
2004	*Understanding Financial Crisis* Oslo Ülikooli suvekool (Norra)

Keelteoskus:

Eesti keel	emakeel
Inglise keel	kõrgtasemel
Saksa keel	kesktasemel
Vene keel	kesktasemel
Hispaania keel	algtasemel
Kreeka keel	algtasemel
Rootsi keel	algtasemel

CURRICULUM VITAE

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Education:

2003 to date   Doctoral studies in financial economics
                 Tallinn University of Technology
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2000–2002   Master of Arts in Economics
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1996–2000   Bachelor of Arts in Social Sciences (*cum laude*)
                 Tallinn University of Technology
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Employment:

1998 to date   AS PricewaterhouseCoopers Advisors

                 Post: Transactions & Crisis Management service line, manager
                 (2005 to date), assistant manager (2003–2005), senior associate
                 (2000–2003), associate (1998–2000)

2005 to date   Tallinn University of Technology
                 Centre for Economic Research

                 Post: Researcher (part-time)

Scientific work:

2007   Bank of Estonia, Department for Economic Research

                 Visiting researcher, research topic "Indicators of Corporate
                 Default – An EU Based Empirical Study"

Autumn 2006   Tel Aviv University

Research on "Dividend Policy Under Distributed Profit Taxation: Investor's Perspective", adviser Prof. S. Benninga

Autumn 2005   University of Athens

Research on "Profit vs. Distributed Profit Taxation and Companies' Capital Structure", adviser Dr. P. E. Petrakis

2006 to date   Supervision of master theses:

Mari Mäe, M.A. in Economics, 2006, "Companies' Capital Structure Under Legal Constraints (EU Based Empirical Survey)", Tallinn University of Technology

Andi Binsol, M.A. in Economics, 2007, "Applicability of Corporate Sustainability Models from the Perspective of Estonian Financial Institutions", Tallinn Univ. of Technology

Merle Rannala, M.A. in Economics, ongoing supervision, "Applications of Cluster Analysis in the Evaluation of Companies' Sustainability", Tallinn University of Technology

Special courses (selected events):

1998–2007   Courses on taxation, finance, accounting and business law
PricewaterhouseCoopers (Estonia, United Kingdom)

2007   Company Valuation
CEMFI (Spain)

2006   Economics of European Integration
Doctoral School in Economics (Estonia)

2005   Understanding Exchange Rate Fluctuations
Stockholm School of Economics (Sweden)

2004   Understanding Financial Crisis
Oslo University Summer School (Norway)

Languages:

Estonian   native
English   fluent
German   fair
Russian   fair
Spanish   basic
Modern Greek   basic
Swedish   basic

Publications (selected):

1. Articles in international journals:

Hazak, A., 2007. *Profit versus Distributed Profit Based Taxation and Companies' Capital Structure*. Forthcoming in: International Journal of Entrepreneurship and Innovation Management, 18 p. (ETIS 1.2; indexed in EBSCO)

Hazak, A., 2007. *Dividend Decision Under Distributed Profit Taxation: Investor's Perspective*. International Research Journal of Finance and Economics, No. 9, pp. 201–219 (ISSN: 1450-2887) (ETIS 1.2; indexed in EBSCO, EconLit, e-JEL and other databases)

2. Conference proceedings:

Hazak, A., 2007. *Empirical Analysis of Capital Structure and Dividend Decisions Under the Distributed Profit Taxation Regime of Estonia*. Forthcoming in: Articles from the 3rd international conference "Baltic Business and Socio-Economic Development", Berliner Wissenschafts-Verlag, 11 p. (ETIS 3.1)

Hazak, A., 2007. *Financial Decisions Under Distributed Profit Taxation*. Global Business & Economics Anthology. Business & Economics Society International, Vol. 2, pp. 404–413 (ISSN: 1553-1392) (ETIS 3.2)

Hazak, A., 2007. *The Impact of Certain Tax And Legal Matters on Companies' Capital Structure: EU Based Empirical Survey*. Articles from the Annual Conference 2007. Estonian Economic Association, Tallinn, pp. 9–48 (ISSN: 1736-4981) (ETIS 3.5)

Hazak, A., Mäe, M., 2007. *Legal Constraints on Companies' Capital Structure: EU Based Empirical Survey*. Proceedings of the 7th International Scientific Conference "Entrepreneurial Finance and Financial Environment", Tartu, pp. 118–135 (ISBN: 978-9949-11-547-1) (ETIS 3.5)

Hazak, A., 2006. *The Impact of Thin Capitalisation Rules and Dividend Restrictions on Companies' Capital Structure*. Advances in Economics: Theory and Applications, Vol. 2, Selected Proceedings of the 2nd International Conference on Business, Management and Economics, Izmir, pp. 239–256 (ISBN: 975-6339-06-3) (ETIS 3.4)

Hazak, A., 2006. *The Impact of Profit Based Corporate Taxation on Companies' Capital Structure versus that of Distributed Profit Based Corporate Taxation*. Articles from the Annual Conference 2006. Estonian Economic Association, Tallinn, pp. 129–156 (ISBN: 978-9949-13-974-3) (ETIS 3.5)

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Managerial, Financial, Fiscal, Transaction Cost and Consumer Perspectives in the Era of Globalisation, pp. 575–590. Athens: Athens Institute for Education and Research (ISBN: 960-88672-5-8) (ETIS 3.2)

Hazak, A., 2006. *The Impact of the Differences in Corporate Tax Systems and Thin Capitalisation Rules on Companies' Financing Decisions*. Proceedings of the 4th Conference on Business Administration. Mattimar, Pärnu-Tallinn, pp. 13–36 (ISBN: 9985-844-17-3) (ETIS 3.5)

Hazak, A., 2005. *Macroeconomic Implications of Statutory Requirements on the Capital Structure of Companies*. Proceedings of the 13th Scientific Conference on Economic Policy. Berliner Wissenschafts-Verlag and Mattimar, Berlin-Tallinn, pp. 240–247 (ISBN: 9985-844-16-5) (ETIS 3.1)

3. Working papers:

Hazak, A., Männasoo, K., 2007. *Indicators of Corporate Default – An EU Based Empirical Study*. Working Paper Series, Bank of Estonia, No. 10/2007, 25 p. (indexed in EBSCO)

Hazak, A., 2007. *Companies' Financial Decisions Under the Distributed Profit Taxation Regime of Estonia*. Working Papers in Economics, Tallinn University of Technology, Vol. 22, No. 155, pp. 5–19 (ISSN: 1406-4982) (indexed in EBSCO)

Hazak, A., 2007. *Dividend Decision under Distributed Profit Taxation: Investor's Perspective*. Working Papers in Economics, Tallinn University of Technology, Vol. 20, No. 145, pp. 5–26 (ISSN: 1406-4982) (indexed in EBSCO)

Conference presentations:

Hazak, A., *Financial Decisions Under Distributed Profit Taxation*. 2007 Business & Economics Society International Conference, 16–20 July, 2007, Antibes, France

Hazak, A., *Empirical analysis of capital structure and dividend decisions under distributed profit taxation*. 3rd international conference "Baltic Business and Socio-Economic Development", 18–19 June, 2007, Tallinn, Estonia

Hazak, A., *The Impact of Certain Tax And Legal Matters on Companies' Capital Structure: EU Based Empirical Survey*. 2nd Annual Conference of the Estonian Economic Association, 12–13 January 2007, Pärnu, Estonia

Hazak, A., *The Impact of Thin Capitalisation Rules and Dividend Restrictions on Companies' Capital Structure*. 2nd International Conference on Business, Management and Economics, 15–18 June 2006, Cesme, Turkey

Hazak, A., *Profit Versus Distributed Profit Based Corporate Taxation, Thin Capitalisation Rules and Companies' Capital Structure*. 1st Annual Conference of the Estonian Economic Association, 20–22 January 2006, Pärnu, Estonia

Hazak, A., *Corporate Tax Systems, Thin Capitalisation Rules and Companies' Demand for Financial Services*. International scientific conference "Managing Global Trends and Challenges in a Turbulent Economy", 13–15 October 2005, Chios, Greece

Hazak, A., *The Impact of the Differences in Corporate Tax Systems on Companies' Demand for Financial Services*. 2nd International Conference on Small and Medium Sized Enterprises, 28–31 August 2005, Lefkada, Greece

Hazak, A., *Macroeconomic Implications of Statutory Requirements on the Capital Structure of Companies*. 13th Scientific Conference on Economic Policy, 30 June – 2 July 2005, Tartu-Värska, Estonia

Abstract

CAPITAL STRUCTURE AND DIVIDEND DECISIONS UNDER DISTRIBUTED PROFIT TAXATION

Theoretical models highlighting the impact of the differences between distributed profit taxation (DPT) and the classical gross profit taxation (GPT) on the capital structure and dividend decisions of companies are presented in this thesis. In addition, the thesis includes an empirical analysis of the effects of DPT on capital structure and dividend decisions, testing the assumptions and hypotheses in the theoretical sections.

DPT is the corporate taxation regime in Estonia, experimentally introduced since 2000. DPT denotes an uncommon taxation system, whereby corporate income tax is based on the amount of profit distributed (as dividends or any indirect distributions) to the company's owners during the taxation period. In this way DPT differs from the traditional GPT system under which corporate income tax is calculated on the basis of a company's profit earned during the taxation period.

The practical reason for undertaking the research is to understand and demonstrate the financial consequences of the DPT regime in Estonia. The results of the thesis may potentially lead to discussions on introducing a similar system in other jurisdictions or on modifying the corporate taxation principles in Estonia.

The thesis is based on three academic papers. The first paper is titled "Profit versus Distributed Profit Based Taxation and Companies' Capital Structure" and deals with the impacts of DPT on capital structure from a theoretical viewpoint. The second paper "Dividend Decisions Under Distributed Profit Taxation: Investor's Perspective" presents a theoretical analysis of dividend decisions within the conditions of DPT. A company operating under uncertainty is modelled in a binomial framework, including company and investor level taxes and investor's different consumption levels. The third paper is titled "Companies' Financial Decisions Under the Distributed Profit Taxation Regime of Estonia" comprising empirical analysis of the effects of DPT. The empirical study is based on a sample of 27 thousand Estonian company observations over a ten-year period in a broad range of industries.

The most important difference between the DPT and GPT systems is the timing of tax payments, while in essence the tax base under both taxation systems is gross profit. DPT as opposed to GPT is comparable to a government granting an interest free loan to companies. The government does not collect the corporate tax in the period when profit is earned, but gives a "tax credit" until the profit is distributed.

Under certain conditions some businesses or projects that would not generate sufficient returns under GPT might be viable under DPT owing to the positive value effects of the postponed tax payments. However, the availability of such a

potential is largely determined by the company's dividend policy. Namely, if profits are decided to be fully distributed when earned, the company value for the investor under DPT and GPT is equal.

The underlying conditions for deciding upon the optimal timing of dividends are different under the two systems. One of the aims of introducing DPT in Estonia was motivating companies to reinvest the profits earned instead of paying them out as dividends. Although in general DPT appears to motivate companies to retain more profits than they would under GPT, interestingly, the theoretical analysis shows that retaining all the profits in the company is never the only optimal payout policy. Rather, the dividend decision appears to be strongly focused on the investor's consumption preferences as well as on the probability and extent of future losses.

An important feature of the DPT system is that the timing of dividend payments and thereby tax payments is at the discretion of the investors. This gives additional flexibility to investors, but may lead to emotional decisions by the investors to retain profits instead of paying them out as dividends in order to postpone tax payments, although retaining of the profits may not be the optimal solution from a financially rational perspective.

The results of the empirical regression analysis, where various micro and macro level control variables were incorporated, indicate that the change of the taxation system from GPT to DPT has brought a significant increase in the share of retained earnings in the sample companies' total capital employed. The tax costs associated with dividends appear to have led companies to keep more profits undistributed under DPT, an expected result in view of the theoretical argument.

Profits retained in the company due to the effects of DPT appear not necessarily to lead to additional strategic investments, but instead to the repayment of liabilities and accumulation of liquid assets. The study finds that company use of external financing tends to be relatively lower under DPT in comparison to the GPT system, supporting the theoretical results of the thesis.

The average share of cash in total assets in the sample companies appears to have increased as a result of changing the tax system from GPT to DPT. These results may be explained by the higher retained profits under DPT, leaving cash in the companies, and the unavailability of acceptable additional opportunities to invest in the business, although profitable investments were made anyway using either equity or external finance.

Overall, as a result of higher cash balances and lower exposure to risks related to excessive use of loans and other external financing facilities, DPT appears to have a positive impact on liquidity and sustainability. However, the downside effect of this taxation system appears to be the allocation of some of the available funds as cash as a potentially inefficient way of investment.

Kokkuvõte

KAPITALI STRUKTUUR JA DIVIDENDIOTSUSED JAOTATUD KASUMI MAKSUSTAMISE TINGIMUSTES

Käesolevas väitekirjas on esitatud teoreetilised mudelid ettevõtte kapitali struktuuri ja dividendiotsuste kujunemise kohta jaotatud kasumi maksustamise (DPT) tingimustes võrrelduna klassikalise puhaskasumi maksustamise (GPT) süsteemiga. Lisaks on töös tutvustatud empiirilise analüüsi tulemusi kapitali struktuuri ja dividendiotsuste kujunemise kohta DPT tingimustes, kontrollimaks teoreetilises osas tehtud eelduste ja esitatud hüpoteeside paikapidavust.

DPT näol on tegemist Eestis alates 2000. aastast rakendatava ettevõtete tulumaksusüsteemiga. DPT raames kuulub maksustamisele ettevõtte omanikele maksustamisperioodi vältel jaotatud kasum (nii dividendide kui muude kasumi-eraldiste vormis). DPT erineb seega oluliselt traditsioonilisest GPT süsteemist, kus tulumaks arvestatakse ettevõtte maksustamisperioodi puhaskasumilt.

Töö praktiliseks eesmärgiks on esile tuua Eesti DPT süsteemi mõjud ettevõtete finantsotsustele. Uurimistulemused võivad viia aruteludeni sarnaste maksustamispõhimõtete juurutamise üle teistes riikides aga ka võimalike muudatuste vajaduse üle Eesti tulumaksusüsteemis.

Väitekiri põhineb autori kolmel teadusartiklil. Esimene neist kannab pealkirja "Jaotatud ja jaotamata kasumi maksustamine ning ettevõtete kapitali struktuur" ning selles esitatakse teoreetiline käsitlus DPT mõjude kohta ettevõtete kapitali struktuurile. Teine artikkel, "Dividendiotsused jaotatud kasumi maksustamise tingimustes investori seisukohalt" tutvustab teoreetilist mudelit dividendiotsuste kujunemise kohta DPT süsteemis. Koostatud on binoommudel määramatuse tingimustes tegutseva ettevõtte kohta, võttes arvesse nii ettevõtte kui investori tasandi maksustamist ning investorite tarbimiseelistusi. Kolmas artikkel kannab pealkirja "Ettevõtete finantsotsused Eesti jaotatud kasumi maksustamise tingimustes" ning selles käsitletakse DPT finantsmõjude empiirilise analüüsi tulemusi. Empiiriline uuring põhineb Eesti erinevate tööstusharude ettevõtte valimil, hõlmates 27 tuhandet vaatlust kümneaastase perioodi vältel.

Olulisimaks erinevuseks DPT ja GPT süsteemide vahel on maksumaksete ajastus, samas kui sisuliselt on maksubaasiks mõlema süsteemi puhul ettevõtte puhaskasum. DPT omab võrreldes GPT-ga samalaadset mõju kui riigi poolt ettevõttele antav intressita laen. Riik ei nõua maksude tasumist mitte kasumi teenimisel, vaid alles kasumi jaotamisel, andes vahepealseks perioodiks "maksukrediiti".

Teatud eeldustel võivad DPT tingimustes tänu hilisemate maksumaksete positiivsele mõjule osutuda vastuvõetavaks investeeringud ettevõtetesse või projektidesse, mis GPT tingimustes kasumlikud ei oleks. Samas oleneb selliste võimaluste olemasolu suuresti dividendipoliitikast. Nimelt juhul, kui kasum

otsustataks jaotada samas perioodis kui see teenitakse, oleks ettevõtte väärtus DPT ja GPT tingimustes ühesugune.

Tingimused, mille põhjal dividendide optimaalse ajastuse üle otsustada, on DPT ja GPT puhul erinevad. Eestis DPT rakendamise üheks eesmärgiks oli motiveerida ettevõtteid kasumit reinvesteerima selle asemel, et kasum dividendidena omanikele välja maksta. Kuigi teoreetilise analüüsi põhjal ilmneb, et üldiselt ajendab DPT tõepoolest vähem dividende maksma, selgub huvitava tulemusena, et kogu kasumi jaotamata jätmine pole ühelgi juhul ainsaks optimaalseks dividendiotsuseks. Pigem osutuvad optimaalse dividendisumma üle otsustamisel määravateks investori tarbimiseelistused aga ka tulevaste võimalike kahjumite tõenäosus ja ulatus.

DPT süsteemi oluliseks tunnuseks on asjaolu, et dividendimaksete ja seega ka maksumaksete ajastus on investorite otsustada. See võimaldab investoritele täiendavat paindlikkust finantsküsimustes, kuid võib teisalt viia emotsionaalsete otsusteni jätta kasum jaotamata, et dividendimakseid edasi lükates maksude maksmist vältida, olgugi et selline käitumine ei pruugi olla ratsionaalne.

Empiiriline regressioonanalüüs, kus on arvesse võetud erinevate ettevõtte ja makrotasandi kontrollmuutujate mõjuga, näitab, et maksusüsteemi muutus GPT-lt DPT-le on kaasa toonud jaotamata kasumi osatähtsuse märkimisväärse suurenemise ettevõtete kogukapitalis. Võib järeldada, et kasumit jaotamata jätma ajendavad dividendide maksmisega kaasnevad maksud, mis on eelneva teoreetilise käsitluse valguses oodatud tulemuseks.

Selgub, et DPT mõjul jaotamata jäetud kasum ei leia alati väljundit täiendavate strateegiliste investeeringutena, vaid paljuski hoopis olemasolevate kohustuste tagasimaksmise ja likviidsete vahendite akumuleerumise näol. Empiiriline analüüs näitab, et võõrkapitali osatähtsus ettevõtete kogukapitalis on DPT tingimustes oluliselt madalam kui GPT puhul, mis kinnitab töös esitatud teoreetilisi seisukohti.

Ilmneb, et valimi ettevõtete keskmine raha ja pangasaldode osatähtsus kogukapitalis on maksusüsteemi muutuse tulemusena suurenenud. Sellist tulemust võib selgitada tõik, et DPT mõjul kasumi jaotamata jätmine tähendab raha jäämist ettevõttesse, samas kui aktsepteeritavad lisainvesteerimis-võimalused puuduvad, kuna tasuvad investeeringud on juba varasemalt kas oma- või võõrfinantseerimise arvelt tehtud.

Üldistatult selgub, et DPT omab positiivset mõju ettevõtete maksevõimelisusele ja jätkusuutlikkusele, kuna ettevõtete rahasaldod kujunevad suhteliselt suuremateks ning võimalikud riskid seoses ülemääraste kohustuste võtmisega väiksemateks. Samas võib DPT negatiivseks mõjuks pidada asjaolu, et osa finantsvahendeid suunatakse seisma sularahana või pangakontodele, mis ei pruugi olla otstarbekaim investeerimisotsus.